



Appendix

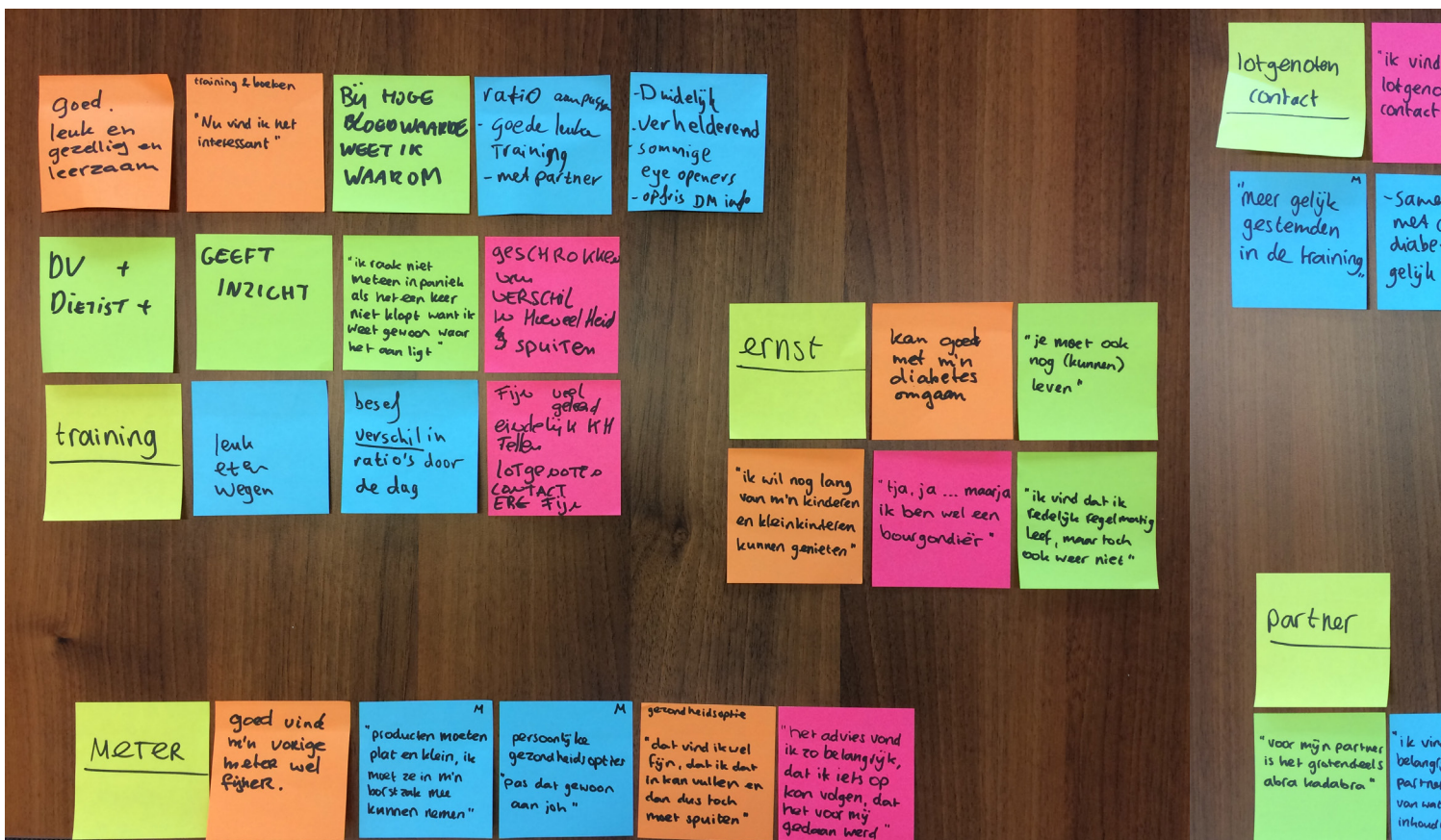
Estimating carbs

For improved diabetes self-management and a healthy everyday life

Myrthe Büskens

Appendix A - Clusters of session

This appendix presents the clusters made from quotes retrieved from sound record of the explorative session and from the post-its created during the timeline exercise.



het
ten
zo fijn

"Het maakt mij
onzeker als mijn
lichaam niet doet
wat de apparaten
verwachten"

meten
"bang om iets
fout te doen"

"nu voel ik me
zekerder"

(on)zekerheden

collega
ten /
geestend
en

**NOG BETERE
FINE TUNING
MOEIJ**

- onzeker,
dubbel op
meten
- meer moet
werk door
andere meter

informatie over kh ^M
"ik wil zeker
weten dat het
goed is"

voel me
ZEKERDER
Behalve bij
eten FRIET
PIZZA

oet dagboek

invullen van
dagboeken
lastig en
vervelend.

**INTENSIEF
VEEL
ADMINISTRATIE**

- veel werk
- " " "
- geen bijsturing
mogelijk

**RATIO
ZELFSTANNIG
AANPASSEN
DOE IK NIET**

- Beetje een
dal
- bijstellen via
DV
- soms sneller
met andere meter

in begin
beetje
onzeker

om duidelijk
wordt of
wa het eten
meten

nog steeds
5 x meten
redelijk blind
varen op
Bolus advies!

gebonden aan meter

"als je 1 keer niet
meet, merk je dat
de rest van de dag
in je advies

succes momenten
ik heb toch maar
gedaan wat de
meter zei
↳ dan ga je advies
opvolgen

"in het begin
was ik fatalistischer
want je ziet
meten resultaat"

"KH tellen is
eigenlijk niet
zo lastig"

kh tellen ^M
"heel veel dingen
weet je gewoon
maar het zijn de
uitzonderingen die
lastig zijn"

"je bent zo
gewend aan wat
je doet, maar
iemand kan de
tafel omdraaien"

"ik ben er heel
voorzichtig
mee, ik wil heel
strak zitten

KH tellen

"dan moet je weer
gaan omkeken,
dat is vervelend"

"de etilacten
kunnen beter"

khd - lijst
lookup

effect

**VERSLAVEND
AFHANKELIJK**

suwdsdien
afrijd 4x
meten/dag

het
dijke dat mijn
kraakst is
diabetes
t."

Appendix B - Estimation Case

This appendix presents the booklet handed out to the participants of the Estimation Case of cycle 2. It contains three exercises: estimating weight of food products, estimating carb ratio of food products and comparing pre-selected food products. This last comparison exercise was printed on A3 paper so the plates would be real size, making it easier to judge the food on how it looked.

Koolhydraten: schatten en meten



Inleiding

Ten eerste, ontzettend bedankt dat je mee doet aan deze sessie over koolhydraten!

Dit is een opdracht- en notitieboekje. Hierin staan de opdrachten uitgelegd en is er ruimte om de antwoorden op te schrijven en extra aantekeningen te maken. Je mag overal in dit boekje schrijven, tekenen en krabbelen, het hoeft niet netjes te blijven. Hoe meer informatie er uiteindelijk in staat hoe meer ik er aan heb.

Dit onderzoek valt binnen mijn afstudeeropdracht. Ik studeer Industrieel Ontwerpen aan de Technische Universiteit in Delft en ik voer mijn afstudeeropdracht uit bij Roche Diabetes Care. Mijn doel is om te onderzoeken hoe mensen met diabetes het bijhouden van koolhydraten thuis aanpakken en waar eventueel extra ondersteuning nodig is. Vervolgens zal ik iets ontwerpen wat deze ondersteuning kan bieden.

Dit boekje bevat 3 opdrachten die de komende dagen 4 keer uitgevoerd dienen te worden (1 keer per dag). Ben niet bang om iets 'fout' te doen tijdens het uitvoeren van de opdrachten. Vaak gaat het mij vooral om de redenatie achter een antwoord, zolang die er duidelijk bij staat is het antwoord voor mij goed. Na het uitvoeren van de opdrachten zal ik weer langskomen om te bespreken hoe het is gegaan en wat je er van vond.

Nogmaals bedankt voor je mederwerking en tot over een paar dagen!

Met vriendelijke groet,
Myrthe

Tips

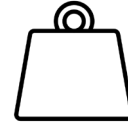


Gedurende deze week schieten je misschien dingen te binnen; verbeteringen of onhandigheden in het bijhouden van koolhydraten. Op deze twee pagina's kun je alles opschrijven/ tekenen / krabbelen wat in je opkomt als je denkt over wat er verbeterd kan worden aan jouw huidige situatie in het koolhydraten inschatten/meten.

Tips



Opdracht 1



In deze oefening zul je met gewicht aan de gang gaan. Het doel is om zelf te leren voelen hoe zwaar iets is i.p.v. dat de weegschaal dit doet.

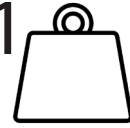
1. Pak 4 eetbare producten die je in huis hebt
2. Leg ze opvolgorde van licht naar zwaar
3. Maak een foto van de producten en stuur naar mij (06-83388825)
4. Schat nu in hoe zwaar je denkt dat de producten zijn. Schrijf de naam van de producten hiernaast op en schrijf erbij hoeveel gram je denkt dat ze wegen:

Voorbeeld:

druif	paasei	portie pasta	pompoen
<hr/>	<hr/>	<hr/>	<hr/>
..... <u>2</u> gram <u>35</u> gram <u>300</u> gram <u>450</u> gram

Let op, dit is een voorbeeld, de gewichten zijn verzonnen

Antwoorden opdracht 1



Antwoorden dag 1: 24-05-2017

_____ gram _____ gram _____ gram _____ gram

Antwoorden dag 2: 25-05-2017

_____ gram _____ gram _____ gram _____ gram

Antwoorden dag 3: 26-05-2017

_____ gram _____ gram _____ gram _____ gram

Antwoorden dag 4: 29-05-2017

_____ gram _____ gram _____ gram _____ gram

Opdracht 2



In deze oefening zul je met verhoudingen aan de gang gaan. Het doel is om een gevoel te krijgen bij welke producten veel of weinig koolhydraten bevatten.

1. Pak een eetbaar product en je weegschaal
2. Weeg 100 gram van dit product af. Leg de weegschaal en de rest van het product weg, dit heb je niet meer nodig voor deze oefening
3. Probeer nu in te schatten hoeveel gram van de 100 gram van het product uit koolhydraten bestaat. Snij/neem dit deel van het product af
4. Je hebt nu 2 delen van het product: het originele deel van de afgewogen 100 gram en de afgenomen hoeveelheid waarvan jij denkt dat het koolhydraten zijn. Maak een foto van beide delen naast elkaar en schrijf de inschatting hiernaast op:

Voorbeeld

mijn product:	Ik schat
.....pasta.....	...20... gram koolhydraten / 100 gram product

Let op, dit is een voorbeeld, de verhouding is verzonnen

5. Pak de weegschaal er weer bij en weeg het afgenomen deel
6. Vergelijk jouw verhouding met de verhouding op het etiket of op een koolhydraten lijst. Schrijf deze verhouding ook hiernaast op.

Antwoorden opdracht 2

Antwoorden dag 1: 24-05-2017

mijn product:

.....

Ik schat:

..... gram koolhydraten / 100 gram product

Ik meet:

..... gram koolhydraten / 100 gram product

Op het etiket staat:

..... gram koolhydraten / 100 gram product

Antwoorden dag 2: 25-05-2017

mijn product:

.....

Ik schat:

..... gram koolhydraten / 100 gram product

Ik meet:

..... gram koolhydraten / 100 gram product

Op het etiket staat:

..... gram koolhydraten / 100 gram product

Antwoorden opdracht 2

Antwoorden dag 3: 26-05-2017

mijn product:
.....

Ik schat:

..... gram koolhydraten / 100 gram product

Ik meet:

..... gram koolhydraten / 100 gram product

Op het etiket staat:

..... gram koolhydraten / 100 gram product

Antwoorden dag 4: 29-05-2017

mijn product:
.....

Ik schat:

..... gram koolhydraten / 100 gram product

Ik meet:

..... gram koolhydraten / 100 gram product

Op het etiket staat:

..... gram koolhydraten / 100 gram product

Opdracht 3



In deze oefening zul je je inzichten in gewicht en verhoudingen combineren en met referentiematen aan de slag gaan. Hieronder staan een aantal producten naast elkaar. Schrijf op hoe vaak jij denkt dat de hoeveelheid koolhydraten van het ene product in de hoeveelheid koolhydraten van het andere product past.

Voorbeeld: suikerklontjes in cola



Ik schat hoeveelheid suiker op:⁷.....gram

Ik schat hoeveelheid cola op:³⁰⁰..... gram

Ik schat dat: in de cola zit¹⁰..... keer zo veel koolhydraten dan in de suiker

Bord 1 aardappel met doperwten - dag 1 - 24 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



Ik schat de hoeveelheid aardappel op:gram

Ik schat hoeveelheid doperwten op: gram

Ik schat dat: de aardappel keer zo veel koolhydraten bevat dan de doperwten

Bord 2 pasta met tomatensaus - dag 1 - 24 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



Ik schat de hoeveelheid pasta op:gram

Ik schat hoeveelheid tomatensaus op: gram

16 Ik schat dat: de pasta keer zo veel koolhydraten bevat dan de saus

Bord 3 rijst met zoete ketjap - dag 2 - 25 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



Ik schat de hoeveelheid rijst op:gram

Ik schat hoeveelheid zoete ketjap op: gram

Ik schat dat: de rijst keer zo veel koolhydraten bevat dan de zoete ketjap

Bord 4 boterham met hagelslag - dag 2 - 25 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



Ik schat de hoeveelheid brood op:gram

Ik schat hoeveelheid hagelslag op: gram

18 Ik schat dat: de boterham keer zo veel koolhydraten bevat dan de hagelslag

Bord 5 tortilla met maïs - dag 3 - 26 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



Ik schat de hoeveelheid tortilla op:gram

Ik schat hoeveelheid maïs op: gram

Ik schat dat: de tortilla keer zo veel koolhydraten bevat dan de maïs

Bord 6 patat met ketchup - dag 3 - 26 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



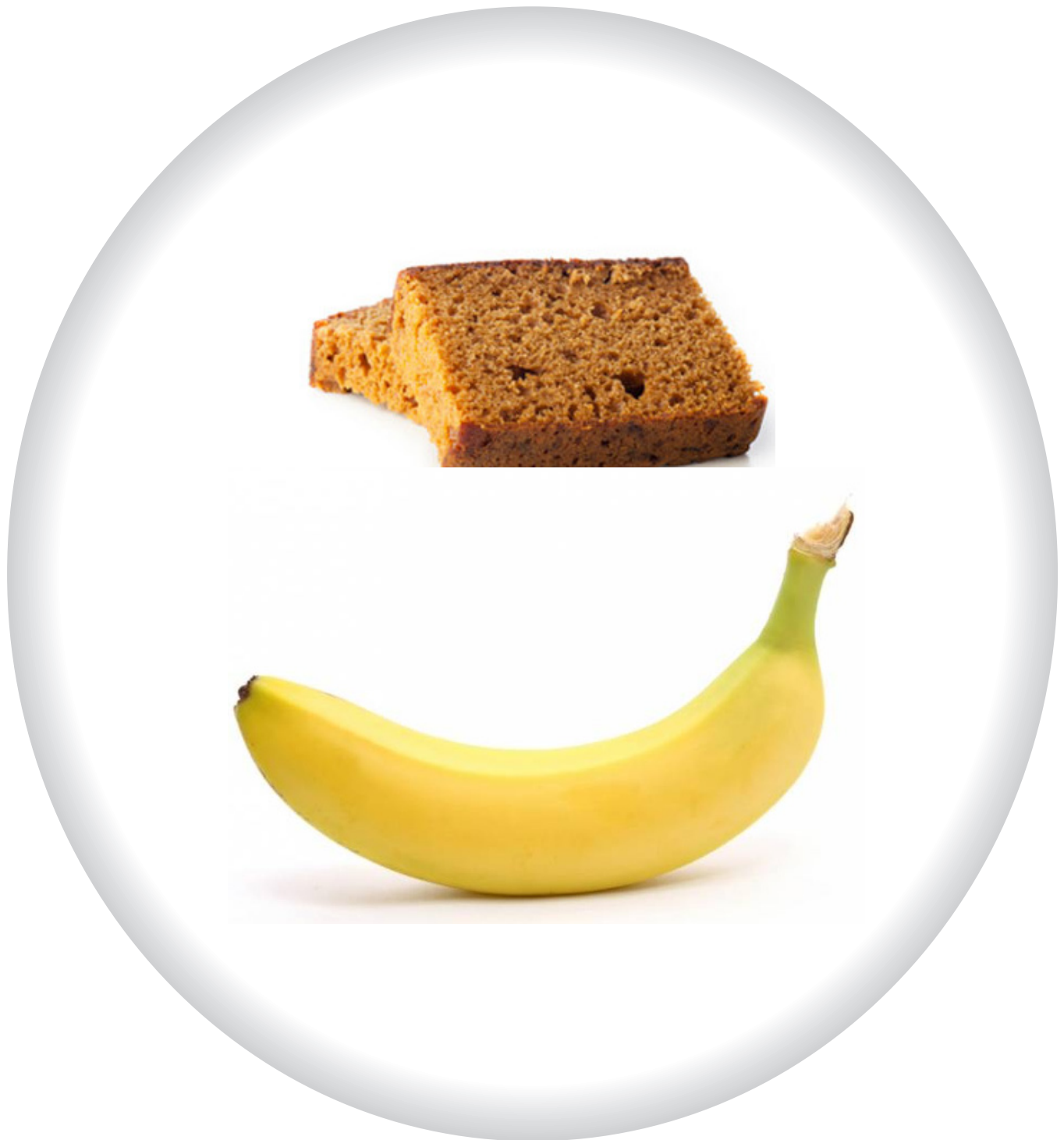
Ik schat de hoeveelheid patat op:gram

Ik schat hoeveelheid ketchup op: gram

20 Ik schat dat: de patat keer zo veel koolhydraten bevat dan de ketchup

Bord 7 banaan en ontbijtkoek - dag 4 - 29 mei 2017

Schat in wat de verhouding is in de hoeveelheid koolhydraten van de twee ingrediënten op het bord



Ik schat de hoeveelheid ontbijtkoek op:gram

Ik schat hoeveelheid banaan op: gram

Ik schat dat: de ontbijtkoek keer zo veel koolhydraten bevat dan de banaan

Appendix C - Accuracy Case

This appendix presents the booklet handed out to the participants of the Accuracy Case of cycle 2. The participants were to make distribution rulers of their ingredients after which they could place them in the accompanying weighing scale so the carb weight could directly be read from the scale.

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Tips



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Tips



Opdracht 1

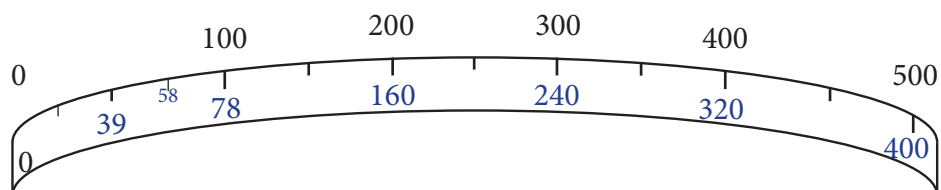


In deze opdracht ga je naar voedsletiketten kijken.

1. Pak een ingrediënt wat je vanavond gaat bereiden en eten
2. Kijk op het voedsletiket en schrijf hiernaast op hoeveel gram koolhydraten er per 100 gram in zitten

	VOEDINGSWAARDE PER		CIRC
	100 G	PORTIE	
	ONBEREID	150 G BEREID*	BENC
Energie	1464 kJ / 345 kcal	908 kJ / 215 kcal	11% • 300 • 2 ee • 1 ur
Vetten	0,0 g	0,0 g	0% • 1 ee
waarvan: verz. vet	0,0 g	0,0 g	0% • 200
enkelv. onverz. vet	0,0 g	0,0 g	0% • 600
meerv. onverz. vet	0,0 g	0,0 g	0% • 300
Koolhydraten	78,4 g	49,1 g	• 1 ee
waarvan: suikers	0,0 g	0,0 g	0% • 25 g
Vezels	1,7 g	1,1 g	• 50 g

3. Pak een lege weegschaal lineaal en schrijf dit getal bij de 100 gram. Voorbeeld:



4. Reken vervolgens om wat er bij andere streepjes moet staan
5. Maak een foto van je weegschaal lineaal en herhaal deze stappen voor alle ingrediënten waar koolhydraten in zitten

Antwoorden opdracht 1



Antwoorden dag 1: 22-05-2017

1. Mijn product is:

2. Op het etiket staat : gram koolhydraten/ 100 gram

Ruimte voor commentaar:

Antwoorden dag 2: 23-05-2017

1. Mijn product is:

2. Op het etiket staat : gram koolhydraten/ 100 gram

Ruimte voor commentaar:

Antwoorden opdracht 1



Antwoorden dag 3: 24-05-2017

1. Mijn product is:

2. Op het etiket staat : gram koolhydraten/ 100 gram

Ruimte voor commentaar:

Antwoorden dag 4: 25-05-2017

1. Mijn product is:

2. Op het etiket staat : gram koolhydraten/ 100 gram

Ruimte voor commentaar:

Opmerkingen / krabbels



Opdracht 2



In deze oefening ga je de hoeveelheid koolhydraten in je gerecht wegen met de ingevulde weegschaal lineaal. Let op of de linealen zijn ingevuld met bereide of onbereide ingrediënten.

1. Pak het ingrediënt waarvan je de koolhydraten wil weten, de bijbehorende ingevulde weegschaal lineaal en de weegschaal
2. Klik de lineaal in de weegschaal
3. Zet een bakje/bord op de weegschaal en draai de weegschaal op 0
4. Weeg af hoeveel je zelf wil gaan eten en weeg af hoeveel koolhydraten erin zitten
5. Schrijf het aantal gram hiernaast op
6. Herhaal dit voor elk product waar koolhydraten in zitten en tel het totaal bij elkaar hiernaast op
7. Maak een foto van je optelling en alle gebruikte weegschaal linealen. Stuur alle foto's (etiketten, linealen en optelling) tussen 17:30 en 20:00 naar Helga Fluit, diëtiste in Medisch Centrum Haaglanden. Haar telefoonnummer is 06-43753321. Zij zal controleren of je het goed hebt gedaan en ze zal je laten weten of je de uitkomst kan gebruiken in je meter voor een bolusadvies.

Antwoorden opdracht 2



Antwoorden dag 4: 25-05-2017

Ingrediënt 1 : bevat gram koolhydraten

Ingrediënt 1 : bevat gram koolhydraten

Ingrediënt 1 : bevat gram koolhydraten

Ingrediënt 1 : bevat gram koolhydraten

_____ +

Totaal: gram koolhydraten

Opmerkingen

Appendix D - Manual Training Scale

This appendix presents the manual made for the participants of the user-test in cycle 4. During the first interview the exercise was practiced using real food but whenever the participant would get stuck this manual could be consulted.

Welkom bij de korte handleiding van de Training Scale. In een paar stappen wordt hier uitgelegd hoe je de Training Scale dient te gebruiken. Het doel van de Training Scale is om de gebruiker te trainen in het inschatten van koolhydraten in verschillende ingrediënten. De oefening die op deze weegschaal gedaan wordt bestaat uit het symboliseren van koolhydraten in het eten.



Deze Training Scale heeft 3 knoppen en 2 schermen:

De schuifknop aan de linkerkant is de knop waarmee je de Training Scale aan en uit zet.



Het linker scherm wordt gebruikt voor het weergeven van de koolhydraatratio (gram/100 gram ingredient) en het totale voedsel gewicht.



Het rechter scherm wordt gebruikt voor het weergeven van het koolhydraatgewicht.



De rechter knop is de reset knop. Door deze in te drukken zal de Training Scale alles vergeten en de gewichten op 0 zetten.



De roze middelste knop is de optel-knop. Door deze in te drukken zal de Training Scale voor je uitrekenen hoeveel gewicht er in totaal op de borden ligt (dus op beide borden) en dit op het linkerscherf weergeven. Hij rekent ook uit hoeveel koolhydraten er in totaal in al het eten zitten en zal dit op het rechter scherm weergeven. De koolhydraten worden berekend op basis van de ingestelde koolhydraatratios en kan dus verschillen van jouw inschatting op het rechter bord. Als je deze knop indrukt zullen de lampjes ook roze worden.



In 4 stappen wordt hier uitgelegd hoe je jezelf kan trainen in het inschatten van koolhydraten en hoe je bij de juiste hoeveelheid koolhydraten uit kunt komen.

Stap 1.



Zet de Training Scale aan met de schuifknop.



Als de Training Scale aan staat zullen de blauwe lampjes in een cirkel rondgaan. Dit betekent dat hij wil dat je aan de ring draait om een koolhydraatratio in te stellen.

Stap 2.

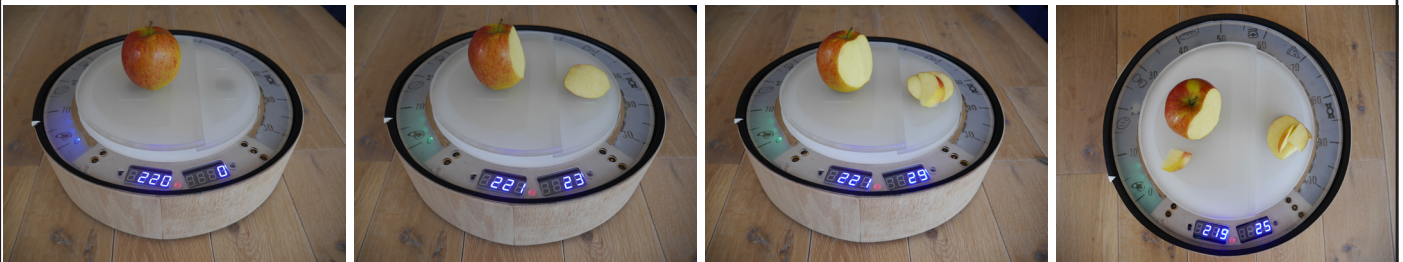


Stel de koolhydraatratio van een bepaald ingrediënt (deze is van een appel) in door aan de buitenkant aan de ring te draaien. Het getal (gram koolhydraten per 100 gram product) zal op het linker scherm worden weergegeven.



Als de ring op een plek blijft staan zal het getal verdwijnen. Op dit moment zullen beide schermen op 0 staan: er ligt geen gewicht op de Training Scale en hij is klaar voor het wegen van eten.

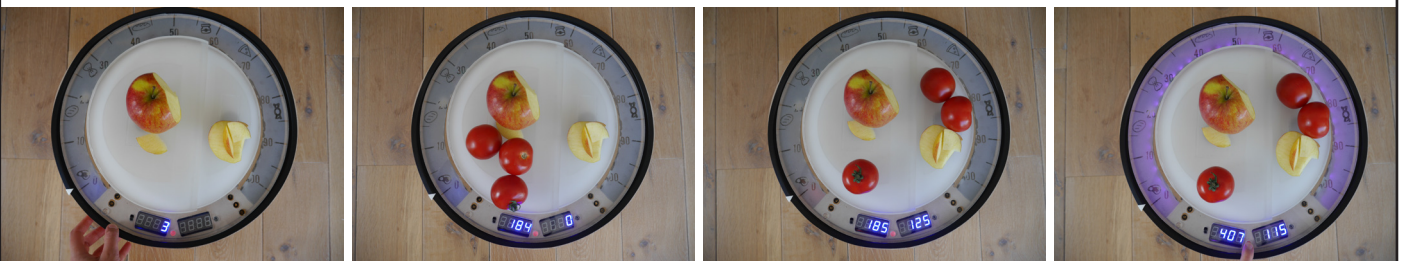
Stap 3.



Leg je eten op het grote bord op de weegschaal. Het scherm geeft aan hoeveel dit in totaal weegt. Schat in welk gedeelte van dit product uit koolhydraten bestaat en leg dit op het kleine bord. Het andere scherm geeft aan hoeveel gram dit is. Dit gewicht symboliseert het gewicht in koolhydraten van deze hoeveelheid van dit ingrediënt.

De kleur van de lampjes geeft aan of de inschatting klopt met de daadwerkelijke hoeveelheid koolhydraten in je eten: rood is fout en groen is goed. Hoe dichterbij de buurt van het goede antwoord hoe groener de lampjes zullen worden. Als de inschatting goed (genoeg) is zullen de lampjes groen gaan knipperen. Dit betekent dat het gewicht op het rechter scherm de correcte hoeveelheid koolhydraten van het opgeschepte eten weergeeft.

Stap 4.



Je kunt nu door naar een volgend ingrediënt. Door de ring op de nieuwe koolhydraatratio in te stellen zullen de gewichten weer op 0 gezet worden. De waarden van het vorige ingrediënt (de appel) worden opgeslagen voor later. Herhaal de oefening voor het nieuwe ingrediënt. Als de lampjes weer groen knipperen dan heb je de koolhydraten goed ingeschat.

Als je het totale gewicht van alle koolhydraten wil weten (dus in dit voorbeeld van de appel en de tomaten samen) kun je de roze knop ingedrukt houden. De schermen zullen dan het totaal gewicht van alle ingrediënten en het totaal gewicht van alle koolhydraten laten zien. In dit voorbeeld is de berekende optelsom van de koolhydraten minder omdat de tomaten overschat zijn (zie rode lampjes i.p.v. groene lampjes).

Appendix E - Interviews cycle 2

This appendix presents all interviews conducted during cycle 2.

First interview, first participant

Has diabetes since he is six years old and had started to determine his carbs since october 2016 when he participated in the BolusCal trainings.

- 1.1.1** I like to participate in this study and I am curious to what will come out of it. Because counting carbs is difficult and cumbersome and not nice. You depend on all kinds of apps that state certain carbs ratios for certain dishes. To make it easier I buy packages and pre packaged food because they have a food label stating exactly how many carbs are in them. And then it becomes easier to determine the carb content. In those cases I don't even need an app. Then I know this many carbs for this amount of potatoes for example and then I can estimate approximately for my own amount.
- 1.1.2** *What kind of app do you use?*
I use Fatsecret, is actually is a calory counter and it is a user app, meaning that everyone can save their dishes and data to the database. It also contains carb information. The things that I eat often I can usually find in here. But things such as pastas or baims remain difficult. And sometimes I wonder whether the carbs in the app are totally trustworthy. I should note that I am in discussion with my diabetes nurse about my insulin ratios being wrongly defined in the meter right now.
- 1.1.3** Actually I have been estimating carbs for 40 years now. Through experience and measuring mu blood glucose levels I know that I needs 14 units of insulin and if I eat a little more I need around 30 units. Usually this goes well but now the meter gives a very low advice especially in the evening which I don't trust. It makes me wonder whether my setting should be changed. But I can deal with it because I just add the units of insulin to the amount that I was used to. So I overrule the advice myself and that works fine for me. It doesn't match with my previous experiences.
- 1.1.4** *And this only happens in the evenings?*
Yes. In the morning I eat bread or oatmeal, it is always the same pattern and then I shoot around 22 units of insulin. In the afternoon I always eat bread with some bread platter, also always the same and then is always around 32 units. Sometime a morning like every other your body still reacts differently, but I don't think that you can prevent that. Usually everything goes well except for diner, then then advice is just too low.
- 1.1.5** *What was your motivation to join the BolusCal training?*
Mainly because I wanted to gain more control over mij blood glucose values. I didn't know what to expect honestly but in the end I thought, why not? If it will give me more insights than that will only make me better. And I still believe that. I a, still a big supporter of this method of managing diabetes. However, it is very essential that all the settings are correct.
- 1.1.6** *How is your experience until now with the new meter after the training?*
My experiences are very positive, it gave me a lot more insights. With my old meter I always used to estimate my meals, now I know how to approach it more accurately.
- 1.1.7** *What do find difficult about counting carbs?*
Well, I eat very regularly, so a lot I don't have to measure or calculate any more. At diner I experience difficulties, because the children come home and then it is already half past 7 and we need to eat quickly. So then we are in a hurry, I'll go and cook, the children will shower and then at some point you really want to eat. Then I don't take the time to check my carbs, I just estimate something en inject some insulin and usually this works fine. Counting carbs takes a lot of time and if you are in a hurry than I just guess something. In the beginning I would weigh and measure my food but now I do that a lot less. Once you get the feeling for carbs you don't the effort any more.
- 1.1.8** *If you guess, do you feel less secure?*
No, actually not. It is because I have diabetes for such a long amount of time and also because I measure my blood glucose values. As long as you measure often you can always reregulate your values and insulin.
- 1.1.9** *If you are not at home, what do you do then?*
Than I make estimations. If I go to a restaurant then I know that the biggest part of the meal will be meat, some vegetables maybe some sauce. So I should be extra careful with insulin and inject less than normal. I try to esti-

mate this beforehand but sometimes I have to adjust my levels later on.

- 1.1.10** *Do you always bring you diabetes products with you?*
No, I always leave them at home. My job doesn't involve physical exercise and I eat very regularly so I dare to leave it at home. I always bring my own lunch and eat the same type of food.
- 1.1.11** *If you wouldn't have had diabetes, would you eat differently?*
Actually, I don't know because I have never done it any other way. And once you start adjusting your eating patterns than you have to take this into account with your insulin. Now since this new meter I know more about carbs and I might be able to do it but before I would have made many mistakes.
- 1.1.12** *What did you struggle with during the first weeks after the training?*
That it took a lot of time. If you are alone than it is okay but if the children are here and they are sitting at the table and want to eat, then I had to weigh my food, calculate the carbs, measure my blood glucose values, ask for a bolus advice and inject insulin. Once I was done with that the children were already finished eating. I don't do all that any more now.
- 1.1.13** *So you weigh your prepared food?*
Yes. I find it easier to estimate what I have on my plate than what I have in the pan.
- 1.1.14** *What are you going to do tonight?*
Tonight I eat a meal from the freezer that I have prepared earlier. The main element is rice, some teriyaki, some vegetables and the meat I still have to prepare. The rice I will probably weigh, the sauce I will look at the food label and the rest I will estimate. It remain a global estimation.
- 1.1.15** *Can you show me what you normally do during the day with counting carbs?*
In the morning I already take into account everything that I will eat until lunch. The same goes for lunch. And in the evening I will use the app to look for information on carbs in dishes and ingredients and than for me it is more about the average. Actually my pattern is always the same. In the weekend I sometimes drink a glass of wine but I don't do anything for that, not even for 2 or 3 glasses of wine. In the weekend I rely more on how I feel. If I don't feel well then I just eat some chocolate, I won't even record that in the meter.
- 1.1.16** *What would make counting carbs more easy for you?*
A trustworthy app would be really helpful. Through the app I have gained insights in which products contain carbs. However, my app is very unclear about what kind of products, how many grams, what the preparation method is. So it really needs a thorough explanation. The knowledge can be improved but I don't know what would make counting carbs easier, you always have to take extra actions.

First interview, second participant

Second participant, first interview

Has diabetes since 2001 en has type 2. In february she joined a BolusCal training

- 1.2.1 *What was your motivation to join the carb training?*
My blood glucose levels are very hard to control so my diabetes nurse advised me that would start with checking my carb intake. I find it extremely difficult until now. It is very hard, I actually have no idea how many carbs are in food. And all those apps are not clear in what you eat how much carbs that contains.
- 1.2.2 *Do you get help from the hospital?*
No. The advice was to just start trying. I am supposed to guess and try and learn from that.
- 1.2.3 *Do you like this method?*
Well, I have received a list from the hospital containing information about carbs in food and this is what I use to determine my carbs. Because I have no idea how to do it otherwise.
- 1.2.4 *Do you think that you have improved since you started?*
Yes, I definitely have to inject less insulin. So that improvement at least is visible.
- 1.2.5 *And did you also start to measure your blood glucose values more?*
Yes, a lot more. Now I measure three times a day where I first only measured when the doctors needed something.
- 1.2.6 *What did you do previously with carbs?*
Nothing at all. I just shot constant amount of insulin and didn't do anything with carbs.
- 1.2.7 *How do you experience the change?*
I like it. Now I measure everyday and I can see how my levels change during the day. And if I don't feel so well than I can adjust my values my shooting more insulin. That is really nice.
- 1.2.8 *Do you now feel more sure about you diabetes?*
Yes, absolutely. I take the time now for diabetes.
- 1.2.9 *Did you find it annoying that you now have to take more time for diabetes?*
No, not at all. It has just become my new routine. It has also become more easier to share information with my diabetes nurse. That used to be all these extra actions.
- 1.2.10 *Were those extra actions the reason that you first did measure a lot?*
No, I don't think that that had anything to do with it. I saw measuring as an obligation. I thought to myself that I was already shooting regular amounts of insulin, why would I also want to record everything? Now I use the new meter the insulin amounts have become variable so now I have to record it. Since I use the new meter my values are not perfect yet but at least it has given me great overview.
- 1.2.11 *How do you handle counting carbs right now?*
Well, I only struggle with diner. Than I don't really know what to do and how many carbs it contains. I also struggle with that sometimes by eyes are bigger than my stomach. But when I have already injected insulin I have to finish eating.
- 1.2.12 *Does that mean you have become maybe more careful with shooting insulin?*
Yes, absolutely. I much rather inject too little than that I inject too much.
- 1.2.13 *What do you do during diner when counting carbs?*
I have received a list from the hospital that states how many carbs certain food contains per spoonful. So I think how many spoons I eat and that is the amount of carbs I eat.
- 1.2.14 *Do you also use apps for extra support?*
I used to, but now I have removed them from my phone again. They were not clear. My partner tried to help me several times. So now I just look at the list and guess a little carefully.
- 1.2.15 *Do you also look at food labels?*
Yes, once in awhile but not very often.

- 1.2.16** *And do you count the carbs of prepared or unprepared food?*
Prepared food. So I first cook, then put it on my plate and then I make an estimation. Often I forget and then I have to figure out later what I had eaten. Then I quickly get the list and do it anyway.
- 1.2.17** *What do you experience as most difficult?*
Well, there are things that are pretty easy such as potatoes, meat or vegetables. But some things are really difficult such as pasta and bamis. Those are ingredients that I don't eat very often and you prepare them in a special way. So those things I find really difficult to estimate with.
- 1.2.18** *Do you use the weighing scale sometimes?*
No, never.
- 1.2.19** *Why not?*
I don't really know. I have never done that so I don't really know how. On the list it just says how many spoons so it is easier for me. When you have diabetes there is already so much that you have to do but you want to do none of those things. Actually you are constantly trying to resist yourself against all that. Everyone can sit down at the table and start to eat but I first have to measure and inject. Also when we are in the restaurant I first have to walk to the toilet to measure and inject before I can eat. I really hate that.
- 1.2.20** *Do you also record snacks or fruit in your meter?*
No, actually not. I do eat it but I only record the three main meals.
- 1.2.21** *Do you ever take your meter with you to work?*
No, I always leave it at home. I make sure that I always have something of sugar on my. I had never thought about the banana I eat that that also influences by blood glucose levels. I just thought of it through your questions.
- 1.2.22** *How do you try to make an estimation?*
I look at the list and then I try to think what extra things I do with the food. Based on that I do a little more or a little less than is stated on the list.
- 1.2.23** *Does your husband help you with managing diabetes?*
No, that is completely my thing
- 1.2.24** *Are you secure right now about your diabetes?*
Yes, I know what I can do to manage it, when my levels are high I know what to do. However, I am still working on lowering my values.
- 1.2.25** *What could help you in counting carbs?*
It could be made more insightful with a better overview of how things work

First interview, third participant

Has diabetes since for 23 years, type 1. She participated in BolusCal in february.

- 1.3.1** *What was your motivation to participate in the carb training?*
My foot was my main motivation. I have a diabetes complication and the foot will only heal once I can control my blood glucose values.
- 1.3.2** *What do you do differently now compared to before the training?*
I measure more because I used to inject constant amounts of insulin. I used to measure once or twice a week. I would adjust things when I would eat fried for example.
- 1.3.3** *Do you still now determine a lot based on your feeling?*
No, if I eat something that I always look at the carbs and put that specific number in the meter. My breakfast and lunch are pretty much always the same. Then it becomes so standard that you always start injecting the same amounts of insulin.
- 1.3.4** *How do you calculate your carbs?*
For example tonight we eat pasta. All carbs of all ingredients I have added together and then portioned it to 5, because we are with 5 at home. Then I divide the weight by 5. I usually keep the pasta separately so I can weigh it. I have made a list of the main things I eat so I don't have to calculate every time. It won't be very precise but approximately will be good enough.
- 1.3.5** *Do you do this with prepared ingredients?*
Yes. I weigh what I put on my plate, so I know exactly what I eat. So I work from the pan to my plate and base my calculations on that.
- 1.3.6** *Where do you weigh?*
The weighing scale stand at the diner table with us because my daughters also have to weigh their portions. I determine beforehand what I will eat and I know that pretty well now without using the weighing scale.
- 1.3.7** *What did you struggle with with the new meter?*
The constant measuring, in the beginning I thought that I would be left with my fingers! At first I was also very confused by carbs, I thought I had to determine the calories. But now I know what to do.
- 1.3.8** *What did you struggle with while learning to count carbs?*
Constantly having to search for the right information and then calculating everything. There are so many different apps and pages but how do you find the right one? It would be nice if there was a list on which I can just choose my food and read the carbs. Now, I have to mediate between different apps all the time and it drives me crazy. I usually cook everything fresh so there are no food labels. This is exactly why I started my own list.
- 1.3.9** *How do you deal with eating situations away from home?*
When I order I first try to make an estimation of much carbs it would contain. But usually I wait till I get my plate and inject based on that.
- 1.3.10** *Do you feel secure them?*
Yes. I have been busy with diabetes and food for a long time now. Most of the carbs are in the starches and I almost never eat them. So that makes it a lot easier.
- 1.3.11** *So actually it seems that you are quite skilled already in counting carbs?*
Yes but it has been a huge struggle to come to this point. I have long resisted against having diabetes. I was under a lot of stress. Now since 2 years I finally understand that my blood glucose values are related to my stress levels. Since I was diagnosed with the complications of diabetes, my foot and my eyes, I was really shocked. It was the moment that I decided that things had to change for me.

First interview, fourth participant

Has diabetes for 23 years now, type 2. Has participated in BolusCal in february 2016.

- 1.4.1** *What did you do with carbs before receiving the new meter?*
I did sort of check them but I was on fixed amounts of insulin so I didn't use them for my therapy.
- 1.4.2** *What was your motivation to join the carb training?*
It was on advice of my diabetes nurse. At one of the check-ups we discovered that my values were way too high so she directed me to this course. I have accepted that I have diabetes a long time ago and from the first minute I have decided that it will not take over my life. I still want to be able to live in a nice way, to eat tasty and live flexible. Sometimes I meet people who don't dare to do anything anymore, well not for me.
- 1.4.3** *How much do you measure?*
Every day at least and I strive for 4 times a day. The weekends are difficult. I sometimes forget to bring my diabetes products with me.
- 1.4.4** *Would you say you handle your diabetes freely?*
Yes, I want to keep having fun. I mean to become very old with this disease and stay healthy for a long time. That is why I now take my bicycle to get to places. I know that I will never be cured but I can determine the quality of my own life.
- 1.4.5** *When during the day are you occupied with carbs?*
With every meal, I always count them. In the morning I know I always eat 20 carbs, actually it is 18 but I don't care about 2 grams. A small desert is also 20, actually most things turn out to be 20. A banana is maybe 30, through experience you learn all this. But if you are in a restaurant than you have to start guessing a little. Until this point it has turned out alright for me. However, I do find myself drinking a radler and never injecting insulin for this. While actually there are quite a lot of carbs in a radler.
- 1.4.6** *Do you try to determine a lot upfront when you are in a restaurant?*
Yes. Past sunday we went to a wok restaurant. I deliberately don't get the rice or bima, I know that I will go for food for around three times. And based on that I make an estimation. A birthday is also a difficult scenario. I have to eat cake, even if I don't want to, well in those cases I just adjust my values afterwards. You can't predict everything.
- 1.4.7** *Have you used a weighing scale in the beginning?*
No, I do have one but I don't use it.
- 1.4.8** *Do you use other tools to help you estimate your carbs?*
I use an app on my iPhone to look up carb information. Bu for instance a package of six cookies only contains a food label stating the amount of carbs per 100 grams. But then they don't also state how much one cookie weight. I find that such a shame.
- 1.4.9** *And what do you do then?*
Then I have to start estimating. I look at the packaging, determine how much all cookies weigh together, divide by the number of cookies. I find it out in the end but it takes me a lot more time and effort.
- 1.4.10** *Do you use the app for diner?*
Most of what I eat, I know already through experience. We eat a lot of vegetables, not so many potatoes. You inject for what you think you eat, one time this went wrong when my wife bought carb-free bread. I had no idea so injected way too much insulin. Yesterday we ate kip siam which contained rice. For me rice remain very difficult to estimate. Than it really comes down to guessing. But afterwards my blood glucose values turned out be inexplicably high. Actually this new meter has made me feel like a personally manned insulin pump.
- 1.4.11** *Do you ever feel insecure about the number of carbs you enter in your meter?*
No, not really. I find the meter really easy to use, you just have to keep measuring.

First interview, fifth participant

Has diabetes for 4 years and has been counting carbs since then.

- 1.5.1** *Did you ever do something with carbs before attending the training?*
Yes because I am a cook. So I know about carbs, fats and proteins and what they do.
- 1.5.2** *What was your motivation to join the training?*
I was directed by the hospital to this training, it was on their advice.
- 1.5.3** *How is your experience with the meter?*
It is fine. In the beginning I used to look at the book containing the carb information a lot. And to make it easier for myself I have erased some things from my diet. For example I don't drink lemonade any more.
- 1.5.4** *When are you occupied with carbs during the day?*
Before the meal I measure my blood glucose values and then I estimate my carbs, eat my dinner and inject. When I am at work I'm inclined to inject after I have eaten because it can happen that I don't have time to finish my plate.
- 1.5.5** *How do you make an estimation?*
This is based on my knowledge of the voedingsmiddelen tabel. There you can read how many grams per 100 grams. Usually this is the same for my meals because I repeat many dishes. Together with a dietician we have analysed my eating pattern based on that I inject insulin. If I eat something unfamiliar then I would first look it up in my table.
- 1.5.6** *How much do you look at the table?*
If it is twice a month that is a lot. I live a considerably regular life.
- 1.5.7** *Do you use a weighing scale?*
No, never. That costs a lot of time, and with all the little separate things I eat that makes no sense. The more actions it takes me, the less likely I will do it.
- 1.5.8** *Have you ever used a scale?*
Yes, in the beginning I used it to check for certain products how much 100 grams would be.
- 1.5.9** *Do you use other tools to support carb counting?*
No, none apart from the table. I don't think that I need it. I think that I live my life very consciously but I don't want to spend every minute of it thinking about diabetes. It won't let it control my life.
- 1.5.10** *How much do you measure?*
I strive for 4 times a day. At night before I go to sleep I check my values to check my long lasting insulin.
- 1.5.11** *How often do you have to adjust your values with extra insulin?*
Every day. Because everything I eat at night after dinner I don't adjust before I go to bed and I don't take that into account with my evening meal insulin. But I don't feel any worse by doing it like this so I just accept it and adjust at night.
- How do you do things when you are away from home?
I would never inject insulin in a bar or at friends. Then I would wait till I got home to adjust my values.
- 1.5.12** *What moments do you experience as difficult?*
When I drink alcohol I try to estimate more carefully. And when I go out for dinner and I don't know what I am going to eat that is really difficult. But, enjoying myself is more important for me than being exactly right with my values.
- 1.5.13** *Do you have a fixed pattern?*
I have a weekly pattern. So this means that my weekends are open but that my working days are always the same every week. Due to the cooking course, I eat at strange times. So whenever I feel hungry I will eat and I will adjust afterwards.
- 1.5.14** *How do you make an estimation?*
Well, I will think first how many of a product is 100 grams and then I try to adjust my meal then I will around 70

or 70 grams of carbs. I just do this on eyesight, I won't check this using a scale or something.

1.5.15

Do you estimate then with prepared or with unprepared ingredients?

I estimate before I eat. I cook my meal and since I live alone everything I cook is what I will eat. So I don't have to take other portions into account. I start with the basis from the table, but then 9 out of 10 times I will give it a twist and just guess what the carb content will be.

1.5.16

What would make things easier for you?

I can imagine that a list of carbs of regularly eaten food would be helpful. But I have noticed that often all meals are about the same amount of carbs. It all has to do with what you are used to.

1.5.17

Do you feel secure with how you handle diabetes now?

Yes. I don't strive to keep my blood glucose values at 5 all the time. My body will give a signal when it needs something, and right now I can make it through with enough energy. I can imagine that in the eyes of a diabetes nurse I don't behave well but I don't really care. It is not that I don't have the time to be more concerned with diabetes and carbs, it is more a form of laziness. I don't want to think about it all the time.

Second interview, first participant

2.1.1 *How did it go this week?*

I really enjoyed doing the exercises. I did find it difficult to make estimations, turned out afterwards when checking myself. It seems that often I am quite wrong which I found really surprising. It is difficult to assess weight by sight as well as by feeling. Sometimes I didn't even know which product would be heavier.

2.1.2 *Did you notice any improvement after doing the exercises for four days?*

Not really. Especially estimating weights I think needs a lot of practice if you want to be really good at that. And estimating the carb ratio is also difficult because you will always need the specific knowledge of that product, it is not something you can reason. This means that you have to continue with reading the food labels.

2.1.3 *How did you try to make an estimation?*

You try to consider the type of food. At the first exercise you only feel the product but with the second exercise you really start to look at the type of product and link this to either previous experiences or similar products. But you can see that I am still quite often wrong with those estimations. For instance blueberries I estimated them on 40 grams whereas they only contained 11. This is a big difference and probably caused by the fact that I didn't know blueberries and had never thought about them before. So I will have to start reading the food labels more actively. I also discovered that food labels are much more trustworthy than the app that I am using. I had never looked on the food label of rice before, I used to estimate that based on experience, but now it turned out that there was a big difference between the app and the food label. I also made a mistake with a mango. I thought it would contain much more carbs because it tastes so sweet.

2.1.4 *So you came upon some surprises that you still remember now?*

Yes, the exercise did create awareness with me that I should look more at food labels. This could help me make more accurate estimations, especially for things I am unfamiliar with.

2.1.5 *Did you encounter things that could make it easier for you to estimate carbs?*

Honestly, I would never really dare to rely on skills to assess weight or ratios based on my feeling. In wonder whether you could train yourself enough to make the results trustworthy enough for an accurate bolus advice. If you want to do it accurately you have to read food labels. Then I also have to admit that compared to weighing and calculating, I find reading food labels a less annoying task. But then again, potatoes and rice you have to weigh.

A better app would be really helpful, one that is trustworthy. Maybe the voedingscentrum should supply one that no one can adjust the database but that you can only add your products and dishes to your own database. It would save me the time to calculate dishes I have already once calculated.

2.1.6 *Before, did you ever make an estimation based on how the food looked?*

No, my estimation was purely based on my experience. I always eat the same amount of potatoes and I know that vegetables don't contain much carbs. It works fine for me. But even though it works fine I still would like to know more about carbs and how I can use them to control blood glucose.

2.1.7 *Would these exercises have helped you in your first weeks after the training?*

Yes, absolutely. It would have helped me in raising awareness of carbs in a very short time. With my way I used trial and error. This has been really helpful already to be aware now of going back to reading food labels.

2.1.8 *What do you think of food labels representing the carb ratio per 100 grams?*

Well, you have to have size for reference and 100 grams is then I think best. I don't mind it that much. Sometimes it also says ratio for a portion but then I always wonder what a portion is so I always find that a dangerous ratio.

Second interview, second participant

2.2.1 *How did it go this week?*

It went alright, apart from the first day. That was really aaaaah. Yes, that went totally wrong. I used to do it wrong already, that had nothing to do with you. But I called the dietician and she helped me through the meal and then the rest went fine. But actually I did not use the scale, I calculated the distributions but I used my own list to determine my carbs.

2.2.2 *Was there a big difference in your list and what you have calculated this week?*

No, but I do think that your way will give more accurate results. With the distributions you can probably determine your carbs more accurately than with my list which is more global amounts. But for me it was too laborious. The evenings are always very hectic with us with a lot of people so I don't have time for weighing and calculating.

2.2.3 *Can you explain what you did instead of using the distribution rulers?*

Well I counted my spoons and looked on the list how many grams per spoonful of a certain ingredient. I didn't weigh, I had never done it before. Maybe it is also a matter of getting used to it.

2.2.4 *Have you done anything differently this week from normal?*

Ik have been more accurate this week, I have paid more attention to what I eat. It has made me more aware of everything I eat. I also looked at the list much more often this week, for every meal. Normally I don't do this, than I just guess something and be done with it. You think you know it when having looked at the list one time. But that turned out not to be true this week.

2.2.5 *So you have noticed an effect of the exercise?*

Yes, it has given me more awareness. During the training in the hospital we got soup and bread to practice counting carbs on. And then they told us it contained 59 and that we were supposed to enter that in the meter. But no one explained how they got to 59. The training was more focussed on the meter rather than on learning to count carbs. Then you come home and you think what did I have to do again? And then when time passes you start doing something and you think you know everything well enough but this week made me realize that I really have to look better at carbs.

2.2.6 *Have you ever checked the weight of your spoons compared to the spoons on your list?*

No, never. I just use them. I trust that the ones who made the list checked the weight of the spoon. It is an assumption.

2.2.7 *What do you think happened on the first day?*

I don't really know exactly how I got to my carb result. But I was very confused with all the separate elements of the meal. The rest of the week was much easier with more standard ingredients such as potatoes. They are all on my list.

2.2.8 *What do you do when something is not on your list?*

I sometimes use an app the Eetwijzer. Together with the list I have never been able to not find something.

2.2.9 *What made the exercise too laborious for you?*

The weighing in itself was not the real problem. It was the combination with calculating everything and recording everything that made it too much work for me and then you don't really know so you just do something. The list is more straightforward and enables me to already decide on my carbs before eating so I can start eating with everyone else.

2.2.10

You mentioned that the training was actually not enough support for you?

For every person with diabetes it is important to know about carbs. I wouldn't know how carbs work and how to count them. A dietician can tell me that something contains this much carbs but I want to know how everything works.

2.2.11

How would you like to learn more about carbs?

It doesn't really matter to me how, I'm open to that, whether it is in the hospital, at home or even in a book or via an app. I wouldn't know right now how to determine the carb content manually. Right now, the list is the only reason I can use the new meter. The problem is that I don't understand how my body can react differently to different food.

2.2.12

Do you ever take the list with you somewhere?

Usually the list stays at home but if I were to go out for dinner I would take it with me.

2.2.13

What would you think of a weighing scale that automatically gives you the carb content of your food?

If such a weighing scale would exist I would definitely use it. As long as it is easy I want to become more accurate.

Second interview, third participant

2.3.1 *How did it go this week?*

I enjoyed doing the exercise. It was a little bit more work than I had anticipated. I especially enjoyed estimating and checking myself. It turns out I am quite well at it.

2.3.2 *What did you enjoy?*

Finding out whether I am right or wrong. I use my list of course and I have quite a skilled eye for what I eat and if I ever eat new things than I weigh it first. But now with these exercises I discovered that I am right often, that my feelings are correct. And that gives me a lot of confidence, knowing that you can rely on your feeling.

2.3.3 *Which exercise did specifically find helpful?*

The one with the drawings was nice but for the exercises in which I could use my own food were more meaningful because it actually taught me things I can use. I also believe that it is more valuable to be able to determine the weight of things because no one would want to weigh and calculate for the rest of their lives.

2.3.4 *What else could have helped you?*

It would be nice if somewhere online there is a file that contains all carb information and that doesn't take a lot of time to find. I just want to select my ingredient and be presented with all relevant and accurate information.

2.3.5 *Did you notice an effect by doing these exercises?*

I think that it keeps you on edge. I think that it is important for everyone to check themselves every year or 6 months. To find out whether they are still right in their estimations and whether you maybe should focus on your carbs for a while again.

2.3.6 *Do you feel that you have enough knowledge of products and carbs?*

Yes, but I think that the things of which you don't expect it are the things you make mistakes. If I am not sure I will calculate.

2.3.7 *Do you think that these exercises would have helped you in learning carb counting?*

Yes, I do think that it would have an added value. I actually think that this should be integrated in the current training, as a sort of preparation exercise.

Second interview, fourth participant

2.4.1 *How did it go last week?*

I learned a lot actually, it gave me many insights. For example I didn't know that a quarter of a banana consisted of carbs. Me feeling for estimating weight is quite good. However, with fruit I usually just handle the rule of twenty which works fine. What is more difficult for me are the drinks, I never inject insulin for them but they do contain many carbs. Estimating the carbs and weight went quite easy because I have a lot of experience to build. I know what I normally eat and how many carbs that contains. So I could just convert and estimate a bit.

2.4.2 *Have you learned new things this week?*

Through these exercises you discover that some foods contain a lot of carbs whereas others contain a lot less. That is the great thing of this exercise, it becomes really visual. If something nice can be created out of this than it can help a lot of people I think. At my work we also have a weighing scale, a very accurate one. And I have weighed lots of foods past week on that scale. Once you get started you get curious to all kinds of things and how many carbs they contain.

2.4.3 *What did you think of the exercise in which you had to estimate the weight?*

That went quite alright. At my work I had to feel the thickness of the yarn to determine whether the total weight would be good. So I know that a lot of practice can build skills in looking and feeling weight. But with the exercises you build a lot on experience.

2.4.4 *Which exercise was most useful for you?*

The second one where you had to divide the food in the correct carb ratio. This really made it clear how some foods contain much carbs and others almost nothing. It also taught me that I can better eat strawberries compared to bananas.

2.4.5 *What did you struggle with?*

Nothing really. Although I was very much surprised by the pasta. My app had never told me that pasta contains that many carbs. It did make me lose trust in the app. If at some point by blood glucose levels would be wrong it would probably be due to the drinks that I didn't account for.

2.4.6 *Do you make your estimation based on sight or on feeling?*

On sight. Your eyes know how much of a product you have. I then looked at the type of food. For example tomato sauce, I thought of tomatoes and of ketchup and I took something in the middle of that.

2.4.7 *Do you think that these exercises could have helped you in learning to count carbs?*

If you train a lot on this than I do think that they eye will become better trained at determining amount but also carbs. A lot of knowledge, I now already have but the exercise added for me the visual image. I think I will pay more attention to it now.

Second interview, fifth participant

2.5.1 *How did it go past week?*

I enjoyed the exercise but it a laborious task. This was mainly caused by that the distribution rulers had to be made for each ingredient. If this were to go automatic, and the scale would recognize product so I could read the carbs instantly that I would really like that and I would definitely use it.

2.5.2 *What could help you even more in estimating carbs?*

Maybe all food products should be categorized over a scale from 1 to a 100. Than you could which ingredient are where on the scale. So if fries, pasta and pizza are all at 55, meaning 55% carbs, dan you could estimate the carb content more easily. Or you weigh your food and know exactly how many carbs it contains.

2.5.3 *Was there a difference in what you normally estimated and what you now calculated?*

No, no really. Normally when I eat pasta I would put 60 in my meter and now with the exercise I calculated 80. So that is not really a big difference. And I don't need to be the accurate anyway. Nothing happens when I am 5 grams off, not even when I an 10 grams off. I want to decide what I eat myself, I won't let it dependent on some book.

2.5.4 *Have you learned new things?*

Yes, that for some products I am quite off. By looking more at the table I discovered that I account too much to for meat and fish.

2.5.5 *Do you think that people can be trained in making carb estimations?*

I think that you train that reasonably well. It is a learning trajectory. The more often you learn to estimate the easier it will get. Right now I put potatoes on my plate and I know when I reach 150 grams. This is something that I trained myself in along the way.

2.5.6 *Did you look more often now at your food table?*

Yes, a lot more. It was interesting to me to look up different products and to compare them with each other. However, you have have to pay attention when looking at such a table because I wouldn't trust anything blindly. Take a pudding roll, there are hundreds of ways to prepare a pudding role. How do I know how this pudding role is prepared.

2.5.7 *Did you notice an effect this week?*

Yes, for me is was back to the classroom, back to the start. It was good for me to consider my carb estimation and how to become more accurate.

Appendix F - Interviews cycle 4

This appendix presents all interviews conducted during cycle 4.

First interview, second participant

- 1.2.1** *How do you approach counting carbs right now?*
I have a list, on which I wrote everything I eat out from a book. It says the portion size from the book and the amount of carbs it contains. Now I don't have to look at my list that often any more, some I know by heart. But other times I really need my list, especially for products that I don't eat very often.
- The last few months I have had a lot of stress, so my blood glucose levels were very high. And then the constant calculating is very difficult. You can't really eat chinese all of a sudden any more. And when I do I am always calculating in the back of my head.
- 1.2.2** *Where else do you get your information about carbs?*
I also look at food labels which is very difficult. They did teach me in the hospital. Then you had to take a percentage of 100 grams and divide and multiply, I don't know what. I find that very difficult.
- There are carbs in everything. So that is also why I look a lot at the food labels. For example, an apple was so strange to me, it contains 9 carbs. Whenever I buy something in the supermarket, I always get discouraged by all the carbs.
- 1.2.3** *What is your motivation to keep track of carbs?*
I feel better when I do. I used to be very heavy and now I feel physically better. It does mean that the rest of my life I will have to count my carbs. Although maybe at some point it will have become routine by then.

We practiced the exercise together

First interview, third participant

1.3.1 *How do approach carb counting right now?*

O, I find it so difficult. With calculating and weighing, I am really bad at it.

1.3.2 *How long ago did you start with carb counting?*

I have diabetes for 33 years and I still don't know how to do it. I just can't remember what I have to do. One day I can calculate the carbs for a piece of bread and the next day I have forgotten completely.

1.3.3 *What tools do you use to support you?*

I have a list since a few day. But normally I just guess something. My husband has tried to get me to look at labels and to calculate but it is too difficult.

1.3.4 *What could help you in estimating carbs?*

What I want to know is how much of a food I am allowed to eat if have a carb limit.

1.3.5 The rest of the interview we practice the exercise with: grapes, yogurt, bread and rice waffles

Second interview, first participant (there is no first interview with this participant because he was also the first participant during cycle 2, the basic questions were already discussed).

- 2.1.1** *How did it go this week?*
I think this is a really useful tool to train people in carbs. For people who are newly diagnosed I think this product can make a big difference. I enjoyed it myself as well, I noticed that I wanted to do the exercise right in one go. So it became a little game actually.
- 2.1.2** *If you compare this to how you taught yourself to count carbs what do you think then of the scale?*
I have built my knowledge and skills purely by gaining experience. However, it took me years to really learn it well. This tool could support someone with constant feedback of the carbs and total amount. So it would train someone much more quickly and efficiently.
- 2.1.3** *Do you see value in the displaying personal products on the ring from 0 to 100?*
If it were my personal products that that would be very convenient. It might bring new insights.
- 2.1.4** *What did you think of the current format?*
If Roche were to produce something like this than it would be very usable. However, smaller would be more convenient. Thinner and lighter especially because it would make it more easy to relocate.
- 2.1.5** *If the scale were to be integrated in a dinner plate, would you like that?*
That would be really convenient because it would eliminate an extra action. You could do the exercise and start eating right away. However, I wouldn't like to eat from a special plate especially when I have company or when the kids are here. The best thing would be if you could put your own plate on it so you can remove the scale after the exercise and start eating.
- 2.1.6** I think this is a really good step in the right direction and I am curious to what comes out of it. Honestly, I had never heard of carbs and their influence of blood glucose levels before my first carb training. That is something that remains odd to me, so little gets communicated.

Second interview, second participant

- 2.2.1** *How did it go last week?*
In the beginning I was too quick. I had already placed my food on the plate before turning it on and when I did it started to blink red. When I removed everything and turn back on again it worked fine. It took some time for me to understand how to use it but once you get the hang of it it is quite a handy tool. It is rather big, you would need a special place for this one.
- 2.2.2** *What do you think went wrong?*
Ik was inclined to already start to calculate ahead of the scale. But it works with 100 grams and I was used to calculating to portion sizes. So that was a bit confusing in the beginning.
- 2.2.3** *What did you think of the exercise with the two plates?*
I struggled with that. The plates weren't put in the right position which was also a reason for the scale to start blinking red. So it took me some time to figure it out.
- 2.2.4** *What was especially difficult past couple of days?*
Let me think how to explain. I was inclined to put all the food on the left plate, because it is bigger. So then you think, I put it there but then you have to start calculating. But after a while I understood what to put where.

One night I wanted to eat Chili Con Carne and I didn't know how to use it on the scale. The powder of the sauce is difficult to put on the plate. So in the end I didn't do that one.
- 2.2.5** *What kind of things did you place on the scale?*
Tomatoes, potatoes, apple, bread and custard. The scale actually made me more curious to other products.
- 2.2.6** *Did you learn new things this week?*
I learned that counting carbs is difficult and that my own way with my list might not be so accurate. Sometimes there was a big difference between my list and what the scale said.
- 2.2.7** *Did you encounter troubles entering values using the ring?*
In the beginning that was my biggest struggle. But at some point I realized what I had to do. However, you cannot adjust this value any more once you have started the exercise.
- 2.2.8** *Would you find it useful if the ring were to display your personal product?*
Yes, that would be really helpful
- 2.2.9** *Did you try drinks on it?*
No, because I didn't understand how I could do this? How would the weight of the cups be eliminated?
- 2.2.10** *Did you enjoy the exercise?*
Yes, I enjoyed it. And I was surprised by the amount of carbs sometimes. Especially tomatoes I did not expect. Of course you have to take time to weigh but once you have that in your system I think that it will become a task like peeling potatoes. Once you get used to is it won't be an obstacle any more.
- 2.2.11** *When would you use it?*
In the evening because the rest of my food is very regular. During dinner there is so much variation of ingredients preparation methods. I would use the scale after cooking bor before processing it in the actual dish. I always put the food on my plate in the kitchen so it would probably be placed there.

2.2.12

Do you think that this scale could help you learn estimating carbs?

Yes, I do. On this scale you can see the product before you. You see what you are about to eat and how much carbs it contains. That is something that you can't find on a list. Of course you see the food in the pan and you have a number for the carbs but that is different from seeing it on the plate like this. Although, I am not sure whether you can train the carb ratios to be able to know them by heart. Maybe you can, but after 8 months I sometimes still need my list.

2.2.13

What for you is the added value of this scale?

Using this scale you get the exact weight and therefore the exact carb content. All the other methods remain an approximation. Lists that say, per spoon or per cup, it is not really accurate because my spoon and cups might be totally different. It does take a little bit more work but you will achieve more accurate results. Also using this scale I wouldn't have to calculate so much any more, it just gives you the number. Accuracy is quite important, 1 gram of carbs can be the difference for me between one unit of insulin and 2 units. Having the certainty in knowing: this is what I eat and this is the amount of carbs is for me the added value.

Second interview, third participant

- 2.3.1** *How did it go last week?*
I have found it very difficult to work with. Maybe if you improve the prototype I can work with it better but right now I was very confused. I forgot what we did with calculating and what number I had to enter.
- 2.3.2** *Can you explain what went wrong?*
Well the ring indicates 100 gram right so I have to put 100 grams on the plate. And then I try to put the carbs on the right plate until the light will blink green.
- 2.3.3** *What do you think that the ring indicates?*
Actually, I don't really understand the ring. At one point I had too much food on the left plate and none on the right plate. But maybe because it has been used for so long it broke down.
- 2.3.4** *Can you indicate exactly what number you entered using the ring?*
The number on the food label
- *Partner enters
- 2.3.5** *Did you watch or help? (question for the partner)*
Yes a few times. I find it difficult to explain to her. I just tell her carbs per 100 grams, weigh, and convert. But I can't do it for her for ever, she has to learn to do it herself.
- 2.3.6** *Do you now weigh your food sometimes?*
Yes, I weigh how much I eat but I don't know how many carbs it contains.
- 2.3.7** *When we tried the exercises together we practiced bread, do you still remember this?*
Yes, there was a very small amount of carbs on the plate. And the yoghurt as well right?
- 2.3.8** *Yes. Do you still remember how many carbs then estimated using the scale?*
No, I really don't remember that. It as very little.
- 2.3.9** *And if you had to guess now what would you say?*
Something like 5 grams?
- 2.3.10** *Yes! That is right! So you do remember?*
Yes, maybe. I also know that I can better eat the bread than the rice waffles that we practiced as well. It is nice that you see the food visually now. I remember that I thought that rice waffles would contain almost nothing but we had to turn the ring all the way to 80. But actually I would want to be able to enter an amount of carbs in the scale and know how much of a food I can eat.
- 2.3.11** *When and where would you use the scale?*
In the kitchen because there we put the dinner on the plates. Unless we have company.
- 2.3.12** *If it were to be integrated into a plate, what would you think of it?*
I think I would prefer to use it as a scale so I can put my own plate on it. Also if it could be really small than I could bring it with me to restaurants.
- 2.3.13** *Can you describe the added value of this scale?*
I think that I don't have to think so much any more and that I don't have to occupy myself with calculating all day long. That would be a relief.