

# The Practice of Delivering Diabetes Medicines Optimisation

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# Agenda

- Background (NaDIA and local data)
- Challenges facing secondary care in managing patients with diabetes
- How we have tried to overcome some of these challenges
- What have been the outcomes

# NaDIA

- **National Diabetes Inpatient Audit**
- **NaDIA 2011 key findings (March 2012)**
  - Length of stay 8 days for those with DM vs 5 days for those without
  - 32.4% experienced at least one medication error
  - 17.4% of patients with medication errors experienced a severe hypoglycaemic episode compared to 7.5% who did not have a medication error

# NaDIA 2010

## Patient Perceptions

- Were staff knowledgeable about diabetes?
  - 65% (national average result)
  - 46.1% (UHL)
- Were staff able to answer questions about your diabetes?
  - >50% (national average result)
  - 29.4% (UHL)

# Work undertaken by East Midlands SHA

- Prof Melanie Davies  
(Clinical Lead for East Midlands SHA and the Diabetes Work-Stream Steering Group)
- Establish a set of key performance indicators for diabetes
- Bench-marking exercise
  - Collecting data to compare ourselves to other areas and establish baseline data to measure improvements


# Summary of KPIs

1. The percentage of readmissions within 30 days as diabetes emergencies
2. The percentage of people with diabetes admitted with ketoacidosis
3. The percentage of people with diabetes admitted with hypoglycaemia
4. Reduction in insulin errors in the inpatient setting
5. Ratio of number of places an accredited education programme to the number of registered patients with diabetes
- 6a Ratio of DPP4 inhibitors to SU prescriptions per PCT
- 6b Ratio of analogue to human insulin
7. The increase mean length of stay for patients with diabetes compared to the non-diabetic population for MI, knee or hip replacement, LRTI
8. Percentage of people with diabetes receiving 9 key care processes adjusted for either exception reporting or percentage delivered to the audit
9. Percentage of people who have ever participated in an educational training course on how to manage their diabetes
10. Total spend on prescribing compared to people with diabetes with an HbA1c of 7.5 or less
11. Percentage of people undergoing a major amputation
- 12a Registration and submission of data
- 12b Participation in the National Diabetes Audit for paediatric diabetes
13. Average number of bed days per patient with diabetes

# Admissions with DKA in CCGs over time

CCG	01/01/2010	01/01/2011	01/01/2012	01/01/2013	01/01/2014	01/01/2015	01/01/2016	01/01/2017	01/01/2018	Trend	
BOSTON	31.1	62.2	81.3	83.7	88.5	81.3	78.9	81.3	5.2		
CORBET	23.6	42.5	51.9	56.6	66.1	66.1	70.8	84.9	7.4		
E LEICS	12.5	19.2	25.1	26.6	22.1	31.7	36.1	39.1	3.4		
E LINCOLN	16.0	24.0	30.0	30.0	30.0	34.0	40.0	34.0	2.6		
EREWASH	32.6	52.2	80.4	80.4	89.1	84.8	78.2	69.6	4.9		
HARDWICK	21.9	38.8	59.1	43.9	50.6	42.2	28.7	33.8	-0.1		
HIGH PEAK	4.0	11.9	23.8	27.8	31.8	43.7	47.7	55.6	7.2		
LEICS CITY	28.1	45.6	56.6	54.6	54.6	54.1	53.1	51.1	2.3		
LINCOLN W	19.6	29.4	45.0	45.0	46.0	49.9	48.9	49.9	3.9		
LINCS SW	11.9	18.7	32.2	39.0	52.6	61.0	62.7	67.8	8.5		
MANFIELD	32.1	48.2	76.9	81.5	86.1	107.9	106.7	110.2	11.1		
MARK	36.8	46.7	63.6	61.6	56.6	68.5	65.6	69.5	4.0		
NENE	29.9	42.6	57.6	51.6	52.7	55.3	52.4	54.6	2.6		
NEWARK	16.2	30.6	48.5	57.5	70.1	70.1	75.5	71.9	8.2		
N DERYS	11.2	28.4	34.5	38.8	33.6	29.3	32.7	30.2	1.6		
NOTTS CITY	43.2	75.2	108.7	106.5	105.0	104.3	97.6	97.6	5.7		
NOTTS N&E	38.6	49.0	63.8	56.4	44.5	50.4	47.5	37.1	-0.8		
NOTTS W	7.2	28.7	40.7	45.5	45.5	31.1	25.3	25.7	1.3		
PRINCIPIA	18.3	34.3	48.0	45.7	54.9	57.2	61.7	75.5	6.8		
SKEGNESS	7.1	12.5	23.2	30.3	39.3	44.6	51.7	50.0	6.8		
S HOLLAND	16.2	20.8	37.0	25.4	32.3	53.1	46.2	62.4	6.0		
S DERBYS	24.4	45.8	64.1	66.3	70.2	68.3	66.0	60.2	4.4		
MELLCOMM	8.7	17.4	28.9	31.8	34.7	37.6	34.7	31.8	3.3		
W LEICS	13.3	24.6	35.2	40.5	40.5	44.5	47.1	45.1	4.3		

# Admissions with hypoglycaemia in CCGs over time

CCG	RY Q2 0910	RY Q3 0910	RY Q4 0910	RY Q1 1011	RY Q2 1011	RY Q3 1011	RY Q4 1011	RY Q1 1112	TREND	
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# Challenges in secondary care for managing patients with diabetes

- Times are particularly tough financially
  - NHS needs to save £20 billion by 2015
  - Meeting CQUIN targets
- Need to reduce the number of medication errors
  - Medication errors have been estimated to cost the NHS over £500 million a year in additional days spent in hospital
- Lots of patients have diabetes (15-20%) only 4.6% are on a specific diabetes ward (UHL data)
- Complexity of diabetes patients
- Complexity of diabetes medicines
  - Average number of medicine taken = 7.2

# Challenges in secondary care for managing patients with diabetes

- Need to reduce avoidable hospital admissions
  - Up to 50% of medicines prescribed are not taken as intended
    - Over 66% of people with T2DM do not take OHAs as prescribed
    - Average cost of an admission for DKA is about £1,450
    - Average cost of an admission for severe hypoglycaemia caused by insulin is about £850
- Adherence to NICE guidance
- Adherence to JBDS guidance
- Finding out insulin doses

# Diabetes MDT

- Diabetes in-patient steering group
- Diabetes consultant
  - Head of service for diabetes (another consultant)
  - Consultant Nurse
  - Diabetes Matron
  - DSN x 2
  - Dietician
  - Member of diabetes research team
  - Diabetes pharmacist

# Reducing the number of medication errors

- Errors may result in:
  - poor glycaemic control
  - increased risk of infection
  - increased morbidity and mortality
  - increase in number of hypoglycaemic episodes
  - increased length of stay
  - potential for being sued
  - poor NaDIA data
  - poor perception of our services

# National initiatives to increase patient safety in diabetes

- NPSA
  - RRR on 'safe administration of insulin' (June 2010)
  - Insulin passport (March 2011)
- NICE care quality standards for diabetes (March 2011)

# National initiatives to increase patient safety in diabetes

- JBDS national guidance on
  - Hypoglycaemia (March 2010)
  - DKA (March 2010)
  - Surgery (April 2011)
  - Enteral feeding of stroke patients (June 2012)
  - HHS [HONK] (Aug 2012)

# National initiatives to increase patient safety in diabetes

- Never Events
- Death or severe harm
  - Use of any abbreviation for 'unit' or
  - Unclear or misinterpreted verbal instruction to a colleague
  - Failure to use a specific insulin device to administer
  - Failure to give insulin when correctly prescribed

# What more can be done to reduce the number of medication errors?

- Understand what errors are occurring
- Education: Up-skilling the work force
  - Prescribers
  - Pharmacy staff
  - Nursing staff



# Better understanding of what errors are occurring – 1

- Analysis of Trust's self-reported error data
  - Monthly analysis of all Datix errors containing key words relating to diabetes care e.g.
    - Insulin
    - Diabetes
    - Metformin

# Analysis of self-reported errors

- Datix reports Sept-Nov 2011
  - 60 datix reports, 84 errors
    - 11 x wrong insulin prescribed
      - 4 x Humalog / Humalog Mix 25 mixups
      - 3 x NovoRapid / NovoMix mixups
    - 11 x issues with IV insulin
    - 5 x insulin deliberately wrongly omitted
    - 4 x insulin accidentally omitted
    - 4 x problems with prn insulin
    - 4 x mismanagement of hypos

## Better understanding of what errors are occurring – 2

- Analysis of interventions made by pharmacists
- All pharmacists urged to report their insulin / diabetes interventions on a pharmacy-specific database
  - Interventions analysed
  - 71 interventions between Oct 2011 and Jan 2012

# Most common pharmacist interventions

- 20 x no device / wrong device
- 16 x wrong insulin prescribed
  - 2 x Novo Nordisk prescribed
- 11 x insulin missed off drug charts
- 4 x wrong dose prescribed
- 4 x IV insulin errors
- 4 x 'u' prescribed
- 2 x problems with 'prn' insulin

# Up-skilling the pharmacy workforce

– 1

- ‘Safe use of insulin’ e-learning module made mandatory for all clinical pharmacy staff

# E-learning module study

## Method

- Pharmacy staff who had not already completed the module invited to take part
  - New intake of pre registration pharmacists all included
- Given 20 questions on insulin use to complete
  - baseline data
- Asked to complete e-learning module
- Repeated the same 20 questions on insulin use

# E-learning module study Results

- 23 pharmacy staff offered to take part
- 23 completed the first set of questions
- 16 (70%) undertook the e-learning module and completed the second set of questions

# E-learning module study

## Results

- Mean average score for the first questionnaire = 14.3 (range 11-18)
- Mean average score for the second questionnaire = 16.2 (range 15-19)
- ~ 10% improvement
  - Pre regs baseline data and post learning data was almost identical to that of the experienced pharmacists



# Up-skilling the pharmacy workforce

– 2

- 1:1 ward visits with clinical pharmacists
  - Surgical pharmacy team chosen
  - Non-threatening, admit misunderstandings, not being judged

# 1:1 ward visits with clinical pharmacists from surgery team

- 5 pharmacists
  - 6 visits
- Together we looked at drug chart and diabetes prescribing/monitoring chart
- Discovered most pharmacists did not routinely look at the blood glucose monitoring results

# Highlights of problems identified

1. Patient receiving QDS blood glucose monitoring
  - All results within normal range
  - Not on any diabetes medicines
  - Did not have diabetes
  - Had had insulin plus glucose infusion for hyperkalaemia and 10 days later was still having QDS blood glucose monitoring

# Highlights of problems identified

2. Humalog instead of Humalog Mix25
3. Patient on I/V and S/C together
4. PRN Actrapid 6 units given twice (1 hour apart)
5. Hypo was treated with 'cup of tea' – no documentation as to if there was sugar in it or not.

Ward not using their hypo box

# Surgical pharmacists' impressions

- All said it had been very helpful
  - One asked for another 1:1 session
- Liked being shown a system for checking medicines alongside blood glucose readings
- All appeared at ease in talking about the things they found difficult when screening diabetes charts

# My impressions of 1:1 training

- Time consuming
- Very valuable for the pharmacists and for me
- I learned what they struggled with
- Most did not know the individual insulin profiles
  - Not able to determine if insulin regimen made sense
    - Not able to pick up if wrong insulin prescribed
  - Confirmed for me what to include in future diabetes medicines / insulin training sessions

# Better care of in-patients with diabetes

- Some patients need access to specialists in diabetes care
  - NaDIA 2010 data
    - 46% with a specific diabetes management problem had not seen the diabetes team
    - Patients lacked faith in the ability of regular ward staff concerning diabetes care

# Diabetes 'in-reach'

- Diabetes team will go to see in-patients with diabetes on non-diabetes wards
  - Direct electronic referral (normally picked up by diabetes specialists nurses)
  - Bleep on-call diabetes SpR
  - 'In reach' to specific wards with a high volume of diabetes patients
    - Vascular ward (started Feb 2012)



# In-reach to vascular ward

- Diabetes consultant, diabetes pharmacist
  - Sometimes a surgical SpR
  - Weekly visit
- See all patients on the ward with diabetes
  - 20-40% of ward
- Most patients require at least one intervention
  - Medicines dosage adjustment
  - Monitoring frequency adjustment
  - Patient with pancreatectomy, refusing BD insulin injections
- Feedback interventions to junior doctors
- Hope to be able to demonstrate a reduced length of stay

# Patient perceptions of vascular ward diabetes in-reach

- Pleasantly surprised
- Happy to talk about diabetes care
- Reassured
  - Grateful to discuss diabetes with an expert
  - Many are normally only seen in primary care
- Grateful for 'holistic' care

# Pharmacist-led diabetes clinics

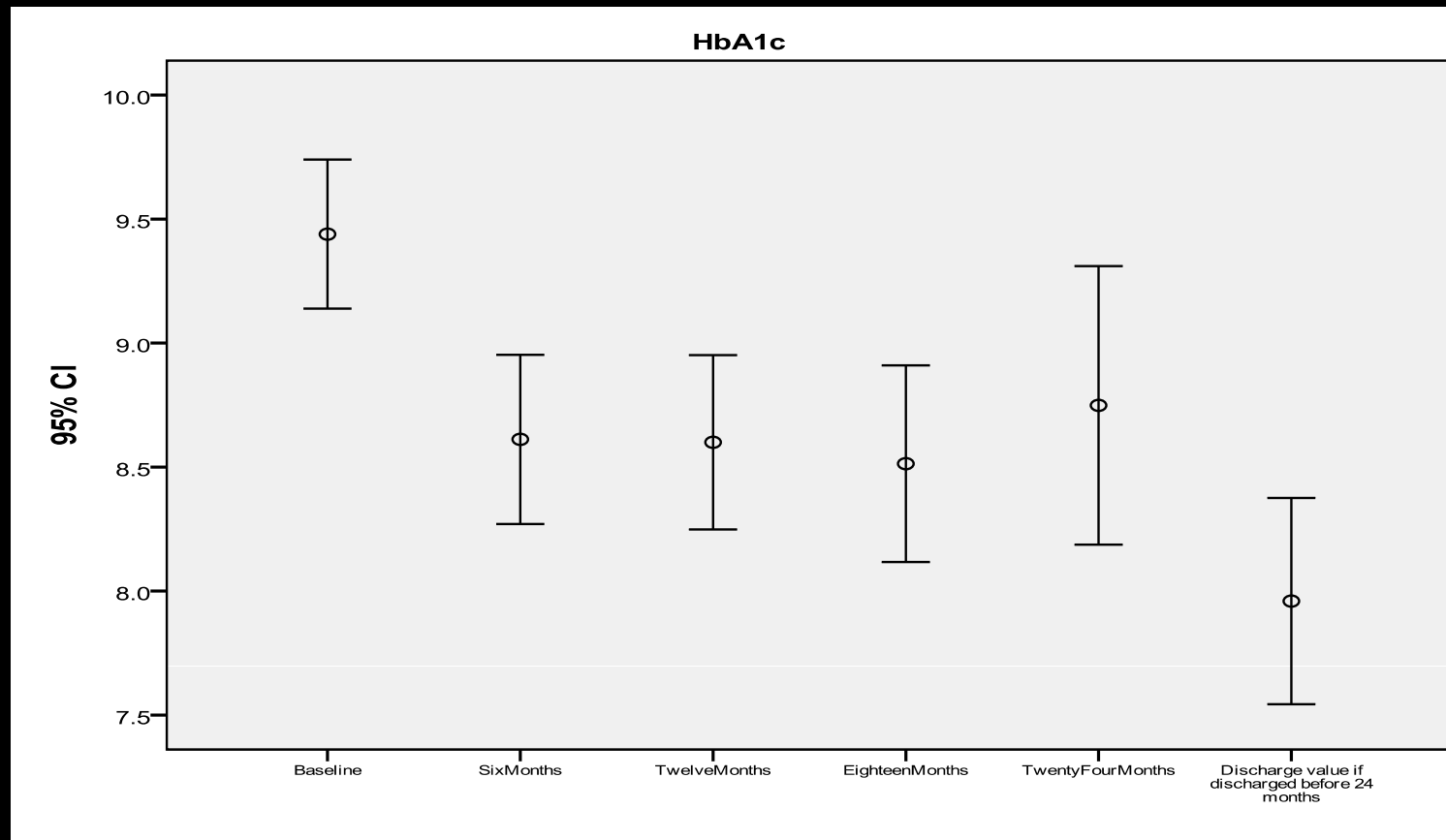
- Natasha Jacques
  - Hearth of England Foundation Trust
- Pharmacist-led diabetes outpatient clinic in secondary care
- Twice weekly clinics
- Referral criteria
  - Patients with diabetes with **two** or more of the following;
    - Suboptimal BP
    - Suboptimal lipid profile
    - Suboptimal HbA1c
    - Concordance issues

# Methodology

- 112 patients included in the study
- Baseline measurements of
  - HbA1c
  - Blood pressure (BP)
  - Total Cholesterol (TC)
- Repeated measurements at
  - 6, 12, 18, 24 months (or discharge if earlier)
- Patient satisfaction of clinic via postal questionnaire

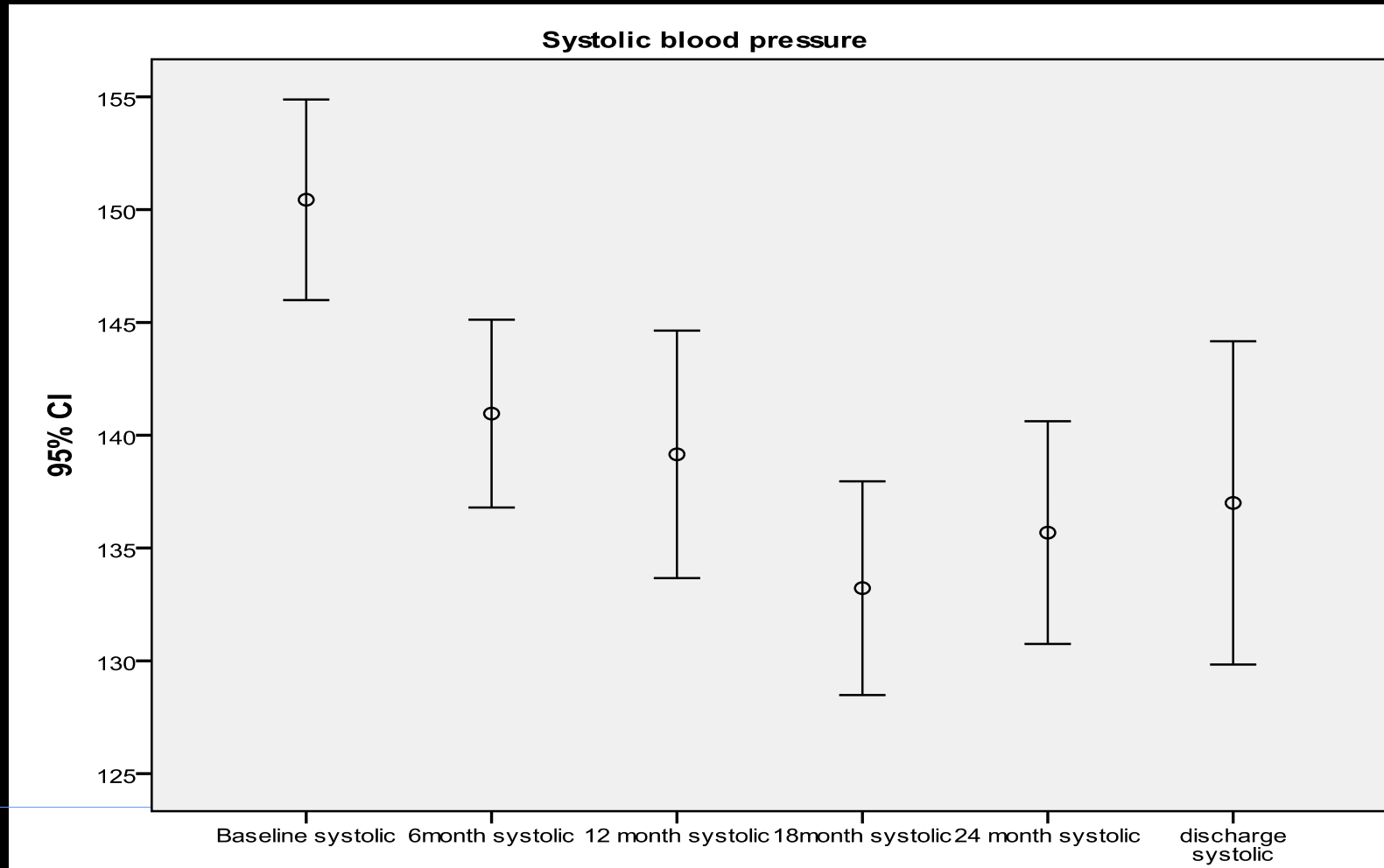
# Results HbA1c

Error bar plot of HbA1c illustrating the mean and 95% confidence limits at each clinic time point



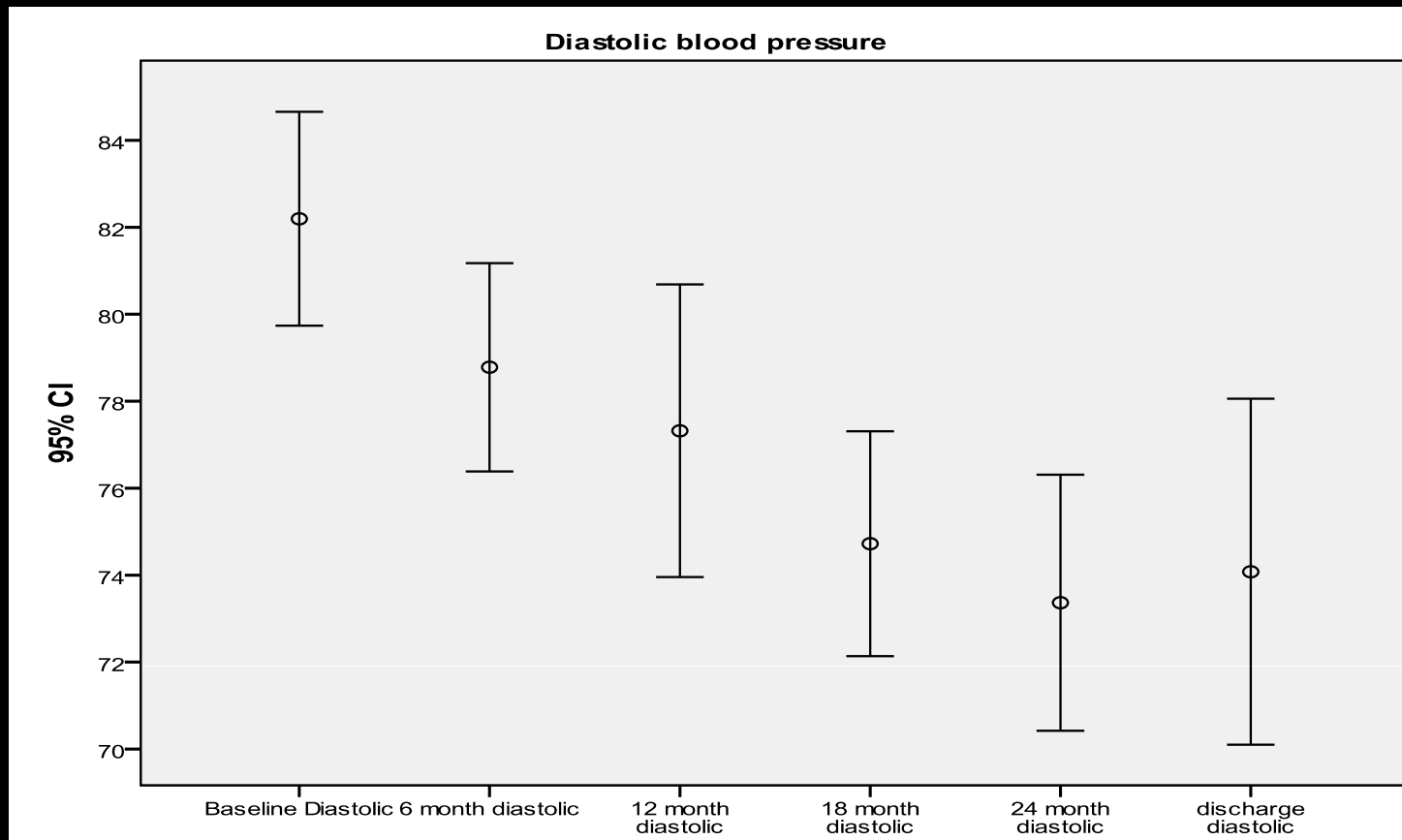
# Results Systolic BP

Error bar plot of systolic BP illustrating the mean systolic BP and 95% confidence limits at each clinic time point



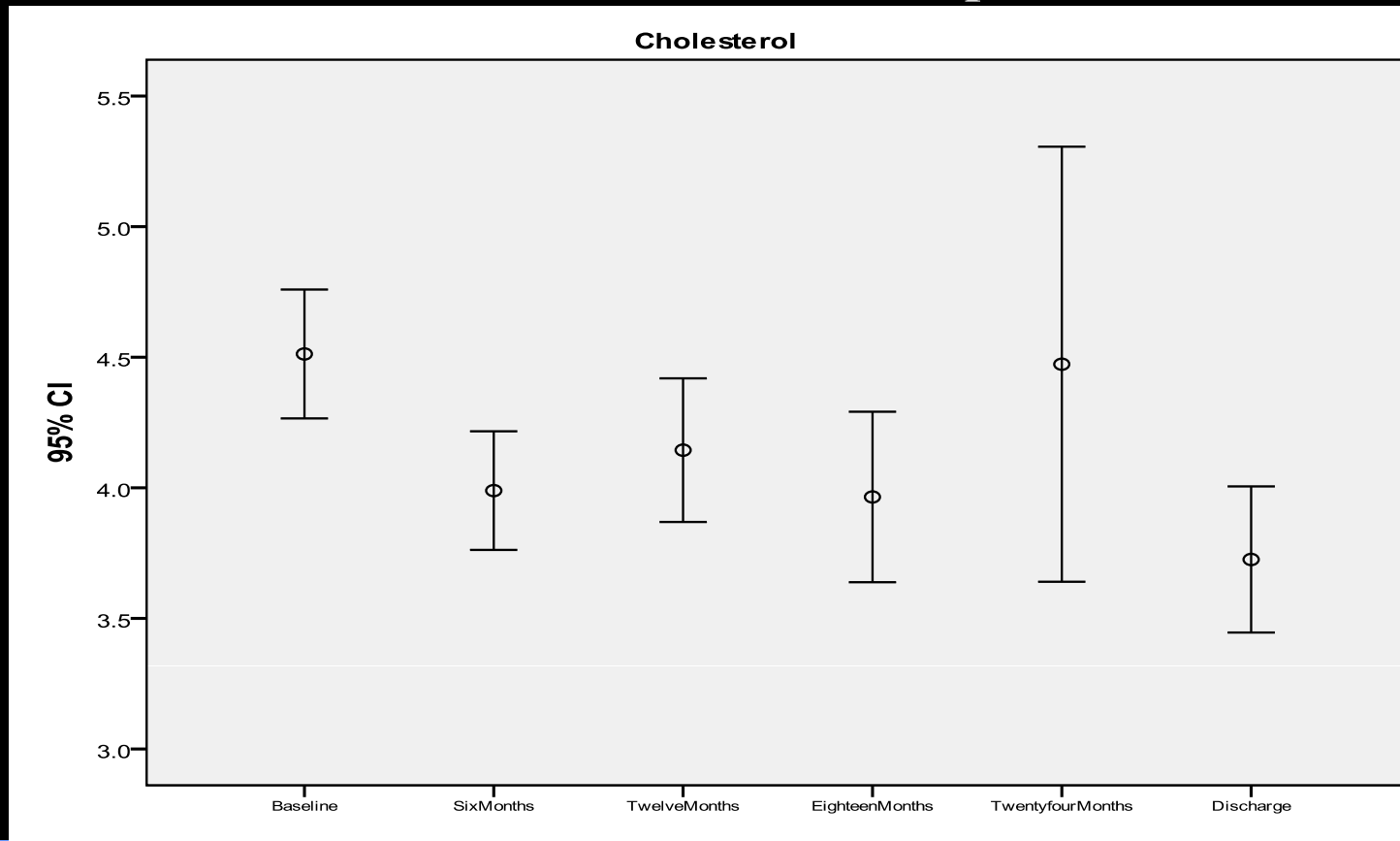
# Results Diastolic BP

Error bar plot of diastolic BP illustrating the mean diastolic BP and 95% confidence limits at each clinic time point



# Results Total Cholesterol

Error bar plot of TC illustrating the mean and 95% confidence limits at each clinic time point





# Summary of pharmacist-led diabetes clinics

- Skilled pharmacists are able to deliver first class out-patient diabetes care
- Patients are happy to be seen by a pharmacist
- Pharmacists are less expensive than doctors

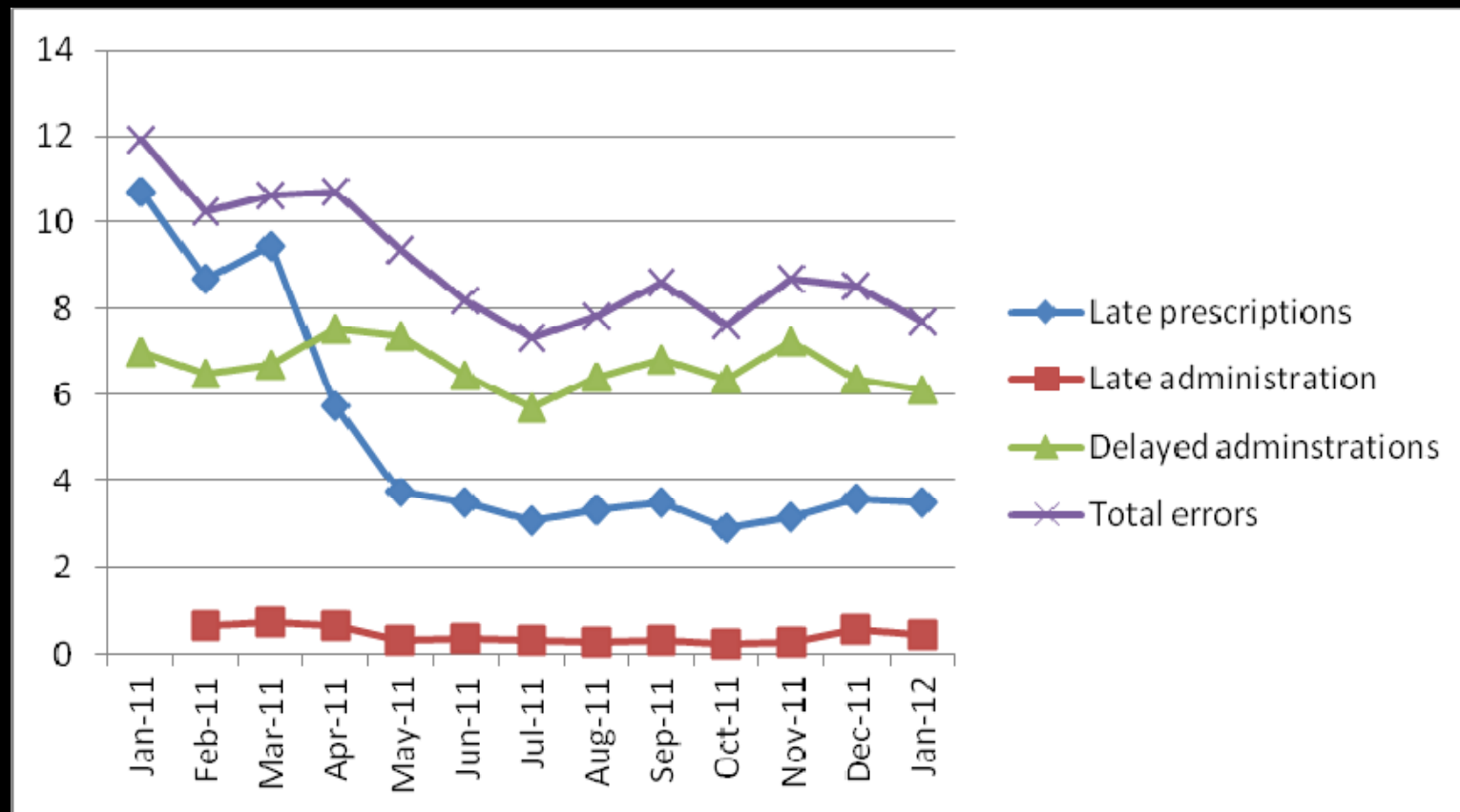
# Electronic prescribing

- Potential to reduce prescribing / administration errors
- Possible to:
  - produce prescribing protocols
  - give administration prompts
  - flag unusual prescriptions to diabetes team
  - flag specific medicines to diabetes team (e.g. U500 insulin)

# Electronic prescribing in West Midlands

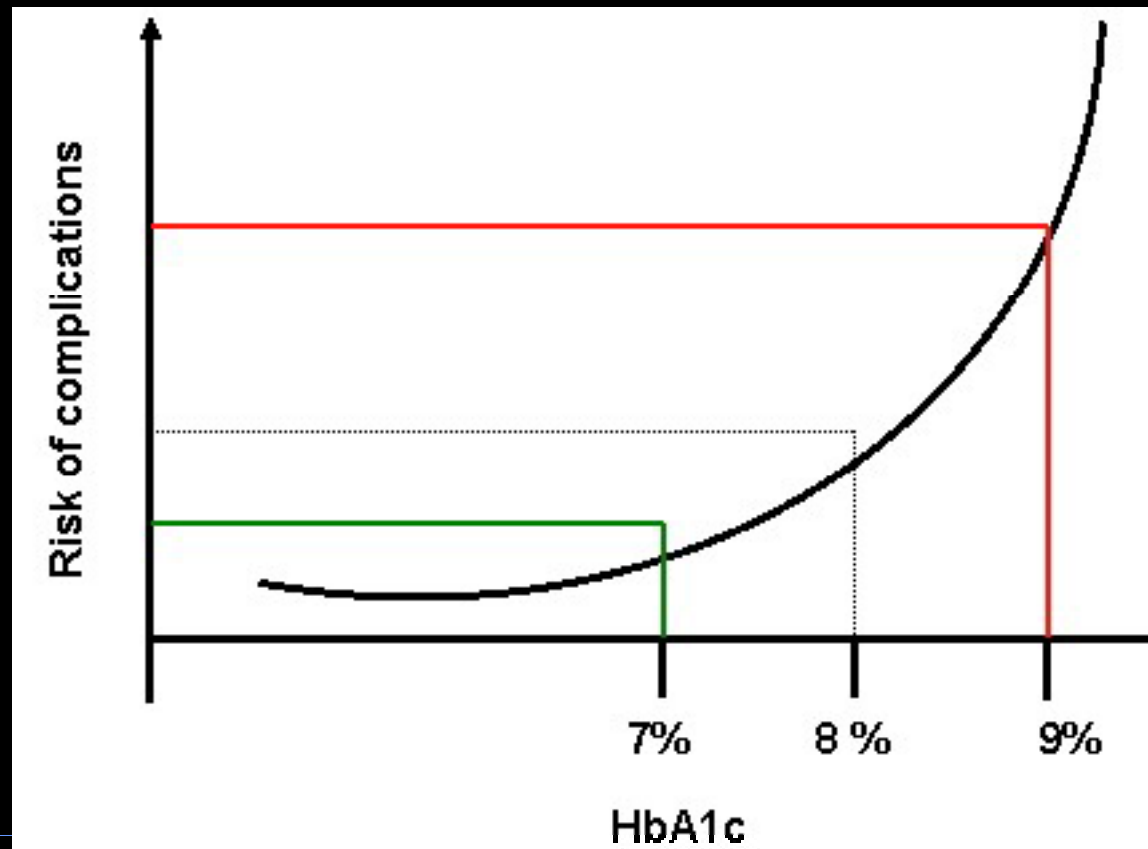
- Used electronic prescribing to help meet a local CQUIN target to reduce diabetes medicines errors by 5%
- Problem with late prescriptions and late / delayed administration
- Introduced electronic prescribing 'protocols' for diabetes medicines
  - Meal-based timing of administration

# Monthly diabetes medication errors (%)



# Dr Jackson's slide

## Diabetes Control is Important



# Summary

- Secondary care face many challenges in managing diabetes patients
- Pharmacists can play a major role in helping to overcome some of the challenges
- Diabetes patients can be complex
  - Education is crucial