

Managing Type 2 Diabetes in Primary Care In a Rural Waikato Town

Helen Cant, Pharmacist Prescriber, Primary Care, Tokoroa

How did I get to “Here”?

- ▶ B.Pharm, Registered Pharmacist
 - ▶ 15+ years experience in community pharmacy
 - ▶ 8 years experience in clinical pharmacy in hospital including Mental Health
 - ▶ 5 years experience as Pharmacy Services Manager in hospital pharmacy
 - ▶ Clinical Pharmacist in Primary Care in Tokoroa 2013 (DHB funded)
 - ▶ Practice area: Medication optimisation / Medicines information/education
- ▶ Certificate in Adult Teaching
- ▶ Postgraduate study
 - ▶ PG Certificate in Pharmacy (Medicines Management) 2011
 - ▶ PG Diploma in Clinical Pharmacy 2014
 - ▶ PG Certificate in Pharmacist Prescribing 2017
- ▶ Pharmacy Council NZ registration as Pharmacist Prescriber 2018
 - ▶ Prescribing specialties: Diabetes, COPD/Asthma, Gout, Hypertension, Hyperlipidaemia

South Waikato District
approx 22,000 people

Tokoroa
approx 14,000 people

35% Māori



20% from the Pacific Islands

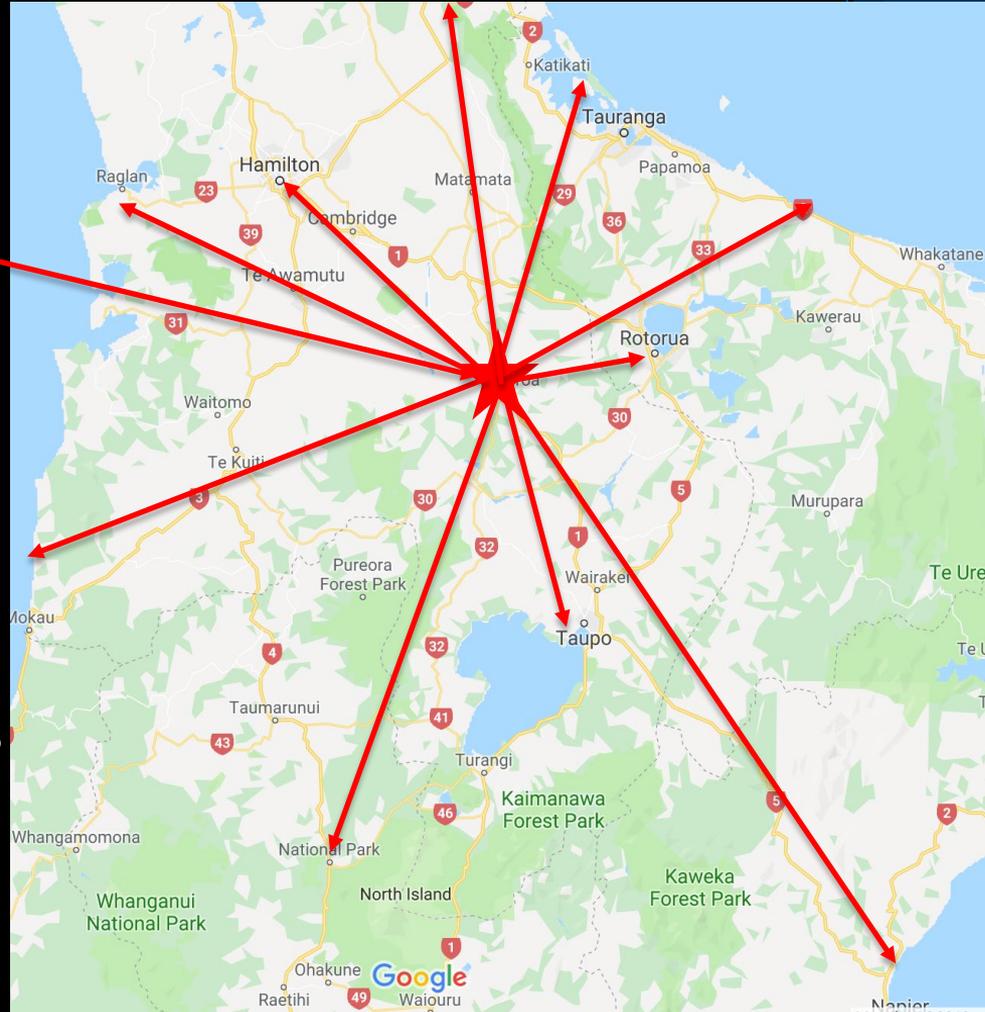
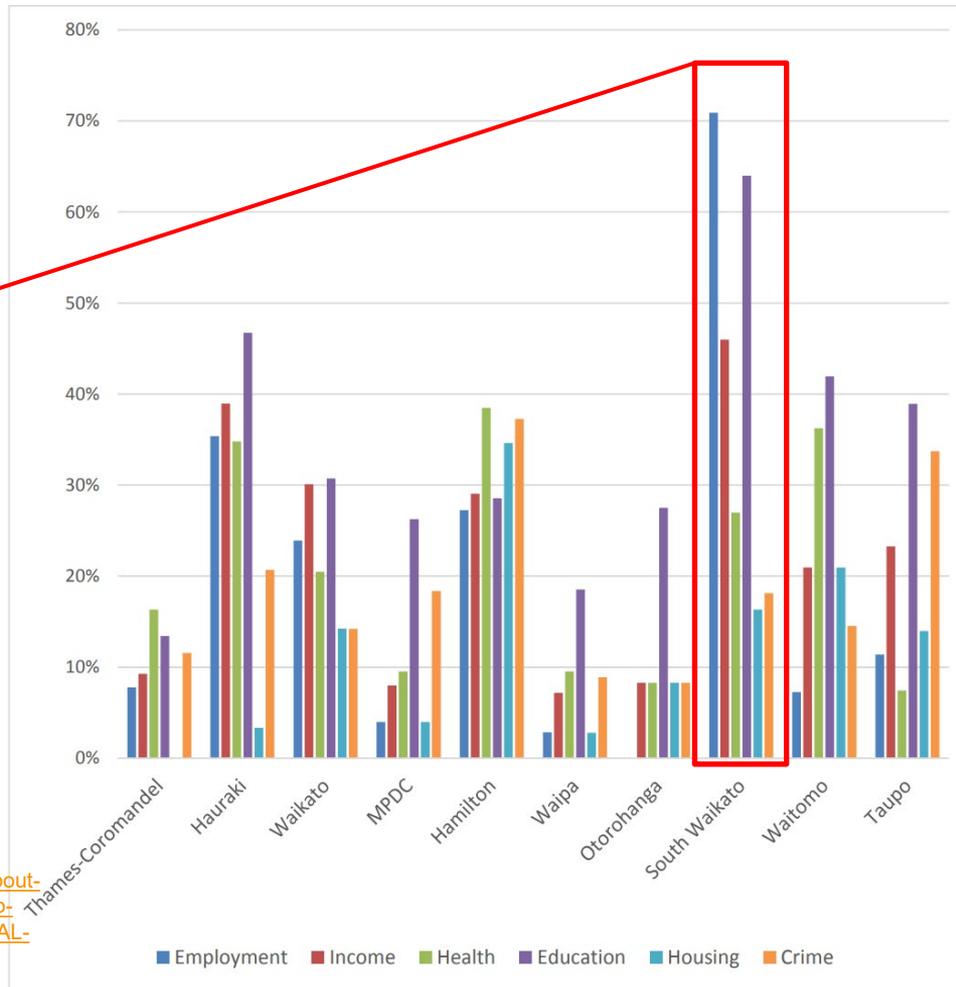


Figure 9: Comparison of high deprivation domains across the Waikato Districts - percentage of population living in Q5 deprivation on specific domains 2013 – access removed

Q5 High deprivation
for the Waikato

South Waikato





What Happened in Tokoroa?

This is the story of Type 2 diabetes care in
one small town

Sadly, similar events are happening
all over NZ

*This is not intended to be in any way a
criticism of anyone or any service*

There is a tsunami of diabetes ...250,000 Kiwis plus another 100,000 who have diabetes and don't know... not counting pre-diabetes



Type 2 Diabetes - A Perfect Storm

▶ Secondary Care

- ▶ Regional Diabetes Service change 2014-15: Overcommitted with Type 1 diabetes which needs specialist management
- ▶ Will only treat people with Type 2 diabetes in very limited situations (eg pregnancy, youth, high dose steroid treatment eg chemo)

▶ Primary Care

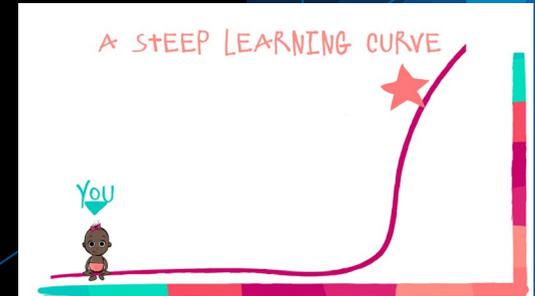
- ▶ Long-standing GPs all but 1 retired or moved out of town
- ▶ Extreme difficulty recruiting
- ▶ *Very caring, very hardworking healthcare teams, working under extreme pressure*

▶ High number of people with diabetes registered at GP practices in Tokoroa (approx 1500 that we know about - not counting pre-diabetes)

- ▶ poorly controlled
- ▶ limited understanding
- ▶ poor health literacy

Why the pharmacist? Can't a GP or nurse do that?

- ▶ GP's and Nurses are a very important part of health care
- ▶ Pharmacists add a different point of view
 - ▶ specialised in medication management
 - ▶ **Full medication review - not just insulin**
- ▶ Insulin = medication
- ▶ Why me, in this case?
 - ▶ Time - already have long appointments for medication review
 - ▶ No cost to patients
 - ▶ Interest & adult teaching skills



Why is tight diabetes control so important?

A number of studies have shown many benefits of reducing a high HbA1c level. In these studies, the equivalent of an 11 unit decrease in HbA1c, eg, from 86 to 75 mmol/mol or 75 to 64 mmol/mol leads to:

- a 16% decrease in risk of heart failure
- a 14% decrease in risk of fatal or non-fatal myocardial infarction (heart attack)
- a 12% decrease in risk of fatal or non-fatal stroke
- a 21% decrease in risk of diabetes-related death
- a 14% decrease in risk of death from all causes
- a 43% decrease in risk of amputation
- a 37% decrease in risk of small blood vessel disease (eg, retinal blood vessel disease causing vision loss).

For example: Reduced Kidney Damage

- ▶ Diabetic kidney disease is the most common cause of end stage kidney disease
- ▶ People with DKD are at greater risk of cardiovascular disease
- ▶ **Optimising treatments to prevent development and progression of DKD is of utmost importance**
- ▶ Empagliflozin (and perhaps other SGLT2 inhibitors) appear to have protective effects on the kidney in addition to those from glucose lowering (and have significant benefits for the heart)
- ▶ GLP1 analogues such as liraglutide or semaglutide reduce progression to macroalbuminuria ie kidney damage
- ▶ ***Neither of these classes of medications is currently subsidised in NZ***

Type 2 Diabetes is a metabolic disease

With involvement of multiple hormonal imbalances

- ▶ Cause: Insulin resistance / high blood insulin levels
- ▶ High carbohydrate intake = high blood glucose levels
- ▶ High Blood glucose levels =
 - ▶ high blood insulin levels
 - ▶ high triglyceride levels = accumulation of fat in the liver / pancreas
- ▶ High insulin levels =
 - ▶ fat-burning is turned off in preference to using glucose
 - ▶ insulin promotes
 - ▶ accumulation of fat
 - ▶ weight gain
- ▶ Weight gain = increased insulin resistance
- ▶ And so it progresses

Barriers



A complex problem

- ▶ Insufficient/misleading/conflicting information/understanding
 - ▶ What does eat a healthy diet mean? ... Low fat message well received
 - ▶ Switch to Weetbix, grain bread, and fruit and vegetables (Bananas are cheap and easy, so are potatoes) but this is high carb
- ▶ Carbohydrates are cheap, veges are not, sugar is everywhere, and is addictive
- ▶ Work commitments and situations - eg truck drivers
- ▶ Money - transport, medications, doctor visits
- ▶ Beliefs - Diabetes is inevitable, I don't feel sick so I'm not sick
- ▶ Family - who does the cooking? What are family expectations?
- ▶ Depression? Anxiety?
- ▶ Dental problems - food options limited with no teeth!!
- ▶ Is blood glucose testing even possible?

What are people told?

Your BMI, blood glucose, and cholesterol are really high....

You need to

- ▶ lose weight,
- ▶ eat a healthy diet,
- ▶ take your medication,
- ▶ do more exercise,
- ▶ test your blood glucose regularly,
- ▶ keep your blood glucose under control....

But..... What do they hear?

“You are too fat”

“You aren’t trying to help yourself”

“You’ve done this to yourself”

“You don’t care”

They feel judged!!!!

And many people are desperately frustrated

Doctor, you want me to lose weight...but the medicines are making me put on weight...

1. Standard dietary message is Low Fat
2. But Low Fat almost always means high carbohydrate
3. High carbohydrate = high blood glucose and high insulin for people with insulin resistance, pre-diabetes or Type 2 Diabetes
4. High insulin means fat deposition and weight gain, AND fat-burning mechanisms turned off
5. Weight gain increases insulin resistance, worsening blood glucose control, need more medication
6. What subsidised medications do we have? Typical prescription: Metformin, a sulphonylurea and then insulin
7. But... sulphonylureas and insulin increase insulin levels - GO TO STEP 4

Appropriate information

“I really don’t understand what all these numbers mean”

They might have had diabetes for 20 years

but

Do they understand what it is?

Do they understand the physiology?

Do they know their targets?

Communication styles

“So you’re going to tell me all the things I’m doing wrong too, are you?”

Patient- centred

Instead of this...	Say this...
You should	What can we do? What do you think the plan should be?
You must / You need to	We’ve talked about some options. What would you prefer to do?
Take these tablets	There are choices in treatment. I think these are the medication options and these are the pros and cons..

Empower the person

Blood Glucose Testing

<https://www.youtube.com/watch?v=rMMpeLLgdgY>

Really? Four times a day? Every day?

But...

- ▶ **The lancets aren't subsidised on prescription!! I have to reuse them!**
- ▶ I can't see well enough to get the strip in the machine or the blood in the strip
- ▶ I have arthritis in my hands!
- ▶ I have poor circulation - it takes three finger-pricks to get one drop of blood!
- ▶ I work in the bush - I can't wash my hands
- ▶ I don't like doing this at work
- ▶ The reading is always high - I just want to throw the meter out the window!

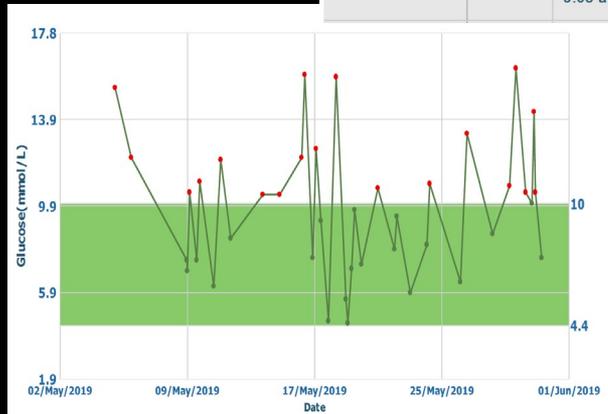
Blood glucose testing isn't easy

THEORY	PRACTICE
Use a new lancet to get a blood sample	The lancets aren't funded so I need to reuse them
Test your blood glucose before every meal. Sometimes you will need to test two hours afterwards too.	Where is there a private place to test? How do I get time off from work to do this? It's easy to forget
Do this every day for the rest of your life	But what if you have peripheral neuropathy? <i>It hurts!!</i>
Wash your hands with soap and water	But what if you work in the bush?
Insert a new test strip into the meter	I can't see well enough I don't have the dexterity in my hands
Wipe away the first drop of blood and use the next drop	What if you have poor circulation? Some people have to do four or five punctures before they can get ONE drop of blood
Track the readings in the book provided	The reading is always high - it's depressing!
Use this reading to decide your insulin dose	This calculation is quite complex
Keep your insulin in a cool place away from children	I don't have any appropriate place, I live with my children and grandchildren

Best information from fingerprick tests

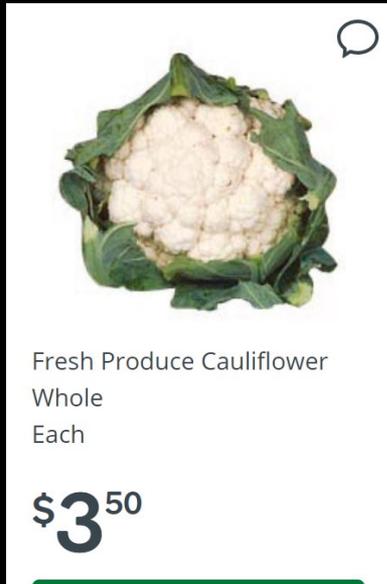
What do these snapshot readings actually mean?

Date	Before Breakfast	After Breakfast	Before Lunch	After Lunch	Before Dinner	After Dinner	Before Sleep	Night
31/May/2019	7.5 7:53 a.m.							
30/May/2019		10.5 8:30 a.m.		10.0 5:42 p.m.		14.2 8:39 p.m.	10.5 10:41 p.m.	
29/May/2019		10.8 8:51 a.m.			16.2 6:15 p.m.			
28/May/2019		8.6 8:10 a.m.						
26/May/2019		6.4 9:05 a.m.			13.2 6:46 p.m.			



Cost

Do I eat or go to the doctor or get my medicines?



After the
regular bills

\$50

For everything
else



Time

This is not simple

- ▶ It can't be done in one 15 minute GP appointment
- ▶ It needs appropriate up to date knowledge
- ▶ The international recommendations are changing significantly

Imagine if... you are having your gallbladder removed, the surgeon finds some complications, but they've run out of allocated time...

They don't just sew you up and say book another appointment

**There's got to be a better
way**



Education Essentials

- ▶ What *is* diabetes?
- ▶ Food
 - ▶ What are carbohydrates/proteins/fats?
 - ▶ How much carb is in what foods, and how much should you be aiming for?
 - ▶ Choose real food (ie limit processed foods) focussing on low-medium carbohydrate options
- ▶ Medications: What do different medications do?
- ▶ What effects do exercise/illness/stress/medications have?

Analogies

1. Why is your pancreas like your bank account?

▶ insulin = money

▶ carbs = bills

▶ insulin resistance = costs more: shopping from dairy vs supermarket

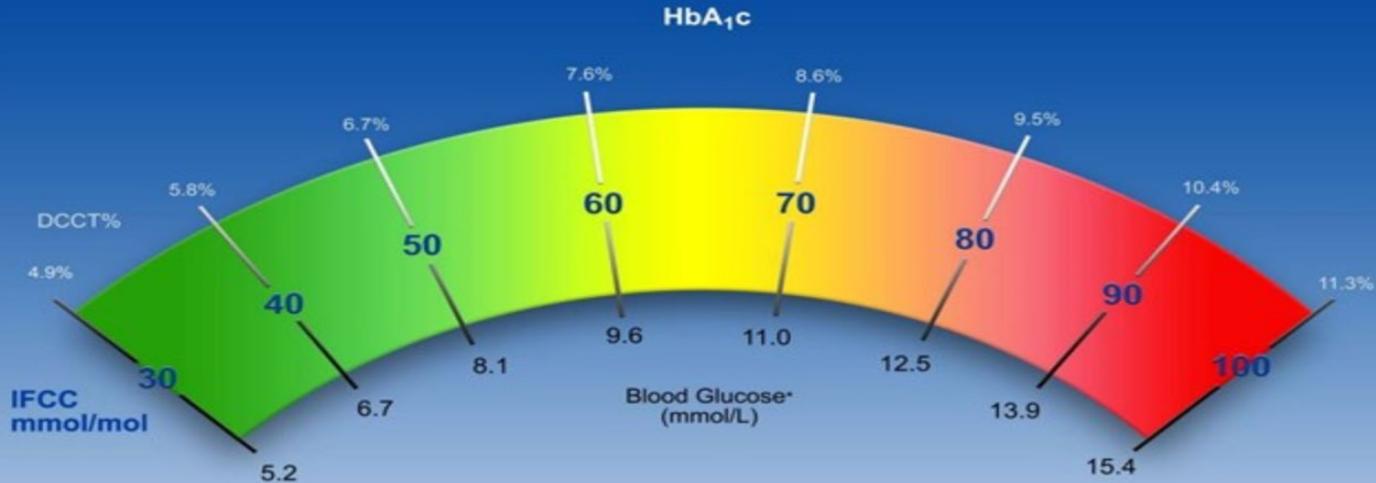
2. Increasing medications without managing carbs is like trying to brake the car with your foot still on the accelerator

Communication and Trust are Key

- ▶ Find out what the person knows
- ▶ Discuss
- ▶ Provide accessible information
- ▶ What's achievable?
- ▶ Be specific
- ▶ Offer options
- ▶ Empower the person - and maybe their family too

Empower the person What's My Target?

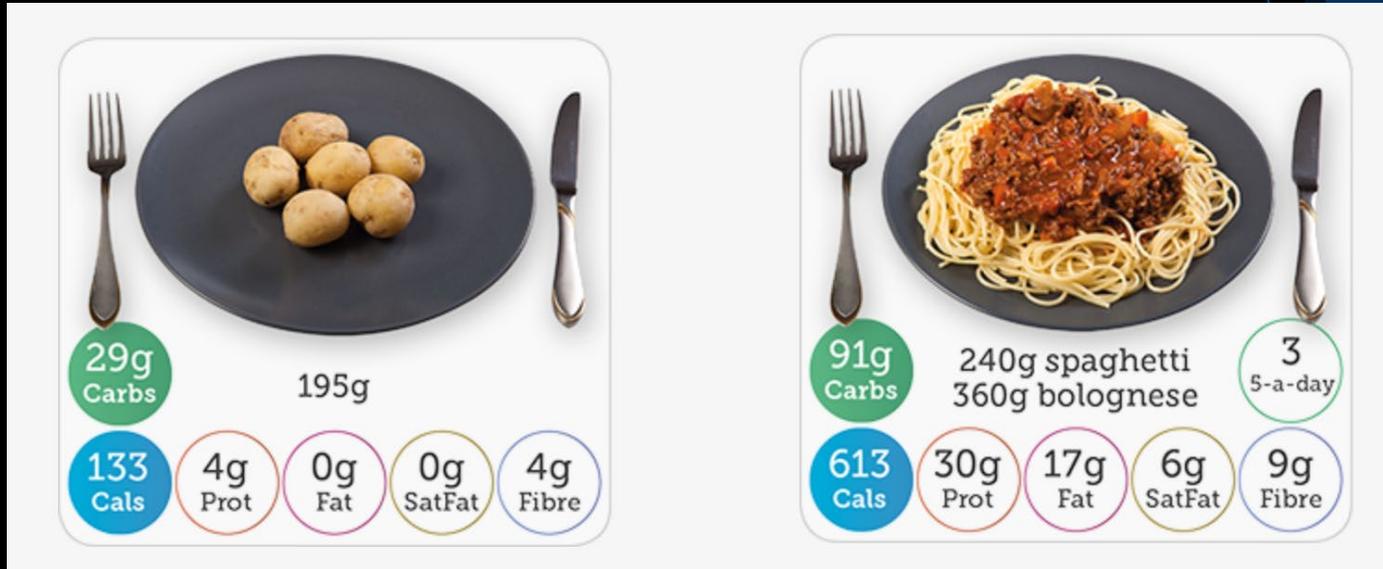
HbA_{1c} as indicator of Diabetes Control



*This is an estimated average glucose (eAG)

Nathan et al. Translating the A1C Assay Into Estimated Average Glucose Values. Diabetes Care 2008; 31:1473-1478
Christchurch Diabetes Centre 2009

“There's No Point - I Can't Read” Use Appropriate Resources



So how much carbohydrate am I eating?

Teach carb awareness and label reading

Visual handouts and apps, websites for recipes

Queensland Government

Foods with little or no Carbohydrate

Fruits and Vegetables
These foods are also low in fat

Broccoli	Cucumber, Tomato, Lettuce	Carrot	Passion-fruit	Strawberry	Rhubarb
Bean/Sprouts	Capicum	Peas	Cabbage	Bok choy	Zucchini
Cauliflower	Eggplant	Green beans	Celery	Mushrooms	Pumpkin/ Squash
Turnip/ Swede	Brussels sprouts	Beetroot	Radish	Onions, Leeks, Shallots, Garlic, Spring onions	

Flavourings, Drinks, Condiments
These foods are also low in fat

Herbs and Spices	Soy sauce/ Worcestersauce	Vinegar, salad dressing	Low joule jams	Vegemite, Bonox, Bovril, Fish & Meat paste
Lemon/ Lime juice	Low joule drink, plain Soda or Mineral water	Cordial, low joule Soft drink	Tea	Coffee
			Low joule Jellies, Gelatine	

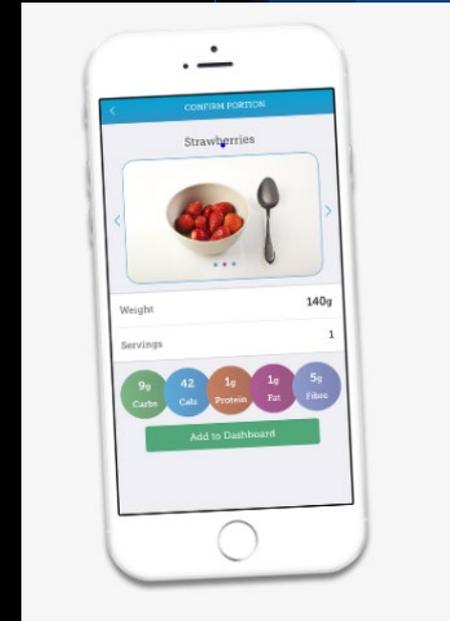
Protein Foods
Trim the fat off meat and chicken

Roast	Steak	Seafood	Mince
Fish	Rabbit	Chicken	Pork chop
Bacon/Deli meats	Frankfurter/ Sausage	Salmon/Tuna	Liver
Cheese	Ricotta/ Cottage cheese	Egg	Tofu / Tempeh
			Nuts

Added Fats
Use only small amounts and choose mono- or poly-unsaturated oils & spreads

Mayonnaise	Oils	Butter, Margarine
Avocado	Peanut butter	Sour cream/ Cream

This is a consensus document from Dietitian/ Nutritionists from the Nutrition Education Materials Online "NEMO" team. Disclaimer: <http://www.health.qld.gov.au/nutrition/copyright.asp> Reviewed: June 2015; Due for Review: June 2017



Eat Real Food (with emphasis on limiting high carb choices)

What Do Real Food Meals Look Like?

Breakfast



Lunch



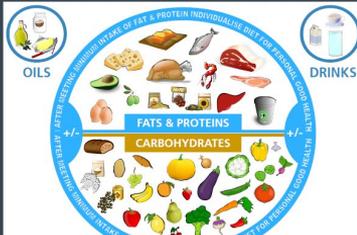
Dinner



Public Health Collaboration

THE REAL FOOD LIFESTYLE

FAT MINIMUM INTAKE = 30g PER DAY FOR WOMEN & 40g PER DAY FOR MEN



HIGH CD (>25%) ← → LOW CD (<25%)
FOCUS ON CARBOHYDRATE-DENSITY (CD) OF LESS THAN 25%

EAT REAL FOOD | AVOID FAKE FOOD | BE ACTIVE EVERYDAY

Find out more on our website
@ www.PublicHealthCollaboration.org

Carbohydrate Content Of Real Foods

LOW (0-10g per 100g)



0 —————> 10

MEDIUM (11-20g per 100g)



11 —————> 20

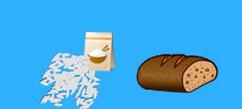
HIGH (20-25g per 100g)



www.PublicHealthCollaboration.org

Carbohydrate Content Of Real Foods

VERY HIGH (>25g per 100g)



Carbohydrate Content Of Fake Foods

VERY HIGH (>25g per 100g)



www.PublicHealthCollaboration.org

What Are Real Foods I Can Eat?

Real foods are naturally nutrient dense and are minimally altered from their natural state, which will nourish you and satisfy hunger.



How Does The Real Food Lifestyle Work?

The Real Food Lifestyle is flexible and helps you to eat real foods to make sure that you get enough essential nutrients to maintain personal good health.

Essential intakes of fat are 30 g a day for women and 40g a day for men.

Essential intakes of protein are 1g/kg of bodyweight per day, so if you are 65kg (around 10 stone), you need to eat 65g of protein a day.

This may sound complicated but if you simply eat fat and protein in the way shown at each meal on the back of this booklet then you'll easily get your essential intake of nutrients.

Carbohydrates are not an essential nutrient, but do form part of a healthy lifestyle – especially vegetables. Any real food carbohydrates you eat should be less than 25% carbohydrate density. That means they should contain less than 25g of carbohydrates per 100g.

What Are Fake Foods I Should Avoid?

Fake foods are highly-processed from their natural state with free-sugars and highly-processed oils, which will not nourish you or satisfy hunger.



Who Is The Real Food Lifestyle For?

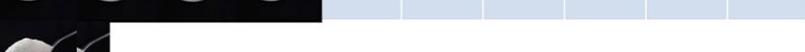
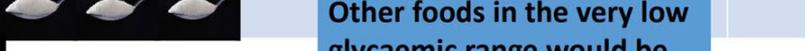
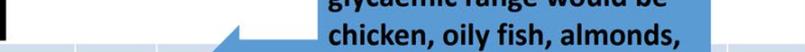
The Real Food Lifestyle is for everyone maintaining personal good health. Personal good health can be measured by your GP and is defined as follows:

1. Waist circumference less than 90cm (35.5 inches) for men and less than 80cm (31.5 inches) for women.
2. Fasting blood glucose less than 5.6 mmol/L.
3. Blood pressure less than 140 mmHg for systolic and less than 90 mmHg for diastolic.
4. Fasting triglycerides less than 1.7 mmol/L.
5. Fasting HDL-cholesterol greater than 1.03 mmol/L for men and greater than 1.29 mmol/L for women.

If three or more out of the five are out of range, it means you have metabolic syndrome and are no longer maintaining good personal health. It is then recommended that you follow The Real Food Lifestyle For Weight Loss until you regain personal good health available from www.PublicHealthCollaboration.org. If you are taking any medications you should seek medical advice first.

<https://phcuk.org/>

What happens to those carbs when they are digested?

Food Item	Glycaemic index	Serve size g	How does each food affect blood glucose compared with one 4g teaspoon of table sugar? 
Basmati rice	69	150	10.1 
Potato, white, boiled	96	150	9.1 
French Fries baked	64	150	7.5 
Spaghetti White boiled	39	180	6.6 
Sweet corn boiled	60	80	4.0 
Frozen peas, boiled	51	80	1.3 
Banana	62	120	5.7 
Apple	39	120	2.3 
Wholemeal Small slice	74	30	3.0 
Broccoli	15	80	0.2 
Eggs	0	60	0 

Other foods in the very low glycaemic range would be chicken, oily fish, almonds, mushrooms, cheese

Management of Hyperglycemia in Type 2 Diabetes, 2018. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)

DECISION CYCLE FOR PATIENT-CENTERED GLYCEMIC MANAGEMENT IN TYPE 2 DIABETES

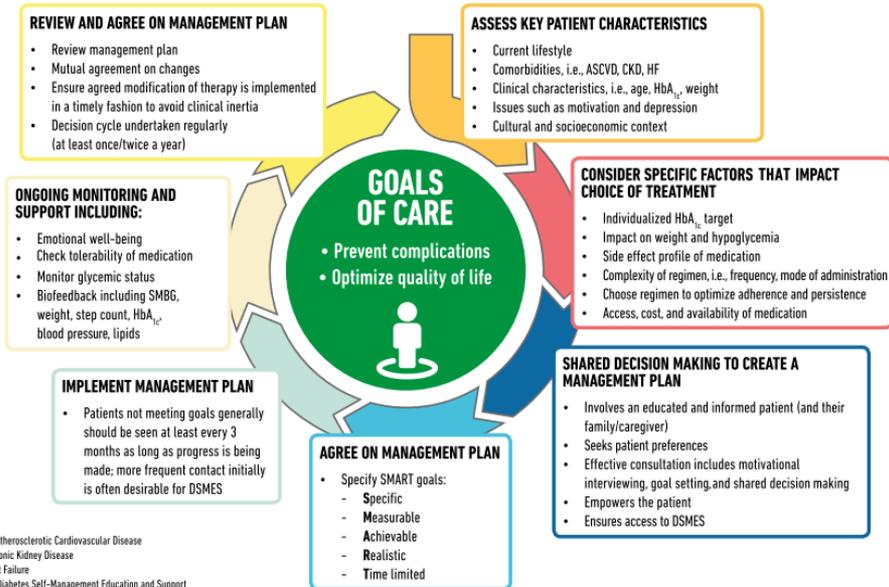


Figure 1—Decision cycle for patient-centered glycemic management in type 2 diabetes.

When that's not enough



What's their
glucose levels
really doing?

The Place of New Technology

- ▶ 61yo NZ European man
- ▶ Secondary school teacher
- ▶ Type 2 Diabetes for 15 + years
- ▶ Basal bolus insulin - carb counting - as complex as it gets
- ▶ High doses of both basal and short-acting insulin
- ▶ HbA1c ok, but...
- ▶ Blood glucose readings high
- ▶ Putting on weight
- ▶ **What's going on? How do we find out?**

FreeStyle Libre® System



Sensor - lasts 14 days.



<https://www.mediray.co.nz/diabetes/shop/freestyle-libre-flash-glucose-monitoring-system/freestyle-libre-flash-glucose-monitoring-system/>

Glucose Testing Alternative



So what happened?

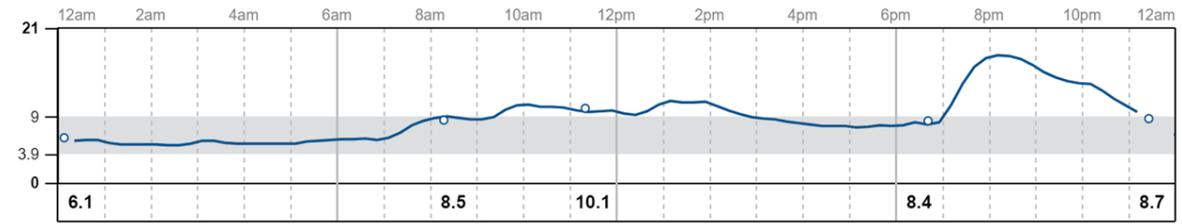
- ▶ How was HbA1c OK with all these high readings ?
- ▶ Was in a financial position to purchase Libre®
- ▶ Within 48 hours had identified two significant overnight hypos
- ▶ Reduced basal insulin
- ▶ He chose to change his food choices because he could see in real time what foods were affecting his blood glucose most
- ▶ Reduced short-acting insulin
- ▶ **Over next 3 months both insulins were steadily reduced and then stopped**
- ▶ Stopped Libre® after 3 months
- ▶ Maintained HbA1c of 53 - 55 on metformin and diet control without Libre® for 18 months
- ▶ Serious infection last year - unfortunately now on very low dose basal insulin

Daily Graphs

Too many carbs
for dinner

THU 30 Jan

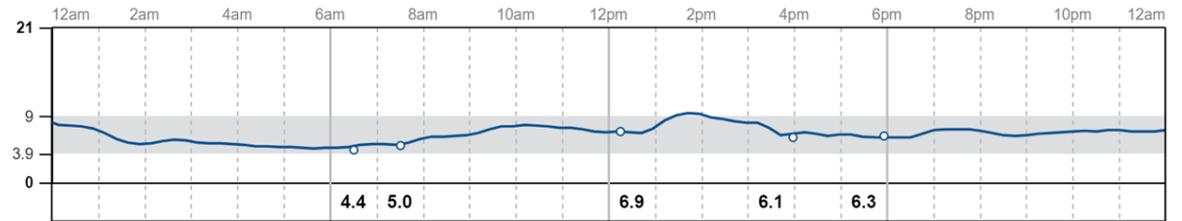
Glucose mmol/L



At home - he's
choosing low carb
options with lots of
non-starchy veges

TUE 11 Feb

Glucose mmol/L

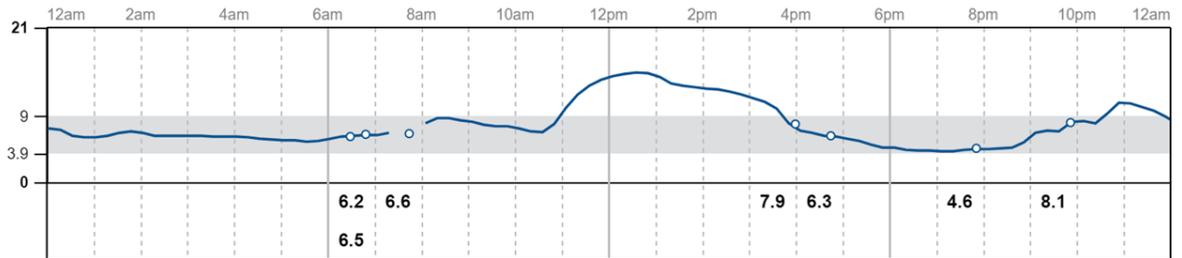


At a conference
where meals catered

That's as good as it
gets in that situation

SAT 22 Feb

Glucose mmol/L





- ▶ This might help a lot of people
- ▶ Secured some funding (25 - 30 patients)
- ▶ Intensive intervention - weekly appointments at least
- ▶ 1 or 2 sensors per patient - 2 or 4 weeks
- ▶ Loan reader
- ▶ Support from GP practice

Case Study - Ms A

- ▶ 53yo
- ▶ NZ Maori
- ▶ Type 2 Diabetes since 2004
- ▶ Very busy (studying)
- ▶ *HbA1c on referral to me 112 ... but target HbA1c 53 - 55*
- ▶ Early kidney damage
- ▶ On mixed insulin since Jan 2012
- ▶ Too busy to see doctor
- ▶ Does not believe anything can improve diabetes control, nothing has worked over years

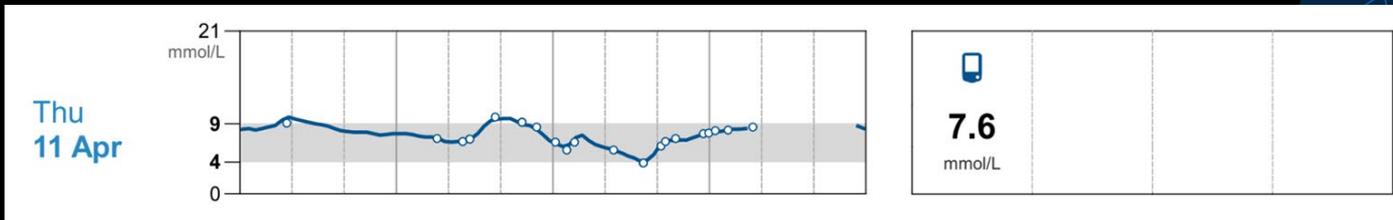
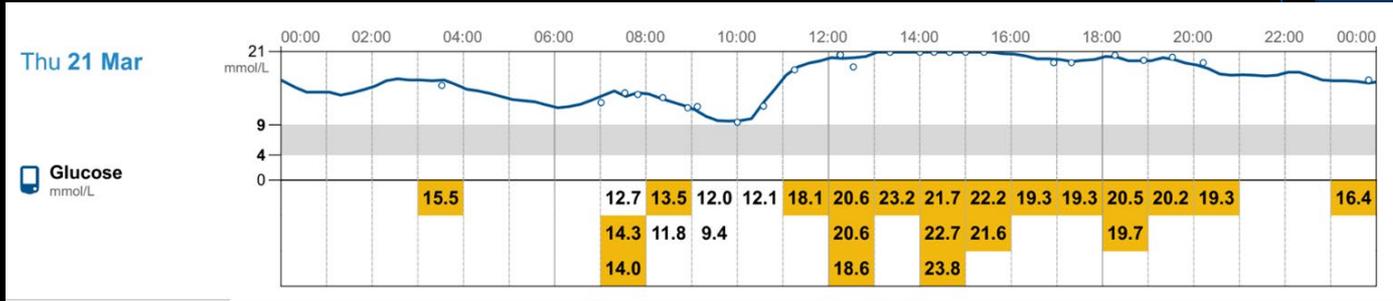
Case Study - Ms A

What did we do?

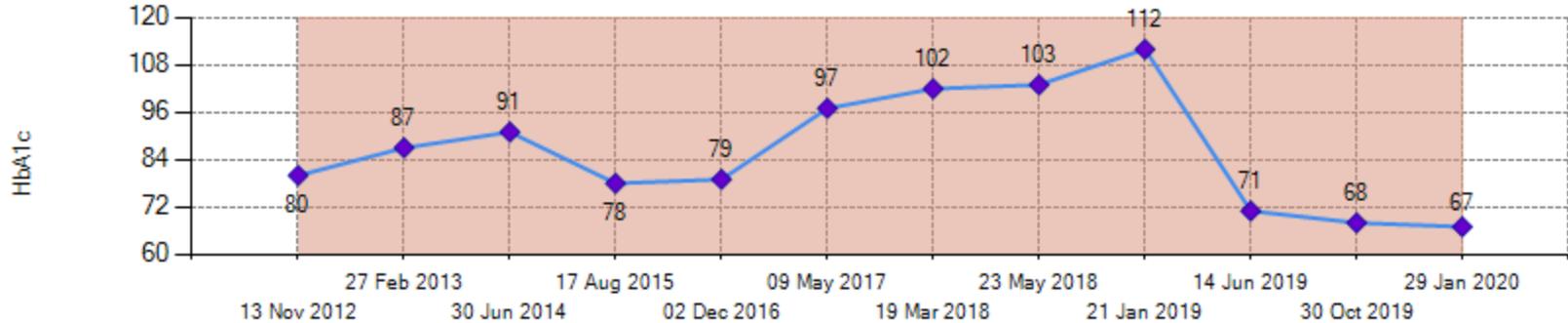
- ▶ Education about physiology of diabetes (in pictures)
- ▶ Discuss role of carbohydrate management
- ▶ Use Freestyle Libre for 4 weeks (cost to project \$170 + GST - nil cost to Ms A)
- ▶ Switch to separate long and short-acting insulin
- ▶ See regularly to alter doses
- ▶ In 3 weeks, was happy to alter her own doses

And then...

Ms A...They told me I'd never succeed...



HbA1c record Ms A



- ▶ In 3 weeks, was happy to alter her own doses
- ▶ Has maintained HbA1c drop without Libre® - even over Christmas!
- ▶ But - Is putting on weight
- ▶ Now ready to discuss food choices again

Case Study - Ms B

48yo NZ European woman
Anxiety & panic attacks +++++
Needle phobia

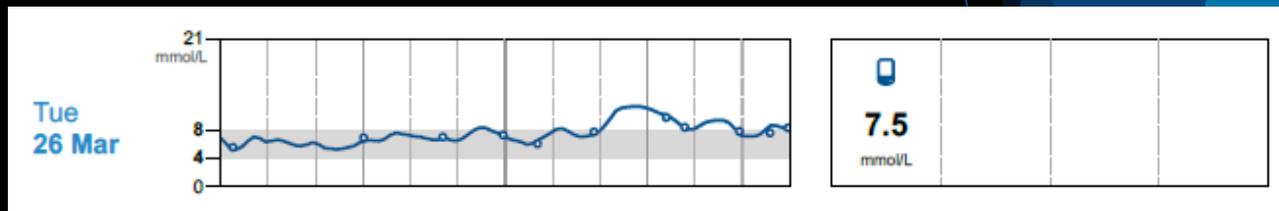
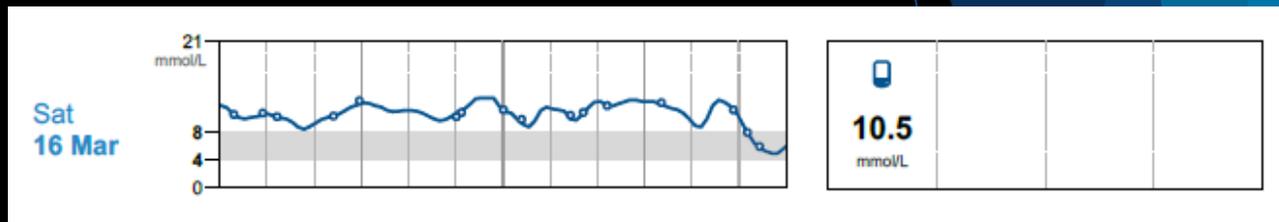
One sensor
Anxiety greatly reduced
Can manage 1 injection a day
Ten days to sort out insulin

No need to fingerprick so
anxiety levels dropped

Blood glucose spikes from stress
reduced

Food choices better

Libre[®] now funded by WINZ
under disability allowance



HbA1c target 53 and no hypos
HbA1c 73 (Dec 2018)
Libre[®] applied 14 March 2019
HbA1c 48 (June 2019) - Insulin reduced

Case Study - Ms C

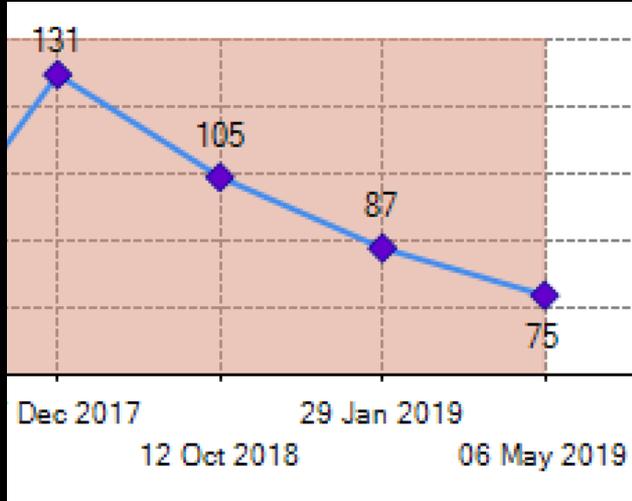
- ▶ 60yo NZ European woman
- ▶ Depression, anxiety, mood swings
- ▶ Forgetful
- ▶ Busy stressful life with family issues
- ▶ Hep B carrier, for years has been expecting to be told her liver is failing
- ▶ Food allergies
- ▶ On a benefit - money is tight
- ▶ Poorly controlled Type 2 diabetes for many years
- ▶ HbA1c in 2017 was 131
- ▶ HbA1c target 53 - 58

Case Study - Ms C

- ▶ “No-one knows how much I’ve tried to lose weight”
- ▶ People say
 - ▶ “You just need to....”
 - ▶ “ You’ve done this to yourself”
 - ▶ “She’s not interested”

Case Study - Ms C

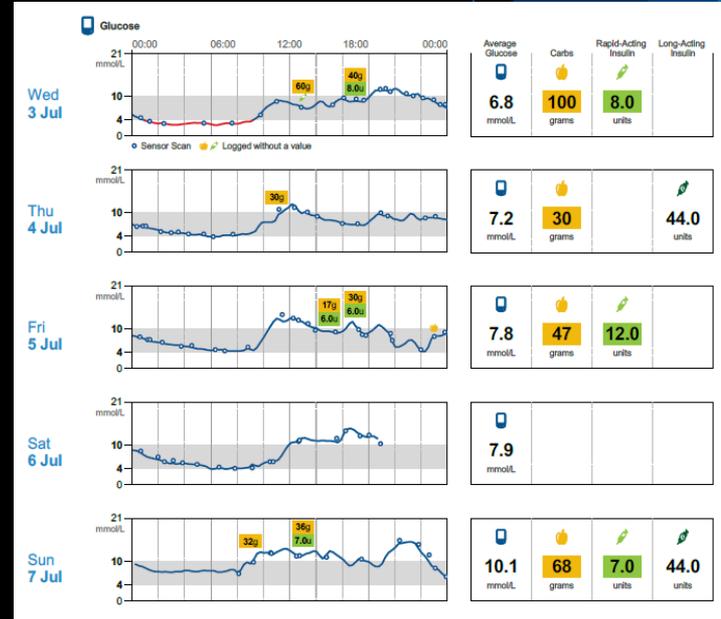
Education and regular followup



Education and regular followup resulted in significant improvement...

But not there yet and progress stalled...
Something else needed

Add Libre®



Snapshot

12 June 2019 - 9 July 2019 (28 days)

Glucose

Estimated A1c **7.5% or 58 mmol/mol**

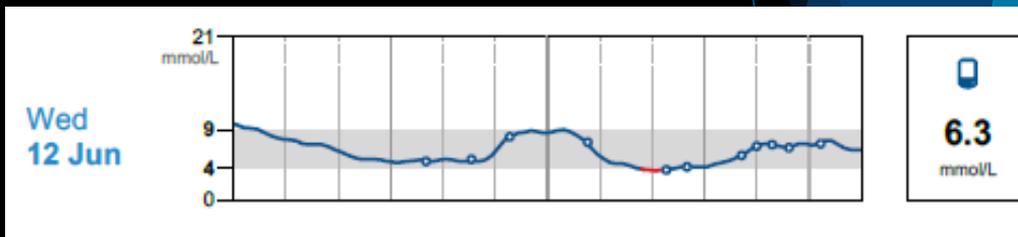
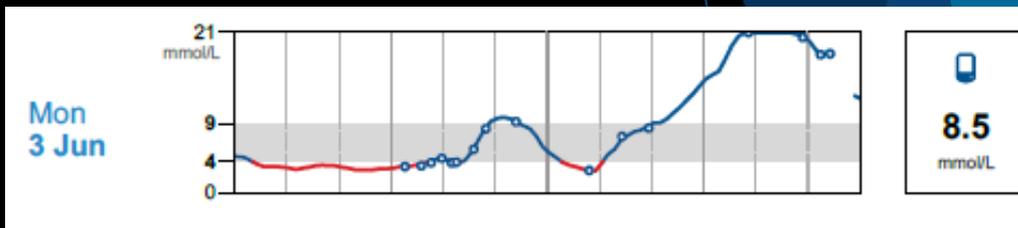
Case Study - Ms C

What does Ms C say?

- ▶ Libre[®] put me in control
- ▶ You get the whole picture not just parts of the jigsaw - readings are in context
- ▶ Easy to use and can add other info easily - a physical memory all in one place, so no need to wonder if eg insulin injected
- ▶ No more sore fingers - can only use 2 fingers due to previous accident
- ▶ Groups were helpful - support of others
- ▶ Able to celebrate each other's successes which helped anxiety

Case Study Mr D - Averages are deceptive

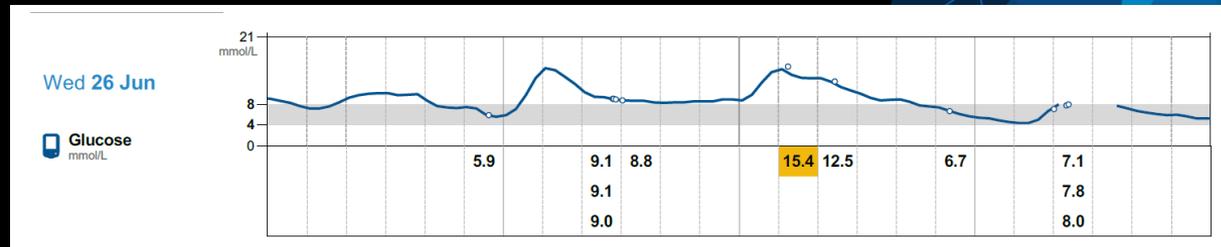
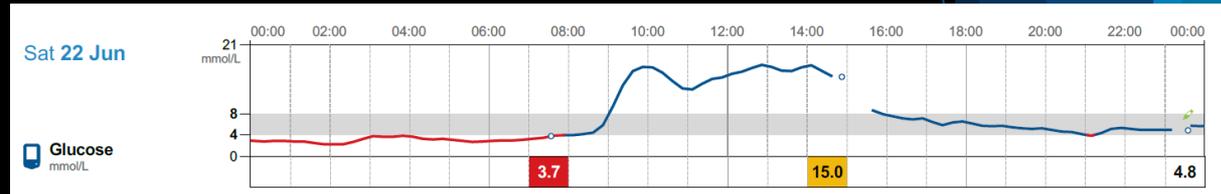
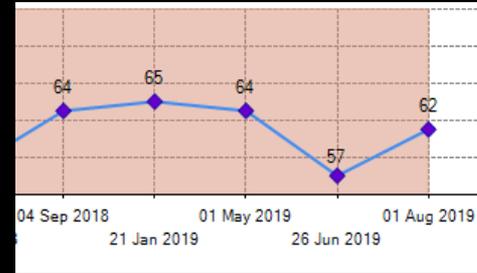
- ▶ 72yo NZ European man,
- ▶ Busy life - lots of volunteering
- ▶ Not feeling too good
- ▶ Tired of people nagging about his diabetes
- ▶ Wife worried about how high his blood glucose readings are
- ▶ HbA1c OK: 61 - 63
- ▶ What's going on?



Too Low overnight - Too high during the day

Case Study Mr E - Averages are deceptive - and in this case maybe dangerous

- ▶ 70yo NZ Maori man (truck driver)
- ▶ HbA1c target 55 - 65 and no hypos
- ▶ Referred to see me by practice nurse as had been working hard on improving blood glucose but not feeling too good - very tired in the morning
- ▶ Waikato Regional Diabetes Service Guidelines blood glucose 5 - 15 to drive



What did we do well?

- ▶ Long appointment gave time for discussion, not rushed: GP is very good but can't achieve this in 15 minutes
- ▶ Felt listened to - consultations were conversations, "what I said was taken in"
- ▶ Felt empowered and treated like individual
- ▶ "What do you think you can you do? - individualised program
- ▶ Food choices appropriate and took likes and money issues into account
- ▶ Support to make choices
- ▶ NOT telling what to do
- ▶ Never, ever, made to feel stupid or useless

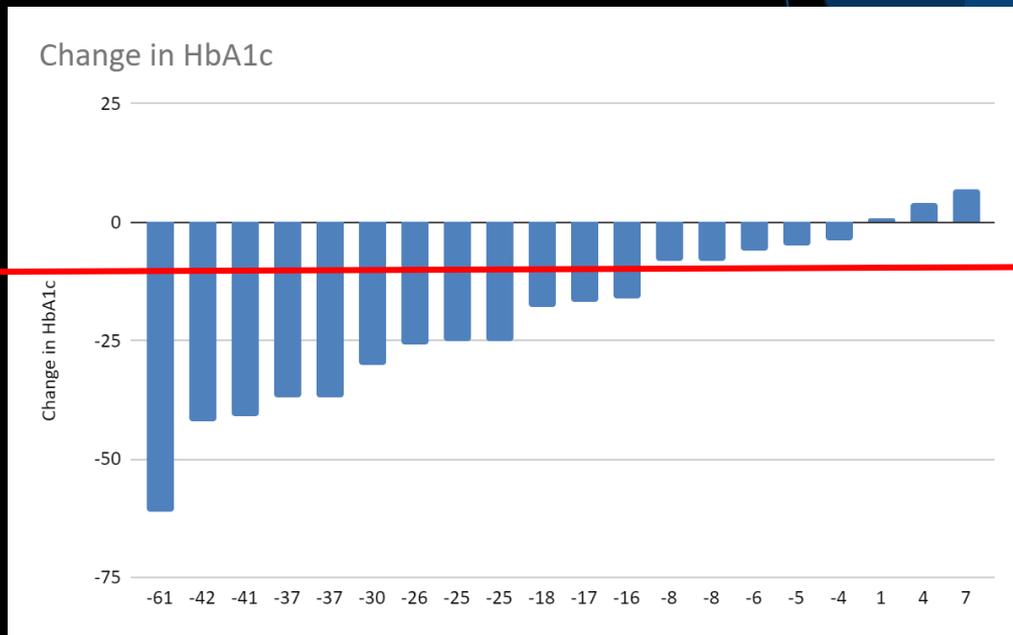
What did people think of using Libre®?

- ▶ “Revolutionised my diabetes management”
- ▶ “Put me in charge of my diabetes”
- ▶ “I can be accountable to myself because I can see for myself what the glucose is doing”
- ▶ “I love it”
- ▶ “How can I get one of my own?”
- ▶ “I couldn’t believe what one sandwich did to my glucose!!”
- ▶ “This thing is magic”
- ▶ “it’s totally changed the way I eat”
- ▶ “it must be broken... it said my glucose went up to 20 after breakfast...”

So what did the project achieve

A drop of 11 mmol/mol in HbA1c substantially reduces risks of diabetic complications

- ▶ 24 people
- ▶ 20 completed
- ▶ 4 not assessed - health issues inappropriate
- ▶ 3 of 20 did not engage and HbA1c increased
- ▶ 5 decrease < 10
- ▶ 3 decrease 10 - 20
- ▶ 4 decrease 20 -30
- ▶ 2 decrease 30 - 40
- ▶ 2 decrease 40 - 50
- ▶ 0 decrease 50 - 60
- ▶ 1 decrease 60-70



These folks will continue to need regular support and follow up to prevent relapse

Raw Data

Pt	1	2	3	4	5	6	7	8	9	10
Before	126	113	112	99	101	93	113	73	88	103
After	75	71	71	62	64	63	87	48	63	85
Change	- 61	- 42	- 41	- 37	- 37	- 30	- 26	- 25	- 25	- 18

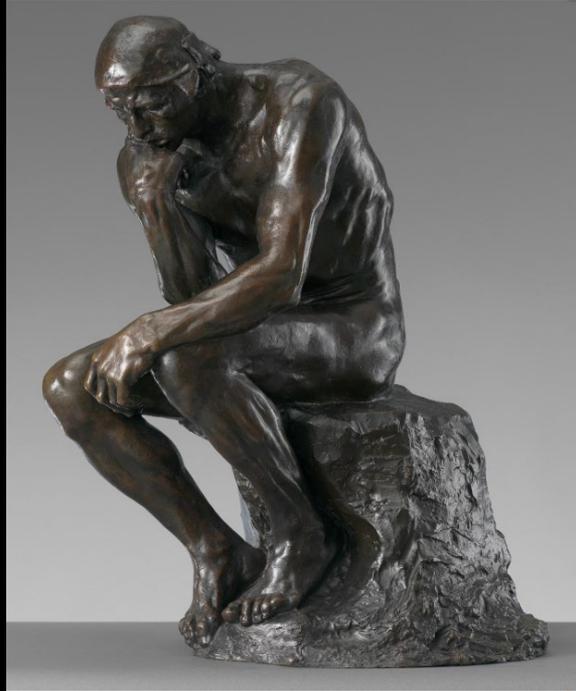
Pt	11	12	13	14	15	16	17	18	19	20
Before	89	112	63	70	81	73	64	76	67	60
After	72	96	55	62	75	68	60	77	71	67
Change	- 17	- 16	- 8	- 8	- 6	- 5	- 4	+ 1	+ 4	+ 7

Why is tight diabetes control so important?

A number of studies have shown many benefits of reducing a high HbA1c level. In these studies, the equivalent of an 11 unit decrease in HbA1c, eg, from 86 to 75 mmol/mol or 75 to 64 mmol/mol leads to:

- a 16% decrease in risk of heart failure
- a 14% decrease in risk of fatal or non-fatal myocardial infarction (heart attack)
- a 12% decrease in risk of fatal or non-fatal stroke
- a 21% decrease in risk of diabetes-related death
- a 14% decrease in risk of death from all causes
- a 43% decrease in risk of amputation
- a 37% decrease in risk of small blood vessel disease (eg, retinal blood vessel disease causing vision loss).

I've been thinking



Should we be managing Type 2 diabetes like we manage smoking cessation?

	Smoking	Type 2 Diabetes
Addictive substance	Nicotine	Fast-digested Carbohydrate Sugar
Support	Quitline, health coaching, Quitcard providers, GPs, nurses, pharmacists, hospitals, spirometry, inhalers....	Variable Time limited
Medication: Step 1	NRT - unlimited	Limited medication range funded Many promote weight gain
Intensive intervention: Step 2	Varenicline (Champix) - 1 course annually	None
Cost to patient	Saves money by quitting	Appropriate food choices more expensive

Yes but those sensors are expensive!!!

Well... depends on the point of view...

- ▶ In-centre dialysis - \$50,000 - \$55,000pa
- ▶ Home dialysis \$25,000pa
- ▶ Angiograms and stents
- ▶ Eye clinic - laser treatments, cataracts
- ▶ Multiple hospital admissions
- ▶ Outpatient appointments
- ▶ Sickness benefits - can't work

Freestyle Libre approx \$55 per week, 26 sensors per year, \$2800pa

But many people won't need one all the time

Two parts to the program -

Libre alone won't work without education and support

If I can delay three people going on to dialysis by a year, every year, I've more than covered my employment costs for the year

If Freestyle Libre® delays in-centre dialysis by a year for one person, the cost saved pays for several hundred Libre® sensors

I Dreamed a Dream...

- ▶ ***What if*** entry to swimming pools was free with a green prescription?
- ▶ ***What if*** we could provide intensive intervention for everyone with likely insulin resistance - before they develop frank diabetes? Tests needed - fasting glucose, HbA1c, renal and liver function tests, and fasting lipid panel - easy
- ▶ ***What if*** we could use new technology intermittently to support positive lifestyle change? And do it early before kidneys or eyes or hearts or nerves are irreparably damaged
- ▶ ***What if*** we taxed sugar? Tax sugary drinks and RTD spirits mixes at the same rate we tax tobacco and spend the money on diabetes prevention and care?

Upskill the Whole Health Workforce

- ▶ Can I run medication optimisation clinics for long-term conditions based in the pharmacies? (Spoiler alert -watch this space)
- ▶ Pharmacist prescribers in General Practice and mobile clinics (but there's only 18 in NZ, plus 12 in hospitals - and we don't qualify for Health Workforce NZ training funding)
- ▶ Clinical Pharmacists based in GP clinics (there are a few around)
- ▶ Community Pharmacy - many different services, for example
 - ▶ Warfarin - CPAMS already in place
 - ▶ Hypertension - BP monitoring in many pharmacies
 - ▶ The need in Type 2 diabetes is huge Could more pharmacists be trained and empowered to help?

▶ And what about Gout?



And what about Gout?