Community & Hospital Diabetes- A clinical perspective

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Aim/ Objective

- Introduction
- Indicator of magnitude of the Problem- Hospital data
- Interactive community and hospital cases inspired by BMJ
- Understanding local/ NICE guidelines

The Robert Hague Centre for Diabetes

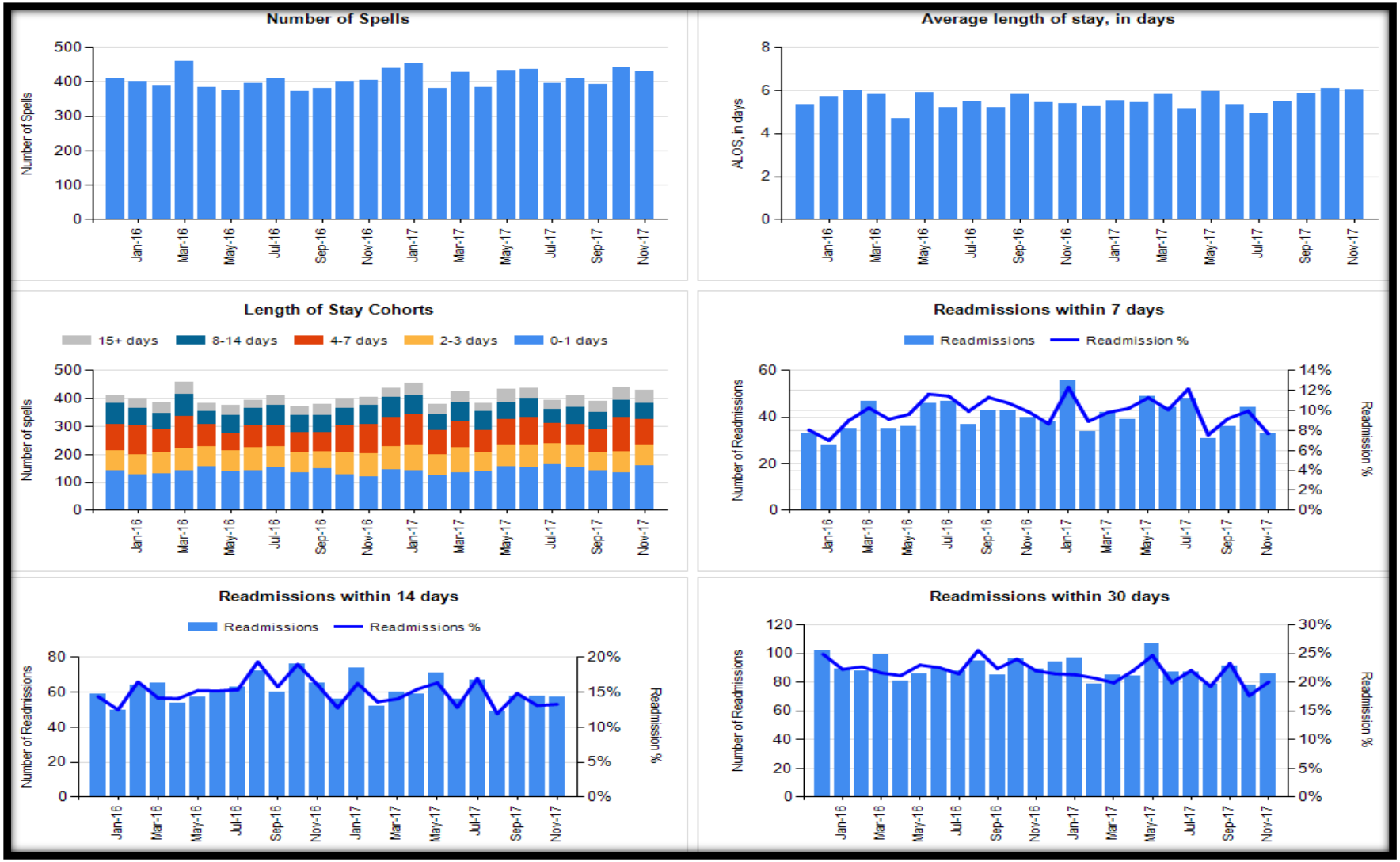
Diabetes Services

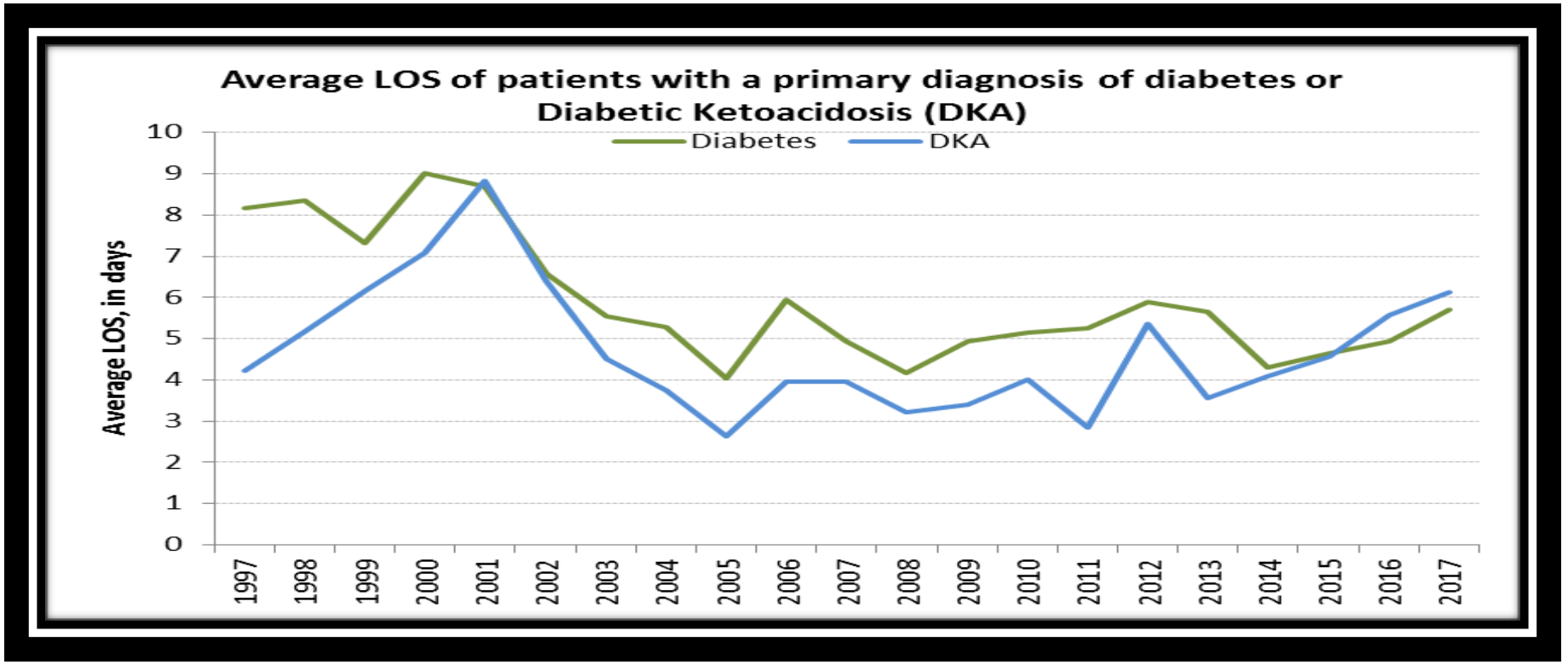
- Podiatrist (Foot Clinic)
- Dietician
- Research and Development
- Young Adult Clinics
- Antenatal Services
- Diabetic Eye Screening
- Insulin Pump Clinics

Endocrinology Services

- Andrology Pituitary disorders
- Growth hormone replacement therapy and thyroid disease
- Full endocrine testing
- Radioiodine therapy – Iodine treatment for overactive thyroid conditions
- Fine needle aspirations of thyroid nodules
- Endocrine antenatal clinics

2016-2017 Diabetes All Diagnosis Data




Average LOS of patients with a primary diagnosis of diabetes or Diabetic Ketoacidosis (DKA)
Diabetes
DKA
Average LOS, in days
0
1
2
3
4
5
6
7
8
9
10
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

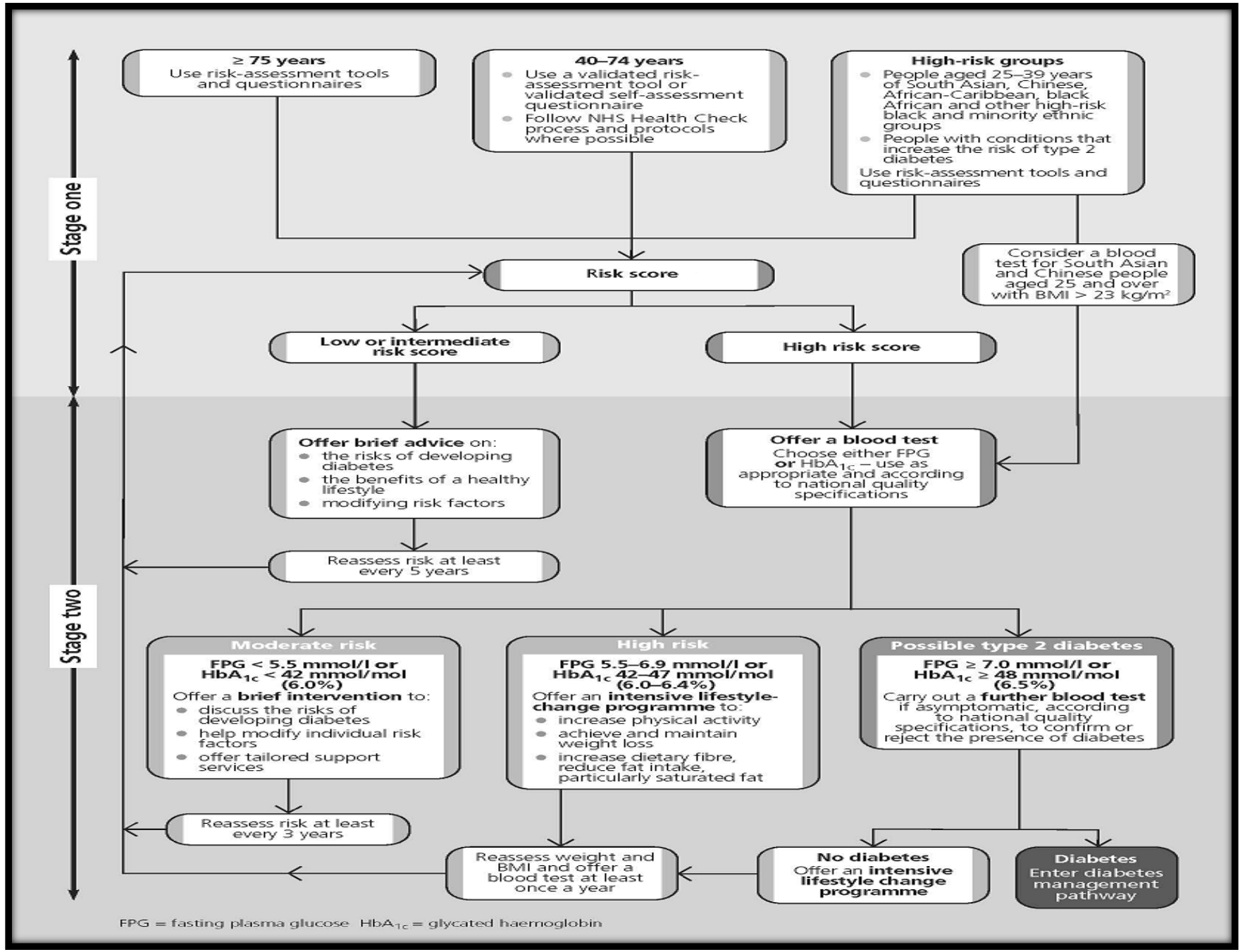
Cases

Diabetes Screening

A 60 year old Caucasian man who has come to see you for routine health check up. He has no medical problems. You calculate that he has a 20% chance of developing diabetes in the next 10 years.

next step?

1. Commence metformin
2. Check HbA1c
3. Offer intensive lifestyle changes
4. OGTT
5. Reassess him in three years


Stage one
Stage two
≥ 75 years
Use risk-assessment tools and questionnaires
40–74 years
Use a validated risk-assessment tool or validated self-assessment questionnaire
Follow NHS Health Check process and protocols where possible
High-risk groups
People aged 25–39 years of South Asian, Chinese, African-Caribbean, black African and other high-risk black and minority ethnic groups
People with conditions that increase the risk of type 2 diabetes
Use risk-assessment tools and questionnaires
Consider a blood test for South Asian and Chinese people aged 25 and over with BMI > 23 kg/m²
Risk score
Low or intermediate risk score
High risk score
Offer brief advice on:
the risks of developing diabetes
the benefits of a healthy lifestyle
modifying risk factors
Offer a blood test
Choose either FPG or HbA1c – use as appropriate and according to national quality specifications
Reassess risk at least every 5 years
Moderate risk
FPG < 5.5 mmol/l or HbA1c < 42 mmol/mol (6.0%)
Offer a brief intervention to:
discuss the risks of developing diabetes
help modify individual risk factors
offer tailored support services
High risk
FPG 5.5–6.9 mmol/l or HbA1c 42–47 mmol/mol (6.0–6.4%)
Offer an intensive lifestyle-change programme to:
increase physical activity
achieve and maintain weight loss
increase dietary fibre, reduce fat intake, particularly saturated fat
Possible type 2 diabetes
FPG ≥ 7.0 mmol/l or HbA1c ≥ 48 mmol/mol (6.5%)
Carry out a further blood test if asymptomatic, according to national quality specifications, to confirm or reject the presence of diabetes
Reassess risk at least every 3 years
Reassess weight and BMI and offer a blood test at least once a year
No diabetes
Offer an intensive lifestyle change programme
Diabetes
Enter diabetes management pathway
FPG = fasting plasma glucose HbA1c = glycated haemoglobin

Pre Diabetes Management

50 year old, South-Asian gentleman has high risk score for diabetes. He had a blood test and his HbA1c has come back at 46 mmol/mol. He does not have any symptoms of type 2 diabetes.

Which is the next step?

1. Commence metformin
2. Diagnose diabetes and refer to a education programme
3. Offer an intensive lifestyle change programme
4. Repeat the HbA1c within one month
5. Tell him all is normal but advise improving lifestyle

Diabetes & Exercise

54 year old man has recently been diagnosed with type 2 diabetes mellitus. His BMI is 32. He says that he walks 20 minutes a day about three days a week.

Is he doing enough physical activity per week?

1. Yes
2. No

Diabetes & Exercise

The best exercise strategy for improving glycaemic control in patients with diabetes?

1. Aerobic training
2. Resistance training
3. Combined aerobic and resistance training

Misleading HbA1c

55 year old is c/o 2 month history of tiredness but no other symptoms. He has no other past medical history. The blood tests show a Hb of 9.5 g/dl (12 to 15 g/dl) and a mean cell volume (MCV) of 67 fl (80 to 90 fl). His HbA1c is 55 mmol/mol.

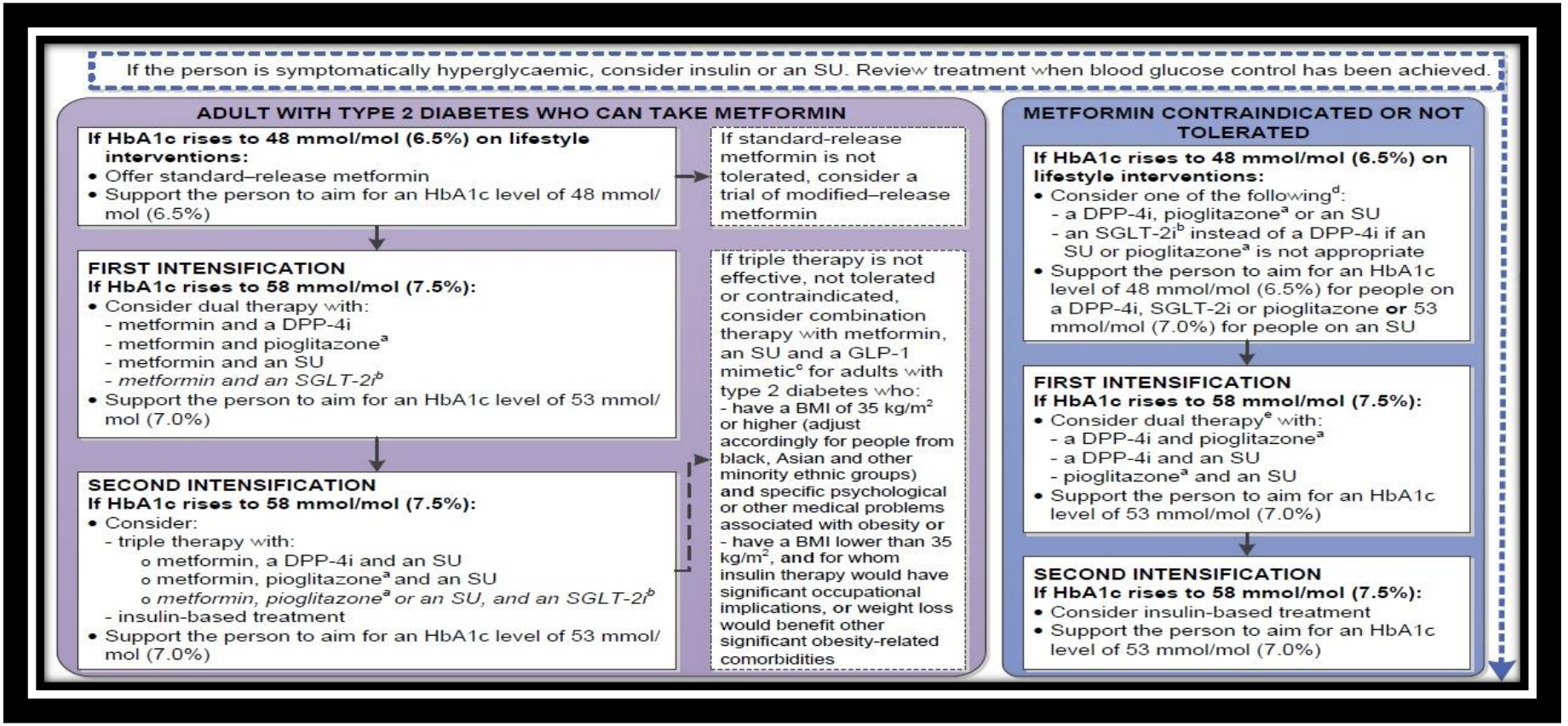
next step?

1. Check iron studies and fasting plasma glucose
2. Diagnose him with diabetes and refer to a diabetes education programme
3. Arrange an oral glucose tolerance test (OGTT)
4. Repeat the HbA1c
5. Reassure him
6. A diabetes risk score

Factors that can result in misleading HbA1c results

- Abnormal red cell turnover conditions Anaemias from haemolysis, spherocytosis or iron deficiency such as in pregnancy may increase the HbA1c
- Haemoglobinopathies
- Certain ones will affect diagnostic criteria eg HbS, HbC, HbF, or HbE. HbA1c may be increased or decreased.
- Rapid onset diabetes In someone with short duration of symptoms
- Near patient testing (also known as point of care testing)

Algorithm for blood glucose lowering therapy in adults with T2 DM



HbA1c target

45 year old scientist was diagnosed with Type 2 Diabetes. He has no other medical problem. He is good with diet and exercise.

Target HbA1c is

1. 42 mmol/mol (6%)
2. 48mmol/mol (6.5%)
3. 53mmol/mol (7.0%)
4. 58mmol/mol (7.5%)

Hba1c target

- Patient individual circumstances/personalize
- Lower in newly diagnosed
- Hba1c 53 improves microvascular complications in 1st decade
- Intensive control does not significantly reduce death from all cause, cvs or macro vascular. Micro vascular improve but not end point.

Type 2 DM management

45 works with heavy machinery worker with Type 2 diabetes. His Bmi 30 kg/m2, Bp 120/80, egfr 78 ml/min, Hba1c 61mmol/mol(7.7). He is on metformin 2 g daily.

In addition to life style modification next step is

1. Add Dpp4, aim hba1c 53 mmol/mol (7%)
2. Add Dpp4, aim hba1c 58mmol/mol (7.5%)
3. Gliclazide, aim hba1c 58mmol/mol(7%)
4. Pioglitazone aim hba1c 58mmol/mol (7.5)

Role of pioglitazone/ thiozolidenedione

- Safety concern useful in selected patients/ Withdrawn due to IHD
- Regulate gene involved in lipid and carbohydrate metabolism, reduce liver glucose production, increase insulin sensitivity in muscles, improving fatty liver and severe insulin resistance
- Wt. gain, fluid retention, heart failure and bone fractures, macular oedema, bladder Ca but no causative role.
- Not given heart failure, hepatic impairment, DKA, bladder cancer, macroscopic haematuria

DPP-4 inhibitors

- Increase incretin, reduce glucagon secretion and increase insulin release
- Hba1c reduction by 0.5 to 1
- Low hypo, no weight gain
- Risk of pancreatitis with incretin based therapies. No causative association
- Heart failure warning with saxa but tecos sita non inferior to placebo for cvs end points no increase in heart failure
- Increase in hospital admission with heart failure: caution but no warning

Type 2 DM Management

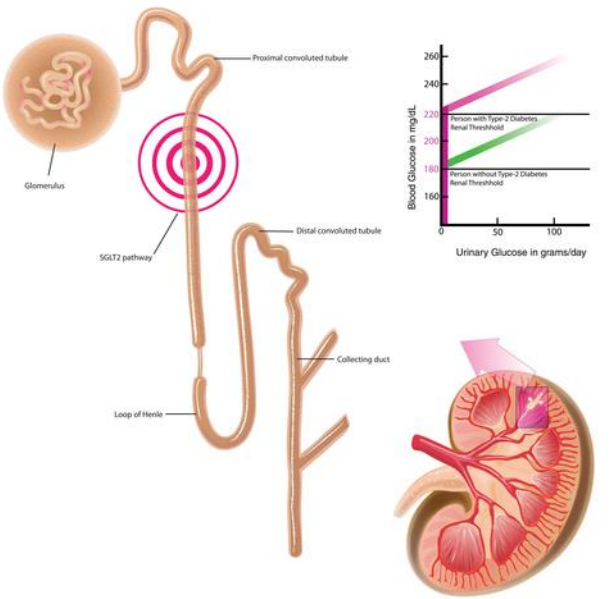
50 year old T2 DM on optimal metformin and gliclazide, pioglitazone, Ace inh, statin. He has angina, MI, sleep apnoea. Bms always high, Hba1c 73.8 (8.9%) and his Bmi 34

Best next option

1. replace pioglitazone with a dpp-4 inh
2. replace pioglitazone with glp 1 agonist
3. Add sglt 2 inh
4. Replace gliclazide with another su

SGLT2 Inhibitor: **Mechanism of action**

- inhibition of Sodium-glucose co-transporter 2
- reduces reabsorption of glucose in the proximal nephron
- resulting in increased urinary glucose excretion
- consequent lowering of plasma glucose levels as well as weight loss.



The kidneys of people with type 2 diabetes reabsorb greater amounts of glucose back into the body compared to non-diabetic people, which may contribute to elevated glucose levels. Canagliflozin, an investigational SGLT2 inhibitor, blocks the reabsorption of glucose by the kidney, increasing glucose excretion and lowering blood glucose levels.

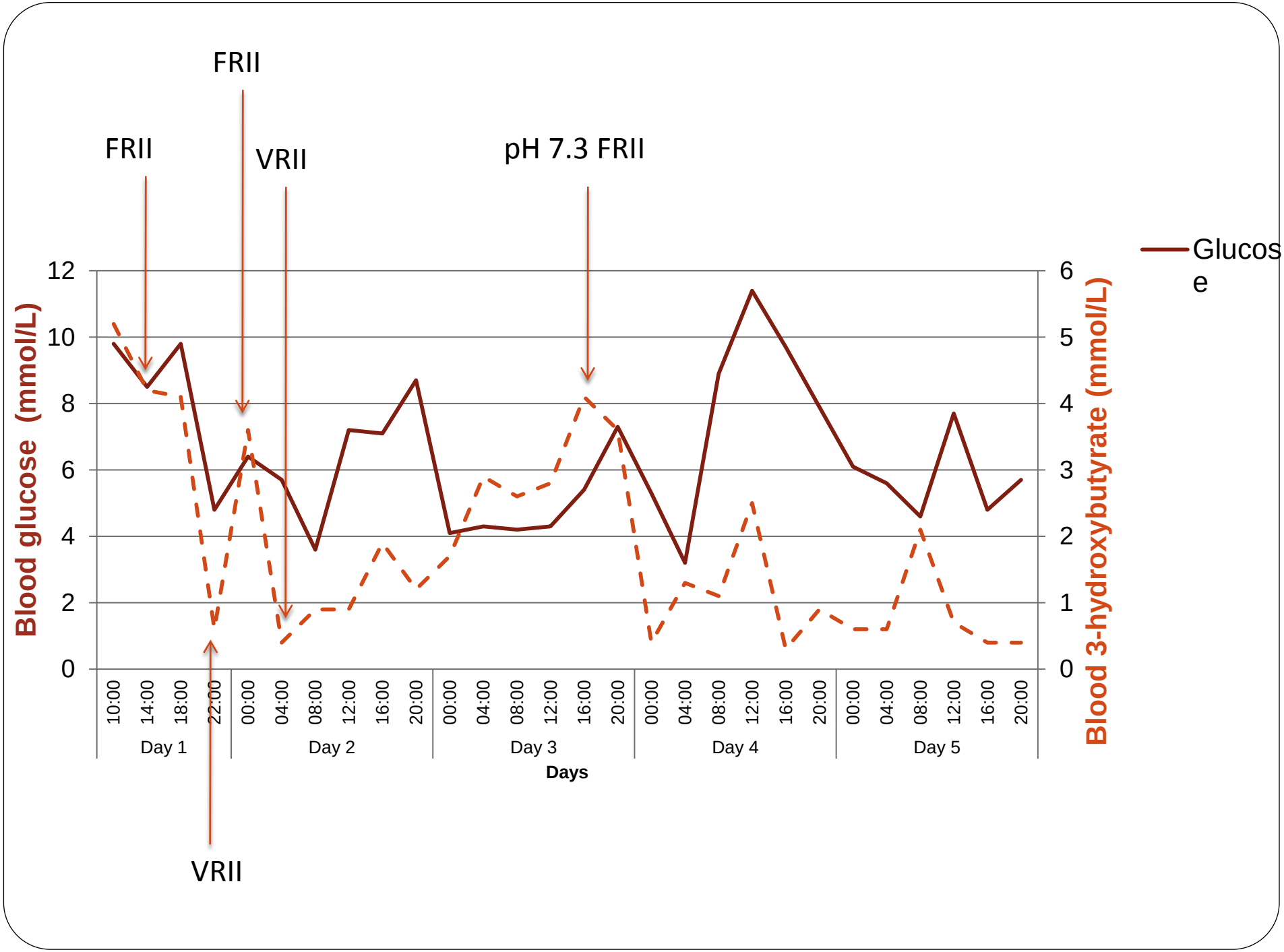
June 2012

SGLT-2 inhibitors

- Reduce Hba1c by 0.5-1%. Weight and BP reduction
- Reducing cardio vascular outcome and death of any cause; Reason for this reducing circulating volume
- *EMPA-reg* -reduced hospitalisation due to HF, CVS death, all cause mortality
- s/e genital inf, uti, volume depleation can cause fall in elderly, increase urinary calcium can cause fracture monitored by fda
- Cana increased amputation/check feet- toe
- Only in combination if hypo or su contraindicated

Diabetic Ketoacidosis associated with SLGT-2 inhibition

- FDA Drug Safety Communication 2015
- A number of DKA cases reported associated with SGLT-2 inhibitors
- Notable that several cases were euglycaemic


FRII
FRII
VRII
pH 7.3 FRII
VRII
Blood glucose (mmol/L)
Blood 3-hydroxybutyrate (mmol/L)
Glucose
0
2
4
6
8
10
12
0
1
2
3
4
5
6
10:00
14:00
18:00
22:00
00:00
04:00
08:00
12:00
16:00
20:00
Day 1
Day 2
Day 3
Day 4
Day 5
Days

Progress

- Clinical condition generally improved
- Overall on VRII for 5 days
- Day 10 of admission (12 since stopping SGLT-2) ketonaemia completely resolved (<1.0)

Prevention of DKA

- Appropriate patient selection
- Consideration of c-peptide/insulin and antibodies
- Patient education
- Discontinuation of treatment at the onset of illness, reduced carbohydrate intake and the day before surgery
- Care with insulin dose reduction
- Consider ketone monitoring

Type 2 Diabetes Management

50 year old patient with Type 2 DM is on Metformin 2 g daily, Gliclazide MR 120 mg/ day, Ace inhibitor, Statin. He had no hypoglycaemic episodes. His Hba1c is 62 mmol/mol, renal function normal, Bmi 34.

Next best option

1. GLP-1 receptor agonist
2. replace metformin with pioglitazone
3. triple oral therapy or insulin
4. no change

GLP-1 receptor agonists

- Recommend with insulin if hba1c above 75 to 86 (9 to 10)
- Benefits-less wt. gain, less hypo
- Loss of upto 3.22 kgs
- Indication-
  - Bmi 35 & problems associated with obesity,
  - lower than 35 insulin therapy will have significant occupational implication ,
  - benefit obesity related comorbidities.
- Continue only if 1% hba1c, wt. loss of 3 % in 6 months.

Initiation of insulin

55 year old, T2 DM from 12 years. On optimal Metformin, Gliclazide MR, Sitagliptin, BMI 30, HBa1c 64mmol/mol (8%), hypo aware, known diabetic complications, active and independent.

Next step

1. Intermediate acting Insulin
2. stop Sitagliptine add GLP 1
3. SGLT2 inh
4. Add pioglitazone
5. Long acting insulin (levemir)

DKA/HHS

- 55 year old male (Mr. B)
- Brought to A&E by paramedics
- Obtunded, could not get out of bed
- No significant PMH
- Not well for the past 1 week, lethargy
- Productive cough 3 days
- Drinking more water
- O/e moves to deep pain but no intelligible speech
- Naloxone no change

- BP 90/50, P/R 115,RR18, t 38.2
- Dry mucous membrane
- Other unremarkable
- Na130, K4.2, Cl 97, HCO3 21, Glucose 1000mg/dl (55.5mmol/L), WCC 14, serum lipemic
- A pH7.34, pCO2 2.0 pO2 7.9,Sats 90%. Blood Ketone 0.9
- CXR LLL consolidation

Diagnosis is

1. Acute Diabetic Ketoacidosis
2. Pseudohyponatremia
3. Pneumococcal Pneumonia with hypoxia
4. HHS/Hyperglycemic hyperosmolar non-ketotic coma

sOsm=2Na+GLU/18+Urea=2*135+55+Urea

AG = Na - (Cl + HCO3)=130-(97+21)= 12

Na = Na + 1.6 x (Glu - 100)/100

lethargy

- Productive cough 3 days
- Drinking more water
- O/e moves to deep pain but no intelligible speech
- Naloxone no change

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HHS

- Hypovolaemia
- hyperglycaemia (30 mmol/L or more) without hyperketonaemia (3 mmol/L) or acidosis (pH 7.3, Hco3 15)
- Osmolality usually 320 mosmol/kg or more
- Measurement of osmolality 2Na+ + glucose + urea
- A mixed picture of HHS and DKA may occur
- High risk of DVT/PE

Steroid and Diabetes

60 year old is on twice daily insulin. He is commenced on 5 mg prednisolone due to new diagnosis of RA.

best option regarding Bm monitoring?

1. Morning , fasting Bm checks when effect of steroid maximum to increase insulin
2. QDS monitoring
3. Rise in BM occurs 2 hours after prednisolone
4. Hypo & hyper can occur in afternoon

Gestational Diabetes Management

A 32 year old woman with a BMI of 36 kg/m2 has a 75 g OGTT at 27 weeks of gestation. The results are:

F P G- 7.9 mmol/L (7), 2 hr. post glucose 9.2 mmol/L(7.8)

Next step?

1. Arrange a review with the practice nurse in 48 hours
2. Start metformin and insulin
3. Arrange an urgent referral to a specialist clinic
4. Refer to a dietitian
5. Start folic acid 5 mg

Pre conception advice

22 year old woman with type 1 diabetes. She is taking basal bolus insulin. She takes OCP. She plans to conceive soon. She wants to stop her oral contraceptive pill. Her last HbA1c six months ago was 87 mmol/mol (10.1%).

What options should you advise her?

1. Don’t try to conceive now
2. HbA1c below 86 mmol/mol will reduce the chances of congenital anomaly
3. she should aim for below 48 mmol/mol (6.5%)
4. All

T 1 Dm in pregnancy

A 31 year old 14 week pregnant woman with type 1 diabetes phones for advice. She is feeling unwell having-nausea for 3 hours although her BMs normal.

Next step?

1. Prescribe cyclizine
2. Send her to A@e
3. Reduce her insulin until she is eating again
4. Test her blood ketones

Post partum

A 30 year old woman see you 10 week post partum. She had gestational diabetes. Metformin was discontinued after pregnancy as gestational diabetes had resolved.

Which test next?

1. 75 g oral glucose tolerance test
2. HbA1c
3. Fasting plasma glucose
4. Random capillary blood glucose

Summary

- Discussed usual, common diabetic presentations
- Management based on local and national Diabetes guidelines
- More insight into integrated care

Thank you

DVLA

- https://www.youtube.com/watch?v=Is96Cwpxtpk