Appendix 1

Questionnaires

Staff diabetes attitudes questionnaire

Michigan Diabetes Research and Training Center Survey Instruments (DAS – 3). Permission to use survey instrument is attached.

Below are some statements about diabetes. Each numbered statement finishes the sentence "In general, I believe that..." You may believe that a statement is true for one person but not for another person, or may be true one time but not be true another time. Mark the answer that you believe is true most of the time or is true for most people. Place a check mark in the box below the word or phrase that is closest to your opinion about each statement. It is important that you answer every statement.

Note: The term "health care professionals" in this survey refers to doctors, nurses, and dieticians.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	In general, I believe that:					
1	...health care professionals who treat people with diabetes should be trained to communicate well with their patients	1	2	3	4	5
2	...people who do not need to take insulin to treat their diabetes have a pretty mild disease.	1	2	3	4	5
3	...there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway.	1	2	3	4	5
4	...diabetes affects almost every part of a diabetic person's life.	1	2	3	4	5
5	...the important decisions regarding daily diabetes care should be made by the person with diabetes.	1	2	3	4	5
6	...health care professionals should be taught how daily diabetes care affects patients' lives.	1	2	3	4	5
7	...older people with Type 2* diabetes do not usually get complications.	1	2	3	4	5
8	...keeping the blood sugar close to normal can help to prevent the complications of diabetes.	1	2	3	4	5
9	...health care professionals should help patients make informed choices about their care plans.	1	2	3	4	5
10	...it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills.	1	2	3	4	5
11	...people whose diabetes is treated by just a diet do not have to worry about getting many long-term	1	2	3	4	5

	complications.					
12	...almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal.	1	2	3	4	5
13	...the emotional effects of diabetes are pretty small.	1	2	3	4	5
14	...people with diabetes should have the final say in setting their blood glucose goals.	1	2	3	4	5
15	...blood sugar testing is not needed for people with Type 2* diabetes.	1	2	3	4	5
16	...low blood sugar reactions make tight control too risky for most people.	1	2	3	4	5
17	...health care professionals should learn how to set goals with patients, not just tell them what to do.	1	2	3	4	5
18	...diabetes is hard because you never get a break from it.	1	2	3	4	5
19	...the person with diabetes is the most important member of the diabetes care team.	1	2	3	4	5
20	...to do a good job, diabetes educators should learn a lot about being teachers	1	2	3	4	5
21	...Type 2* diabetes is a very serious disease.	1	2	3	4	5
22	...having diabetes changes a person's outlook on life.	1	2	3	4	5
23	...people who have Type 2* diabetes will probably not get much payoff from tight control of their blood sugars.	1	2	3	4	5
24	...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.	1	2	3	4	5
25	...Type 2* is as serious as Type 1† diabetes.	1	2	3	4	5
26	...tight control is too much work.	1	2	3	4	5
27	...what the patient does has more effect on the outcome of diabetes care than anything a health professional does.	1	2	3	4	5
28	...tight control of blood sugar makes sense only for people with Type 1† diabetes.	1	2	3	4	5
29	...it is frustrating for people with diabetes to take care of their disease.	1	2	3	4	5

30	...people with diabetes have a right to decide how hard they will work to control their blood sugar.	1	2	3	4	5
31	...people who take diabetes pills should be as concerned about their blood sugar as people who take insulin.	1	2	3	4	5
32	...people with diabetes have the right not to take good care of their diabetes	1	2	3	4	5
33	...support from family and friends are important in dealing with diabetes.	1	2	3	4	5

Revised 12/18/98

Physicians Questionnaire

Please answer the following questions as good as possible. This is not an examination. It will however give an indication of the knowledge of doctors on diabetes inpatient management.

1. Department: _____

2. Level:

Consultant	Registrar Year:_____	MO	Intern

3. On average how many patients with diabetes do you have in your ward / unit at any given time? _____

4. Who is primarily responsible for the management of diabetic patients' blood glucose control in your ward / unit?

Consultant	Registrar	MO	Intern

5. How often do you have difficulty to control your diabetic patients' blood glucose?

Always	frequently	sometimes	seldom	never

6. How often do you consult someone to help you manage your diabetic patients' blood glucose?

Always	frequently	sometimes	seldom	never

7. Who do you consult to help?

_____

8. The diabetic patients admitted to your ward / unit are mostly admitted for what reasons (mention the 2 or three most common reasons for admission)?

_____
_____

9. Do you consider the management of hyperglycaemia in diabetic patients as difficult or problematic?

Yes	No

Why?

_____
_____
_____

10. Do you think that diabetic patients are admitted to hospital for longer compared to non-diabetic patients?

Yes	No	Don't know

11. Do you think that diabetic patients are more prone to develop complications than non-diabetic patients while in hospital?

Yes	No	Don't know

12. How do you request that your diabetic patients' blood glucose be monitored in the ward in general?

_____
_____

13. What is the target blood glucose you are aiming for in inpatients admitted to your wards (not ICU) with diabetes?

_____
_____

14. Describe how you will decide how much insulin a diabetic patient will need when they were not on insulin before and now need to receive insulin in hospital?

_____
_____
_____
_____

15. In a type 2 diabetic patient admitted to your ward for an unrelated problem how will you prescription look if the patient is eating, and not for surgery within the next 3 days. The patient's blood glucose was well controlled with Metformin (Glucophage) 850 mg 3 times per day and gliclazide (Diamicron) 2 tabs (160 mg) 2 times per day?

_____
_____
_____
_____
_____

16. In a type 1 diabetic patient admitted to your ward for an unrelated problem how will you prescription look if the patient is eating, and not for surgery within the next 3 days. The patients blood glucose was well controlled with Actraphane insulin 30 units mane and 16 units nocte?

_____
_____
_____
_____

17. If your patient with type 2 diabetes was well controlled with Metformin 850 mg 3 times per day and gliclazide 2 tabs (160 mg) 2 times per day at home, is unable to eat in hospital. Please write a prescription for this patient?

_____
_____
_____
_____

18. If you have a type 2 diabetic patient treated at home with Metformin 850 mg 3 times daily and Actraphane insulin 40 U in the morning and 20 U in the evening. Your patient is unable to eat. Please write a prescription for this patient in hospital?

_____
_____
_____
_____

19. You have a patient with type 1 diabetes on insulin, Basal bolus regimen: Protaphane 26 u nocte, Rapid acting insulin 12 u before each meal. The patient is going for surgery tomorrow. Please write a prescription for your patient?

_____
_____
_____
_____

20. The target blood glucose for a diabetic inpatient is 5.5 to 8.3 mmol/l

True	False	Don't know

21. If a type 2 diabetic patient on oral therapy who is eating is admitted to hospital, the most correct way to treat the patient is to continue with the oral treatment with the addition of additional insulin boluses according to blood glucose values at mealtime.

True	False	Don't know

22. If a patient with type 2 diabetes on oral therapy is admitted and unable to eat, the most suitable method of treatment is an insulin sliding scale to treat hyperglycaemia.

True	False	Don't know

23. A type 1 diabetic patient admitted for surgery is best managed with a sliding scale if not eating

True	False	Don't know

24. Peri-surgically a patient with diabetes type 1 or 2 should be treated with intravenous insulin

True	False	Don't know

25. Type 1diabetic patients who are eating should have their blood glucose monitored 6 hourly

True	False	Don't know

26. A sliding scale is the best way of deciding how much insulin a patient with diabetes need

True	False	Don't know

27. Insulin adjustments should be made according to an adjustment scale for all patients on insulin in hospital

True	False	Don't know

28. Long acting insulin is contra-indicated in all patients admitted to hospital who are eating

True	False	Don't know

29. Patients with type I diabetes always need some insulin irrespective of whether they are eating or not

True	False	Don't know

30. Combination insulins e.g. Actraphane and Humulin 30/70 are not suitable for use in any patient with diabetes who is admitted to hospital.

True	False	Don't know

Nurses' questionnaire

Please answer the following questions as good as possible. This is not an examination. It will however give an indication of the knowledge of doctors on diabetes inpatient management.

1. Level

Senior Registered nurse	Registered nurse	Staff nurse	Student nurse

2. Unit

Medical	Surgical	Orthopedic/ Ophthalmology /ENT	Gynecology

3. On average how many patients with diabetes are present in your unit / ward at any given time?

_____
_

4. Do you consider a patient to be hypoglycaemic if the blood glucose is 2.9 mmol/l?

Yes	No	Don't know

5. The best schedule to monitor blood glucose is a day profile?

Yes	No	Don't know

6. Is a blood glucose level of 8,3 mmol/l acceptable for a diabetic patient?

Yes	No	Don't know

7. Do you think that diabetic patients are more prone to develop complications than non-diabetic patients while in hospital?

Yes	No	Don't know

8. Do you consider the management of blood glucose in diabetic patients troublesome?

Yes	No	Don't know

9. The forearm is the best place to inject insulin.

Yes	No	Don't know

10. An insulin adjustment scale is the dose of insulin to be given in addition to the usual insulin dose and is determined by the pre-meal blood glucose.

Yes	No	Don't know

11. Protaphane can be injected intravenously.

Yes	No	Don't know

12. To test capillary blood glucose the side of the finger is the best place to do the finger prick.

Yes	No	Don't know

13. Patients that are not eating should not receive boluses of insulin, but rather insulin infusions.

Yes	No	Don't know

14. Please describe how often should blood glucose ideally be tested in diabetic patients when they are admitted to hospital, and at what times.

_____

15. List the best body sites to inject insulin in a diabetic patient?

16. When will you consider a patient to be hypoglycaemic, and how will you respond?

17. Explain what is the difference in an insulin supplementation scale and an insulin sliding scale?

18. What insulins can be given intravenously?

19. Explain how you go about measuring capillary blood glucose? And what blood glucose machine is available in your ward?

20. Under what circumstances should you withhold insulin injections?

21. What are poorly controlled diabetic patients at risk of developing in the hospital?

22. What is the normal blood glucose that we aim for in patients with diabetes?

Diabetes inpatient knowledge questionnaire

Please complete the following questionnaire by circling Yes, No or Don't Know for each answer.				
Knowledge Questionnaire SVO/ver 7/1/06				
	PHYSIOLOGY			
1	Type 1 diabetes is caused by an absolute lack of insulin production.	Y	DK	N
2	Type 2 diabetes is usually associated with insulin resistance.	Y	DK	N
3	Insulin increases blood glucose.	Y	DK	N
4	Type 1 diabetes is more serious than Type 2 diabetes.	Y	DK	N
5	All patients treated with insulin have Type 1 diabetes.	Y	DK	N
6	Obesity is a risk factor for Type 2 Diabetes.	Y	DK	N
	BLOOD GLUCOSE (BG) MONITORING			
7	When the BG meter on the ward is in use Quality Assurance checks should be carried out once a day.	Y	DK	N
8	Whilst in hospital patients with Type 1 diabetes always need 4 tests a day, pre-meal & pre-bed.	Y	DK	N
9	When in hospital patients with Type 2 Diabetes always need to do one BM per day.	Y	DK	N
10	A BG greater than 12 mmol/l should always be reviewed by a doctor.	Y	DK	N
11	It is important to have a pattern of BG measurements over a few days before changing treatment.	Y	DK	N
12	BG measurements in hospital may differ from those recorded by the patient at home.	Y	DK	N
	MEDICATIONS			
13	Metformin typically causes hypoglycaemia.	Y	DK	N
14	Glibenclamide is the drug of choice in Type 2 diabetes.	Y	DK	N
15	Metformin is the drug of choice in patients with Type 2 diabetes who are overweight.	Y	DK	N
16	Gliclazide should be taken after meals.	Y	DK	N
17	Metformin is safe in kidney impairment.	Y	DK	N
	INSULIN			
19	Actraphane or Humulin 30/70 contains 70% cloudy NPH & 30% soluble insulin.	Y	DK	N
20	If you had to mix Actrapid with Protaphane the best technique is to draw up the Protaphane first.	Y	DK	N
21	Pre-mixed insulins are typically taken twice a day.	Y	DK	N
22	Only soluble insulin can be given IV.	Y	DK	N
23	Actrapid should be given 5 min. before food.	Y	DK	N
24	Insulin pen devices must be stored in a fridge.	Y	DK	N
	HYPOGLYCAEMIA			
25	Aggression is a symptom of hypoglycaemia.	Y	DK	N
26	Shaking is a symptom of hypoglycaemia.	Y	DK	N
27	Diabetics may go hypo many hours after exercise.	Y	DK	N
28	Poor intake of carbohydrate is a cause of hypoglycaemia in patients on insulin.	Y	DK	N
29	A cheese sandwich is an appropriate initial treatment for hypoglycaemia.	Y	DK	N

30	When a BM is less than 4 mmol/l you should omit giving insulin.	Y	DK	N
	HYPERGLYCAEMIA			
31	Hyperglycaemia is high blood sugars.	Y	DK	N
32	Lethargy is a symptom of hyperglycaemia.	Y	DK	N
33	Impotence can be caused by longstanding hyperglycaemia.	Y	DK	N
34	Acute illness is a typical cause of Hyperglycaemia.	Y	DK	N
35	Thirst is a symptom of hyperglycaemia.	Y	DK	N
36	If a patient with Type 1 diabetes is ill and has hyperglycaemia, you should check for ketones.	Y	DK	N
	COMPLICATIONS			
37	Retinopathy is the leading cause of blindness in young adults in developed countries.	Y	DK	N
38	Most Type 2 patients with Nephropathy are dead within 5 years of diagnosis.	Y	DK	N
39	Loss of sensation is an indication that the patient is at risk of diabetic foot disease.	Y	DK	N
40	Tight BP control is important in patients with Nepropathy.	Y	DK	N
41	Good glycaemic control can prevent complications of diabetes.	Y	DK	N
42	Patients with diabetes are more at risk of coronary heart disease than patient without diabetes.	Y	DK	N
	SCREENING / PREVENTION			
43	Patients with diabetes should have their eyes checked only if they have problems.	Y	DK	N
44	Patients with diabetes should have their feet checked by a podiatrist or doctor at least every 5 years.	Y	DK	N
45	Proteinuria can signify diabetic kidney disease.	Y	DK	N
46	Patients with diabetes should never cut their own toe nails.	Y	DK	N
47	Patients should only have their eyes checked in the hospital diabetes clinic.	Y	DK	N
48	The Annual Review is a yearly check of eyes, feet, kidneys, cholesterol and BG control.	Y	DK	N
	DIET			
49	Patients with diabetes should have a diet with no sugar, restricted protein, low fat, restricted carbohydrates.	Y	DK	N
50	Patients with diabetes must never eat cakes or sweets.	Y	DK	N
51	Special Diabetic Foods are a good choice for patients with diabetes.	Y	DK	N
52	Peas, beans & lentils can help control BG levels.	Y	DK	N
53	Patients with Type 1 diabetes need a late night snack.	Y	DK	N
54	Patients with diabetes must not drink alcohol.	Y	DK	N
	SURGERY / FASTING			
55	The most appropriate way to manage a patient on insulin going to theatre is to use an insulin infusion & adjustment scale.	Y	DK	N
56	When changing from a glucose constant infusion back to the patients normal insulin you should stop the GKI the night before you start the normal insulin.	Y	DK	N

57	Patients with diabetes often need to stay in hospital longer after surgery than patients without diabetes.	Y	DK	N
58	Patients with diabetes must never be fasted for a hospital procedure.	Y	DK	N
59	When possible patients with diabetes should be on the morning list for surgery.	Y	DK	N
60	Patients with Type 1 diabetes who are unable to eat should be on a insulin.	Y	DK	N
	GENERAL			
61	HbA1c is a test to measure average BG over 6 – 12 weeks	Y	DK	N
62	Patients on insulin cannot drive public service vehicles.	Y	DK	N
63	Patients with diabetes are not excluded from any forms of employment.	Y	DK	N
65	There are national guidelines for the management of type 2 diabetes.	Y	DK	N

Appendix 2

Inpatient diabetes management protocol for patients eating meals

Diabetes Insulin Prescription for Patients Eating

A. *Scheduled Insulin – given subcutaneously*

Regular insulin should be given 20 to 30 minutes before meals and 30/70 insulin should be given 20 to 30 minutes before breakfast and dinner.
Bedtime (22h00) insulin should be given with the evening snack, more or less 22h00
Patients on oral agent should continue with treatment as usual unless a contraindication for the use of oral agents is present.
All patients should continue their home insulin regimen.
Patients newly started on insulin should be initiated as follows:

- Type 2 diabetic patients: 0.2 – 0.3 u per kg per day. This can be started as once daily NPH insulin at bedtime, as long as less than 20 u are needed per day. If more than 20 u are needed either twice daily 30/70 premixed insulin or a basal bolus regimen can be started. Metformin should be continued; Sulphonylureas can be stopped or continued.
- Type 1 diabetic patients: 0.5 to 0.7 u per kg per day. This should be given either as a basal bolus regimen or twice daily 30/70 premixed insulin.
- NPH or evening 30/70 premixed insulin should be adjusted according to the morning pre-breakfast glucose.

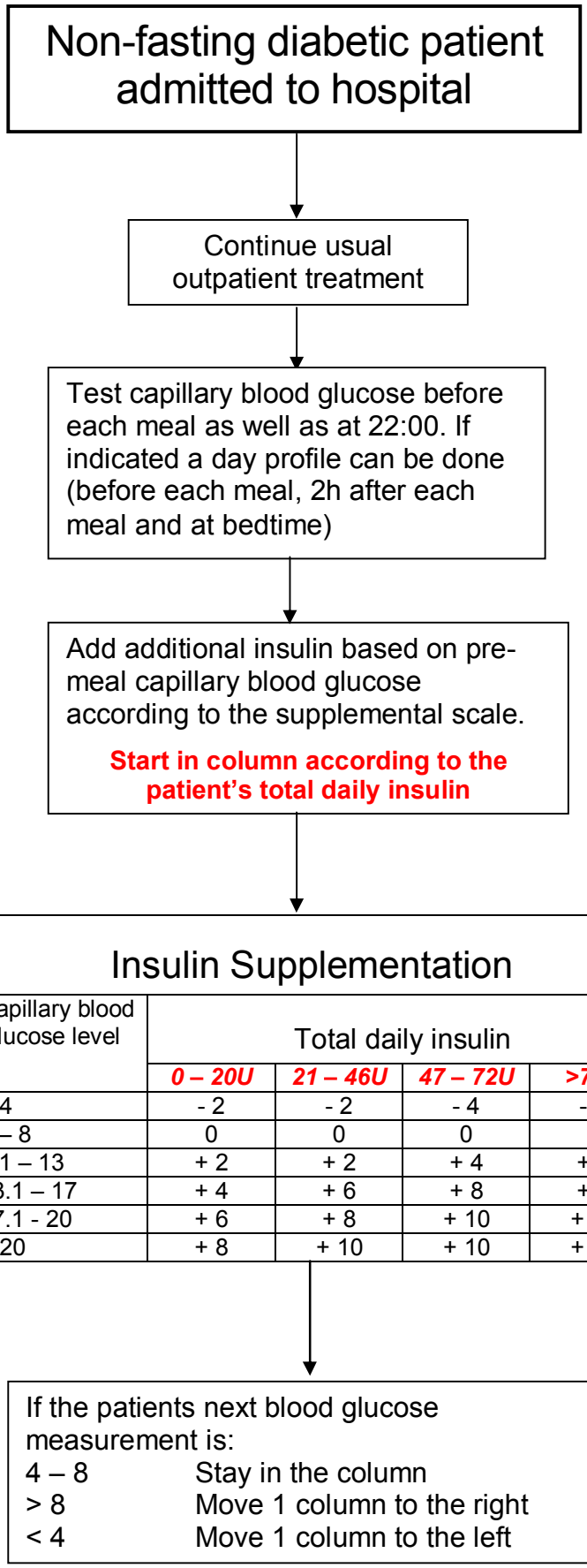
B. *Adjustment / Supplemental / Correctional insulin*

- This should be administered in addition to the SHEDULED insulin or oral agents.
- Supplemental / Adjustment insulin should always be given 20 to 30 min before meals as regular insulin.
- Patients on oral agent only can receive only supplemental insulin in addition to the oral medication.
- Patients on Regular insulin before meals, supplemental insulin can be added to the scheduled insulin and given simultaneously.
- Patients on only NPH or 30/70 insulin should receive the Supplemental insulin as an additional injection.
- Known type 1 diabetic patients and type 2 diabetic patients on insulin – initiate additional insulin according to the column corresponding to the total daily insulin dose that the patient receives.
- Type 2 diabetic patients on oral treatment should be started in column A.
- If pre-meal blood glucose measurements are higher than 8 mmol/L on 2 occasions move one column to the right. If it is lower than 4 mmol/L on two occasions move one column to the left.

Insulin Supplementation (Always Regular insulin)

Capillary blood Glucose level mmol/L	**Total daily insulin**				
	A 0 – 20U	**B 21 – 46U**	**C 47 – 72U**	**D >72U**	**E individualised**
< 4	Initiate hypoglycaemia regimen				
6 – 8	+ 0	+ 2	+ 4	+ 6	
8.1 – 10	+ 2	+ 4	+ 6	+ 8	
10.1 - 13	+ 4	+ 6	+ 8	+ 10	
13.1 – 17	+ 6	+ 8	+ 10	+ 12	
17.1 - 20	+ 8	+ 10	+ 12	+ 14	
> 20	+10	+12	+14	+16	

Regular: Actrapid or Humulin R NPH: Protaphane or Humulin N 70/30: Actraphane or Humulin 70/30

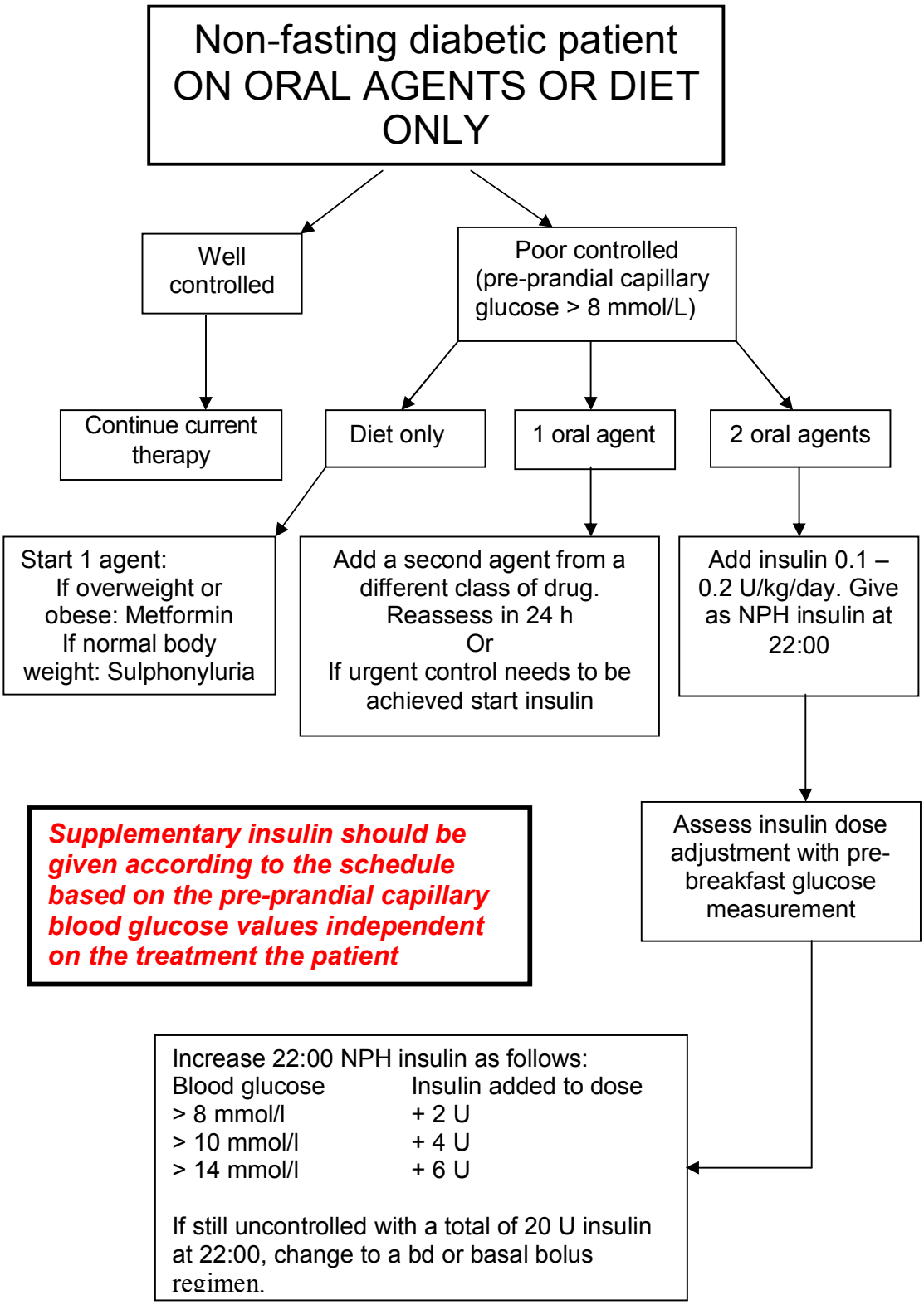


Insulin Supplementation

Capillary blood Glucose level	Total daily insulin			
	0 – 20U	***21 – 46U***	***47 – 72U***	***>72U***
< 4	- 2	- 2	- 4	- 6
4 – 8	0	0	0	0
8.1 – 13	+ 2	+ 2	+ 4	+ 6
13.1 – 17	+ 4	+ 6	+ 8	+ 8
17.1 - 20	+ 6	+ 8	+ 10	+ 10
> 20	+ 8	+ 10	+ 10	+ 12

If the patients next blood glucose measurement is:

4 – 8	Stay in the column
> 8	Move 1 column to the right
< 4	Move 1 column to the left


Non-fasting diabetic patient ON ORAL AGENTS OR DIET ONLY
Well controlled
Poor controlled (pre-prandial capillary glucose > 8 mmol/L)
Continue current therapy
Diet only
1 oral agent
2 oral agents
Start 1 agent: If overweight or obese: Metformin If normal body weight: Sulphonyluria
Add a second agent from a different class of drug. Reassess in 24 h Or If urgent control needs to be achieved start insulin
Add insulin 0.1 – 0.2 U/kg/day. Give as NPH insulin at 22:00
Supplementary insulin should be given according to the schedule based on the pre-prandial capillary blood glucose values independent on the treatment the patient
Assess insulin dose adjustment with pre-breakfast glucose measurement
Increase 22:00 NPH insulin as follows:
Blood glucose Insulin added to dose
> 8 mmol/l + 2 U
> 10 mmol/l + 4 U
> 14 mmol/l + 6 U
If still uncontrolled with a total of 20 U insulin at 22:00, change to a bd or basal bolus regimen.

Non-fasting diabetic patient USUALLY ON INSULIN.

Patient usually on basal bolus regimen

Continue regular insulin boluses (usually Actrapid or Humulin R before meals).
Continue with basal insulin (usually NPH in evenings) at 22:00
Since in-hospital diet is more strictly regulated the dosage might need to be reduced by ± 80% of the usual home insulin.
The usual hospital diet contains more or less equal amounts of carbohydrates for breakfast, lunch and dinner. Thus the regular insulin boluses should be of equal size.
Give additional regular insulin according to the pre-meal blood glucose according to the supplementation insulin scale.
If the pre breakfast blood glucose is high on two consecutive mornings increase the evening NPH with 2 to 4 units.
If a new patient needs to be started on basal bolus insulin: Total daily dose of combination insulin: 0.5 to 0.7 x body weight (kg). Give 40% as NPH at 22:00 and 20% before each meal.

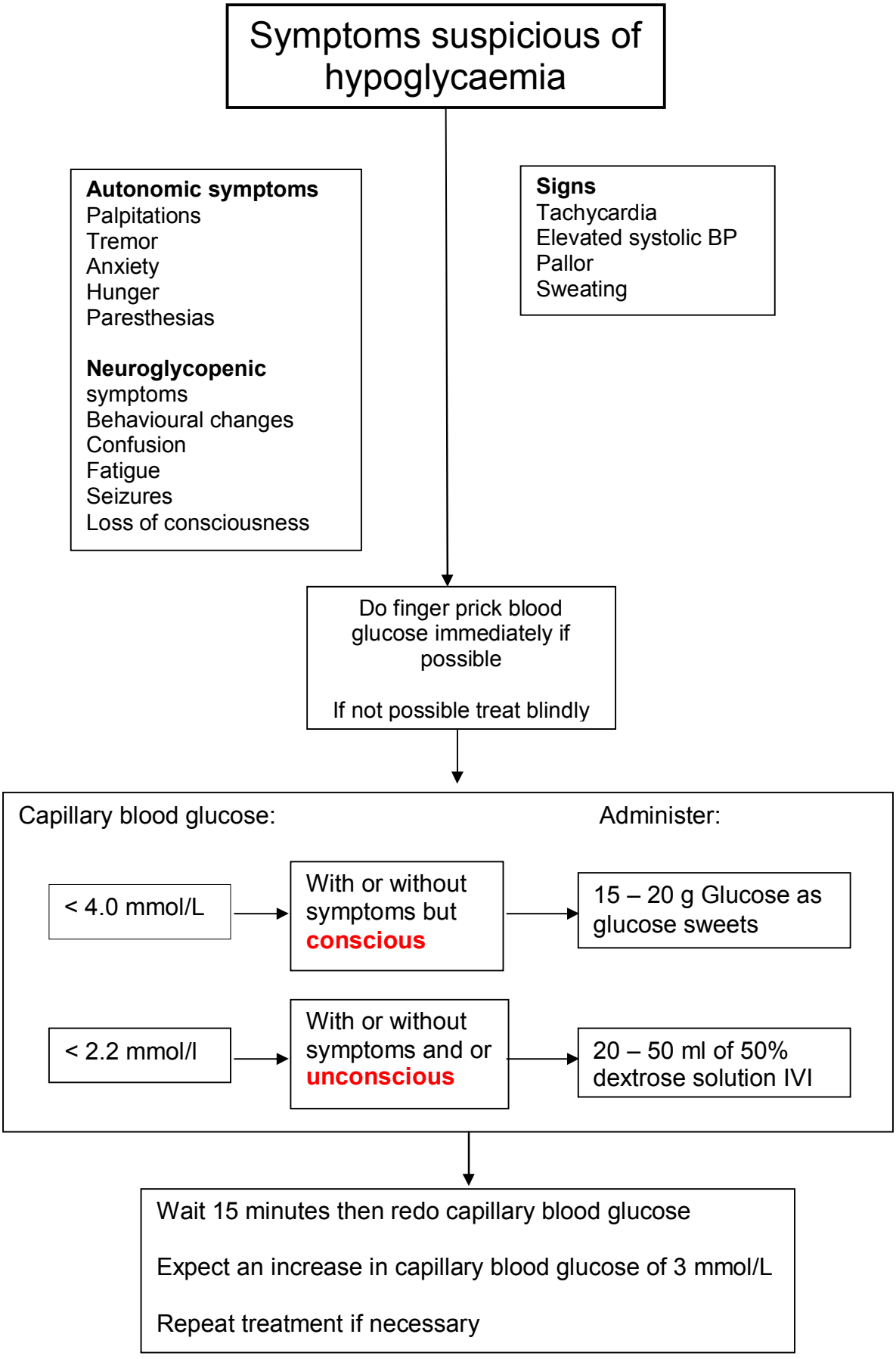
Patient usually on bd combined insulin

Continue with home regimen. Give additional regular insulin, according to the pre-meal blood glucose according to the supplementation insulin scale.
If a new patient need to be started on bd insulin:
Calculate the dose as follows:
Total daily dose of combination insulin: 0.5 to 0.7 x body weight (kg). Give 66% of this before breakfast and 33% before dinner.

Note that any patient on NPH insulin can develop hypoglycaemia during the night. This can manifest as either hypoglycaemia or hyperglycaemia in the morning before breakfast. Thus all patients with before breakfast hyper- or hypoglycaemia should have a blood glucose done between 2:00 and 4:00 at night

Insulin Supplementation

Capillary blood Glucose level	Total daily insulin			
	0 – 20U	***21 – 46U***	***47 – 72U***	***>72U***
< 4	- 2	- 2	- 4	- 6
4 – 8	0	0	0	0
8.1 – 13	+ 2	+ 2	+ 4	+ 6
13.1 – 17	+ 4	+ 6	+ 8	+ 8
17.1 - 20	+ 6	+ 8	+ 10	+ 10
> 20	+ 8	+ 10	+ 10	+ 12


Symptoms suspicious of hypoglycaemia
Autonomic symptoms
Palpitations
Tremor
Anxiety
Hunger
Paresthesias
Neuroglycopenic symptoms
Behavioural changes
Confusion
Fatigue
Seizures
Loss of consciousness
Signs
Tachycardia
Elevated systolic BP
Pallor
Sweating
Do finger prick blood glucose immediately if possible
If not possible treat blindly
Capillary blood glucose:
Administer:
< 4.0 mmol/L
With or without symptoms but conscious
15 – 20 g Glucose as glucose sweets
< 2.2 mmol/l
With or without symptoms and or unconscious
20 – 50 ml of 50% dextrose solution IVI
Wait 15 minutes then redo capillary blood glucose
Expect an increase in capillary blood glucose of 3 mmol/L
Repeat treatment if necessary

ONE WEEK BLOOD GLUCOSE CHART

WEEK: 1 2 3 4 5

A – actrapid/humulin R
AP – actraphane/ humulin 30/70
P – protaphane/ humulin N

For patients eating and not on Actrapid infusion

Do blood glucose 4x/day
*Before meals + bedtime (22:00)
If prescribed do 7x/day (Day profile)
*Before meals, 2h after meals and at bedtime
If requested do at 02h00

Patient name:

Hospital number:

			Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
		DATE							
Breakfast	Before	Time							
		Value							
		Insulin AP							
		Insulin A							
	After	Time							
		Value							
Lunch	Before	Time							
		Value							
		Insulin							
	After	Time							
		Value							
Dinner	Before	Time							
		Value							
		Insulin AP							
		Insulin A							
	After	Time							
		Value							
Bedtime	22H00	Time							
		Value							
		Insulin P							
Night	02H00	Time							
		Value							