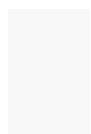


CAWT

Report on
Diabetes Medicines
Management Project
2007

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Acknowledgements

I would like to acknowledge the following people and organisations that made this project possible, for their immense assistance, guidance and facilitation of this project.

Community Pharmacists

CAWT Diabetes Steering Group

CAWT Development Centre

Directors of Pharmaceutical Services

Background

This “Medicines Management” project was funded by the European Union under the Interreg IIIa funding program. It constituted one part of the project

“Health Promotion and the Care of Type 2 Diabetics in Primary Care: The contribution of the Community Pharmacist:” which ran from October 2004 until May 2007. Trevor Hunter M.P.S.I. was the project manager for the overall project.

Dr Martin Henman (The School of Pharmacy and Pharmaceutical Sciences, TCD) was research consultant to the project throughout.

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1. General Introduction

194 million people were estimated to have diabetes in the world in 2003 according to the International Diabetes Federation .This was projected to increase to 333 million in 2025 (1). In Ireland there were approximately 140,000 Republic of Ireland (ROI) and 67000 Northern Ireland (NI) with diabetes, the prevalence rates being 4.7% and 5.4% respectively reflecting the younger age profile in the ROI. Prevalence was higher in females 6.3% NI, 5.4% ROI than males 4.5% NI, 4.0% ROI (2).

Diabetes is a major economic burden for national health services .In the UK one study has estimated that diabetes accounts for 9% of the total National Health Service budget (3) In the Republic of Ireland., 10% of the total health budget is spent on diabetes care (4).

Diabetes has many serious complications being a major cause of lower extremity amputations, blindness and end stage renal failure as well as a cardiovascular disease. Patient education and improved medicines management have been shown to improve patient welfare (5, 6, 7).

There has been a strategic shift in the management of diabetes from secondary care to primary care and the utilisation of resources in the community to increase patient education and self care (8, 9). Managing cardiovascular risk has been a priority in both jurisdictions (10, 11). Community pharmacists are readily accessible, knowledgeable professionals, who are currently underutilized because of traditional service structures in Primary Care and because they are not included in ‘Shared Care’ arrangements between the Primary and Acute Care sectors. However, pharmacists do intervene to help patients with their medicines and capture information about a patient’s prescribed medicines through their Patient Medication Records.

This project sought to enable community pharmacists to make a greater contribution that would provide a significant health and social gain, promote joint policy development and service planning between the CAWT group, promote team work in Primary Care and empower patients throughout the region.

This Medicines Management project built on the learning outcomes of the CAWT Pharmaceutical care and Health Promotion programmes (12) and the Managing your medicines campaign run in Northern Ireland (13).

1. Aims

One of the aims of the ‘*Health Promotion and Care of Type 2 Diabetic in Primary care*’ community pharmacy project was to improve the management and quality of life of Type 2 diabetic patients through community pharmacies in the CAWT region. The CAWT region consisted of the Southern Health and Social Services Board (SHSSB) and the Western Health and Social Services Board (WHSSB) in Northern Ireland (NI) and the former North Western Health Board and North Eastern Health Board areas now constituting parts of the Health Services Executive West (HSEWEST) and Dublin North East (HSEDUBNE) in the Republic of Ireland (ROI). To meet this aim an intensive Pharmaceutical Care programme was initially delivered from 2005-2007(12). Based on the learning outcomes from this programme a further refined programme concentrating on medicines management was developed.

The activities to meet the aims of this arm of the project were

- Identification of specific areas of high service need for diabetics and recruitment of pharmacists to undertake the study/project;
- Development and delivery of pharmacist training;
- Identification by pharmacists of people with Type 2 diabetes in their practice, followed by determination of individual medication management needs and the use of a Medicines Management Assessment record tool in monitoring patients and documenting interventions to optimize their medication utilization.
- Referral to other healthcare professionals as required
- Capture of the response to the intervention

2. Study Methods

Pharmacists identified patients with type 2 Diabetes in their practice from their patient medication records. Patients were approached and required to complete a patient consent form. The pharmacist arranged a consultation where they recorded the patient's current diabetes medication and completed a Diabetes Medicines Management Assessment questionnaire. During the consultation the pharmacist assessed five aspects of the patient's medication;

- medication - related side effects
- compliance issues
- number of medicines in agreement with evidence based guidelines
- knowledge of the clinical values for monitoring their diabetes mellitus
- awareness of the association between the use of their medicines and their clinical values

At the conclusion of the consultation the pharmacist resolved any pharmacy medication management issues and advised the patient of the communication of the consultation outcomes to their GP.

The Pharmacist then prepared an action plan, a copy of which constituted the referral to the GP. The documented outcome of the consultation was communicated to the GP.

Three months after the initial consultation, the pharmacist recorded follow up feedback including;

- GP communication method and comments
- Changes made to patients medication
- Whether Clinical values had been recorded since the initial consultation

The Intervention was piloted in 4 pharmacies, one in each health board in August 2006. Pharmacist training was delivered in October 2006 and the project commenced in the period 16th October to 14th November 2006. Patients were followed up in February and March 2007 and data recorded. Data was analysed using SPSS version 12.

The Data Capture forms, referral and patient consent forms are shown in Appendix 1

3. Results

3.1. Participant Pharmacy Characteristics

Tables 1-3 show that the pharmacist intervention was delivered broadly across the CAWT region. This is in contrast to the original pharmaceutical care intervention model which was only deliverable at a small number of localised sites. More pharmacies in the Republic participated in the campaign while a substantial number of pharmacies in Northern Ireland were already participating in an NHS Medicines Management Programme. Some Northern Ireland pharmacists may have felt that the CAWT initiative duplicated the work of the NHS programme. There was no significant difference in the mean number of consultations per pharmacy across each of the Health Boards.

Table 1 Pharmacy Participation by Health Board Area

	Pharmacies	Consultations	Mean/pharmacy
WHSSB	7	66	9.4
SHSSB	7	47	6.7
HSEDUBNE	11	99	9.0
HSEWEST	8	49	6.1
Total	33	261	7.9

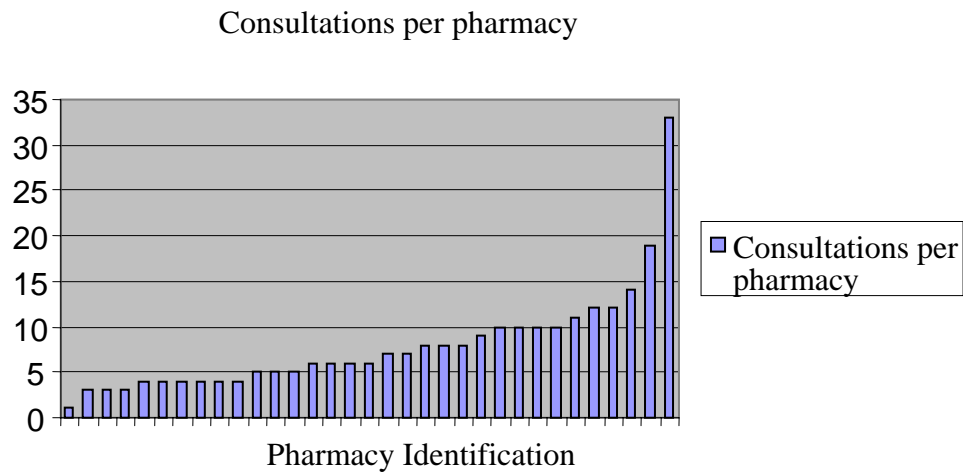
Table 2 Consultation Frequency by Health Board Area

	Frequency	Percent
WHSSB	66	25.3
SHSSB	47	18.0
HSEWEST	49	18.8
HSEDUBNE	99	37.9
Total	261	100.0

Table 3 Pharmacy Participation and Consultation Frequency by Jurisdiction

	Pharmacies	Consultations	Mean/pharmacy
NI	14	113	8.1
RO I	19	148	7.8
Total	33	261	7.9

Figure 1 Distribution of Consultations per pharmacy



Consultations ranged from 1 to 33 per pharmacy with a mean of 8 per pharmacy.

Table 4 Pharmacy Proximity to Secondary Care Services

	Mean distance to Secondary Care Services
Health Board	
WHSSB	21
SHSSB	9
HSEWEST	16
HSEDUBNE	27

The mean distance to secondary care centres was 19km with a range from 1km to 46km.

Table 5 Urban Rural Distribution *

	Urban	Rural	Total
WHSSB	3	4	7
SHSSB	4	3	7
HSEDUBNE	0	11	11
HSEWEST	3	5	8
Total	10	23	33
%	30.3%	69.7%	100.0%

*Urban Centres were classified as Pharmacies within habitations with a population of greater than 10,000 people in the 2001 census

The majority of pharmacies (70%) served rural populations with significant regional variation. The mixture of Rural and Urban centres served as a heterogeneous sample with which to deliver the intervention.

Table 6 Reported Age Distribution of patients

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 21-30	2	.8	.8	.8
31-40	12	4.6	4.8	5.6
41-50	31	11.9	12.4	18.0
51-60	63	24.1	25.2	43.2
61-70	75	28.7	30.0	73.2
70+	67	25.7	26.8	100.0
Total	250	95.8	100.0	
Missing System	11	4.2		
Total	261	100.0		

The age profile of the patients reflects the mature age range at which the disease is usually diagnosed with 82% of patients over 50years old (Fig 3)

Fig 2 Reported Age group

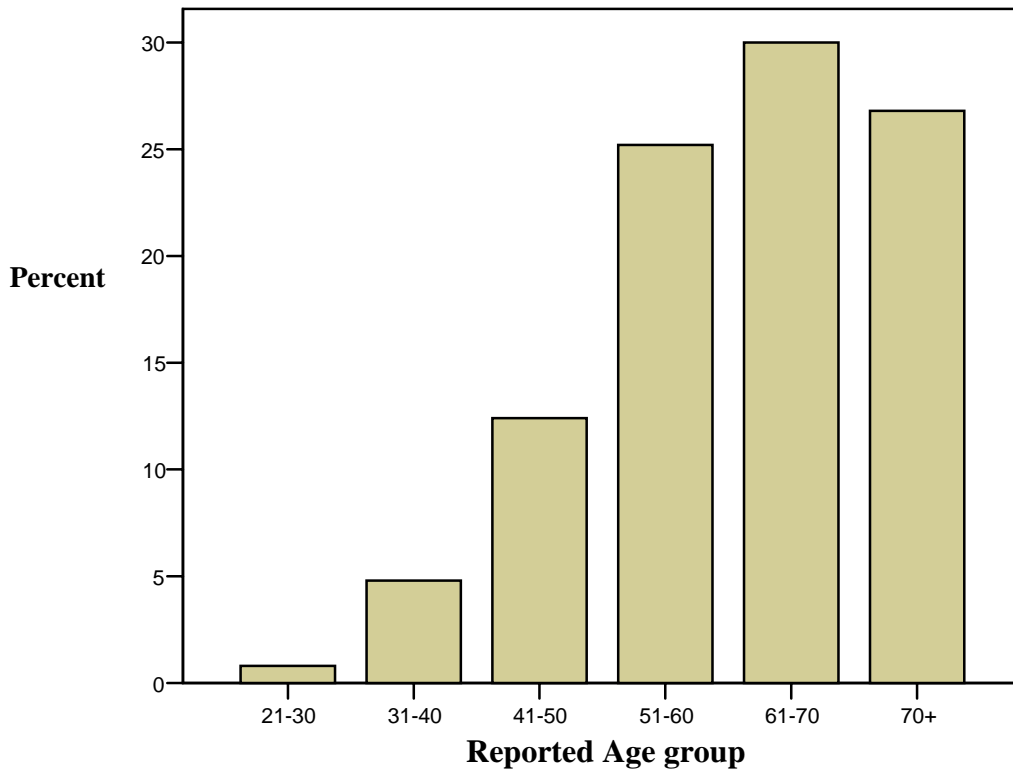
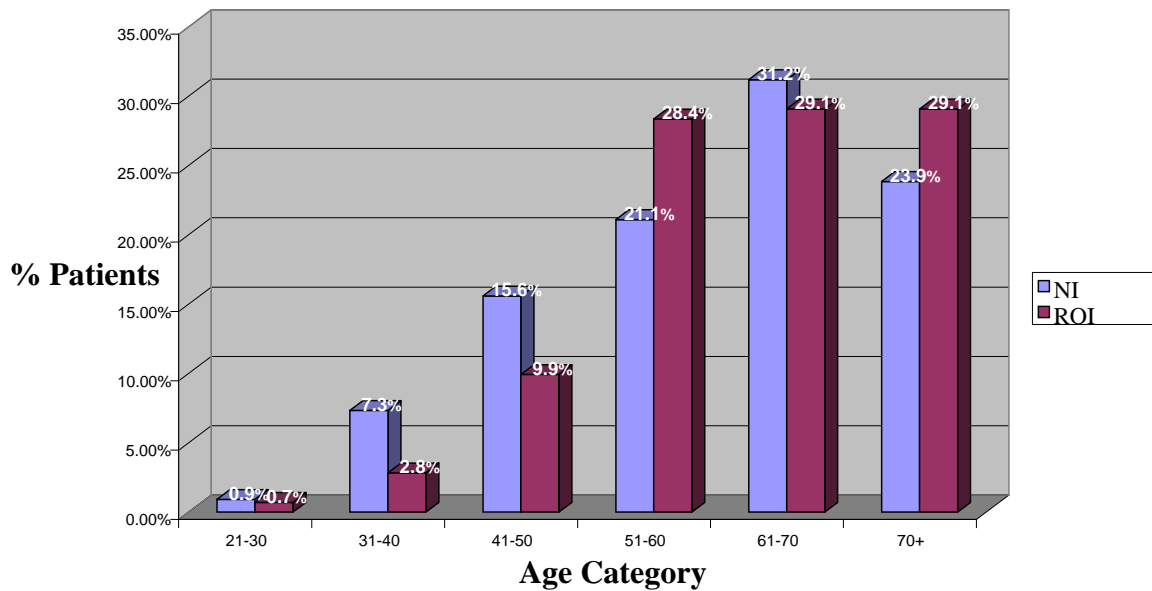


Fig 3 Reported Age Frequency by Jurisdiction



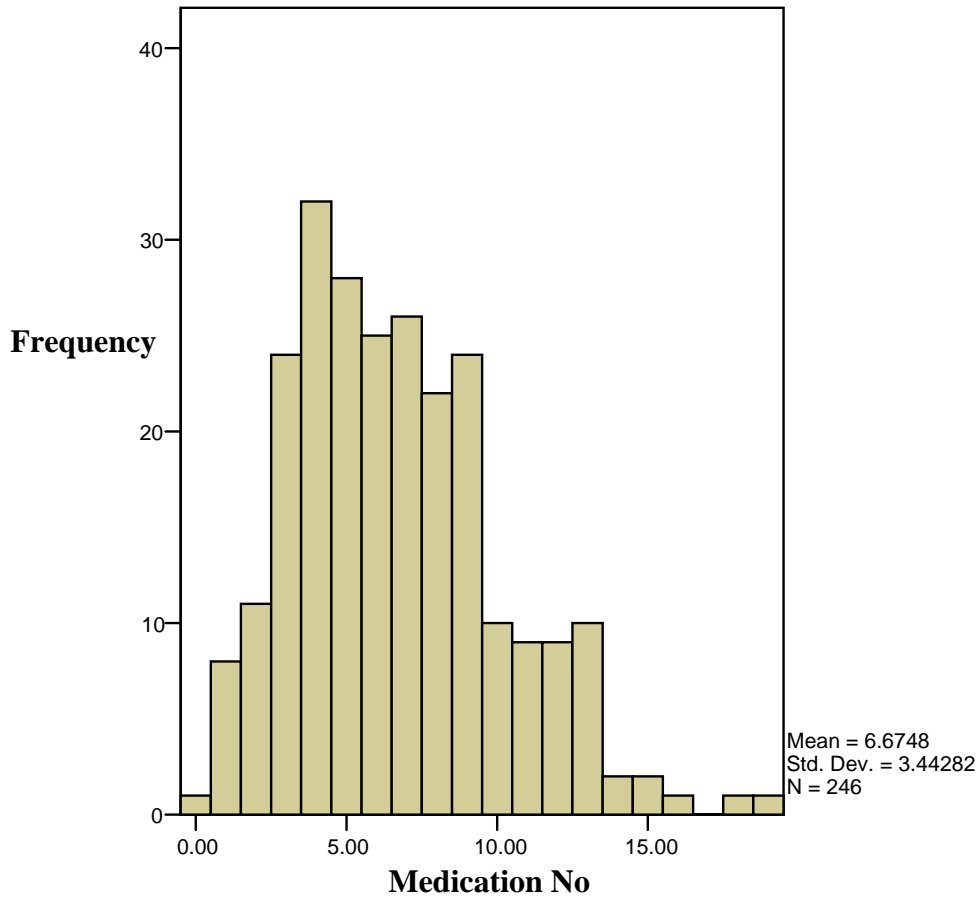
There were no statistically significant differences in the proportion of patients in each age group between the jurisdictions (Figure 3).

Gender

The gender distribution of patients showed a majority of males (57.9%); this was consistent with the CAWT Health Promotion studies carried out in the same regions in which there was a slight predominance of male patients of 53.3% in 2005 and 59.6% in 2006 respectively. This may indicate some bias on the intervening pharmacist's part in view of the higher incidence of diabetes in females.

3.2. Medication Profile

Fig 4 Total Number of Medications



The distribution of the reported total number of patient medications showed a typical Gaussian distribution with a mean of 6.67 medications per patient (Fig 4 and Table 8)

Table 8 Total no. of patient medications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	.4	.4	.4
	1.00	8	3.1	3.3	3.7
	2.00	11	4.2	4.5	8.1
	3.00	24	9.2	9.8	17.9
	4.00	32	12.3	13.0	30.9
	5.00	28	10.7	11.4	42.3
	6.00	25	9.6	10.2	52.4
	7.00	26	10.0	10.6	63.0
	8.00	22	8.4	8.9	72.0
	9.00	24	9.2	9.8	81.7
	10.00	10	3.8	4.1	85.8
	11.00	9	3.4	3.7	89.4
	12.00	9	3.4	3.7	93.1
	13.00	10	3.8	4.1	97.2
	14.00	2	.8	.8	98.0
	15.00	2	.8	.8	98.8
	16.00	1	.4	.4	99.2
	18.00	1	.4	.4	99.6
	19.00	1	.4	.4	100.0
	Total	246	94.3	100.0	
Missing	System	15	5.7		
Total		261	100.0		

Fig 5 Patient Total No. of Medications Frequency by Jurisdiction

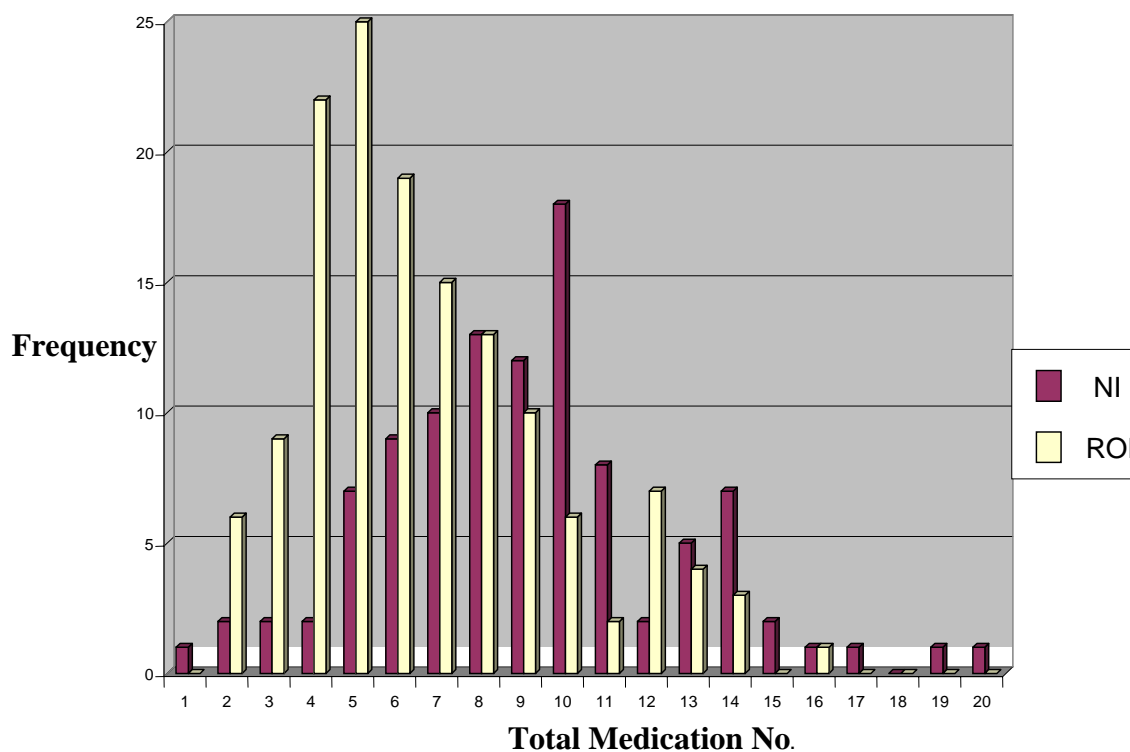


Table 9 Patient Total Number of Medications by Jurisdiction

	Jurisdiction	N	Mean	Std. Deviation	Std. Error Mean
Total Medication No	N Ireland	104	8.1058	3.49457	.34267
	Republic Ireland	142	5.6268	3.00970	.25257

Fig 6 Total No. of Medications in Patient cohort 50+ yrs by jurisdiction

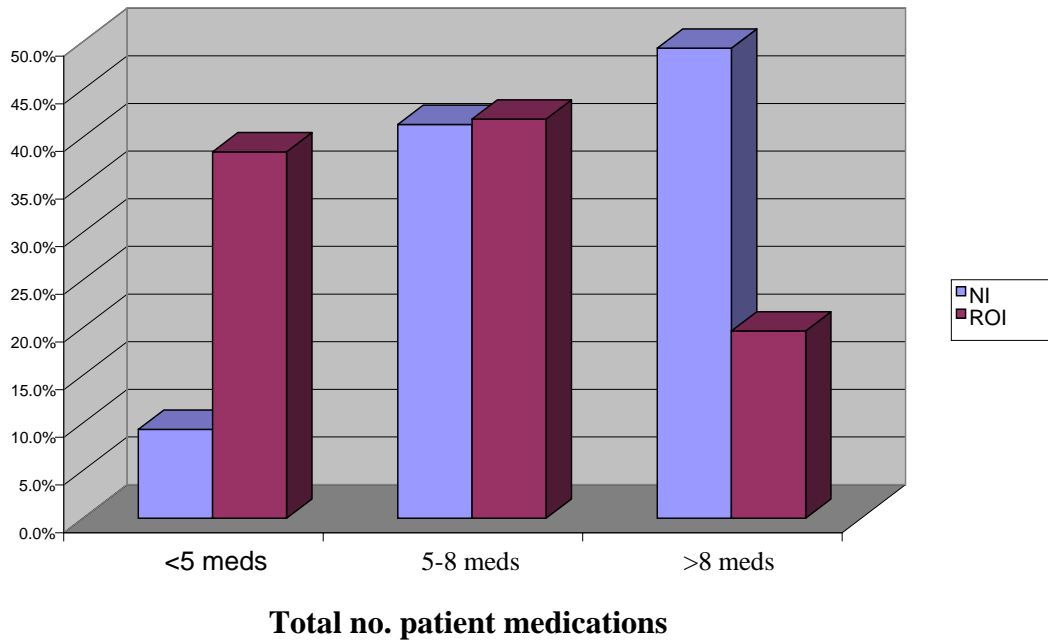


Fig 5 shows the total medication use by jurisdiction and it clearly showed two overlapping Gaussian distributions. The observed difference in the patient cohort over 50 is striking Fig6. With fewer patients receiving less than 5 medicines and almost three times as many receiving 8 or more medicines, the intensity of drug treatment in Northern Ireland appeared to be significantly greater than in the Republic. This may reflect differences in the approach to attaining treatment goals for type 2 diabetes between jurisdictions.

Medication Profiles by Drug class

Fig 7 Antiplatelet Medication Profile Frequency

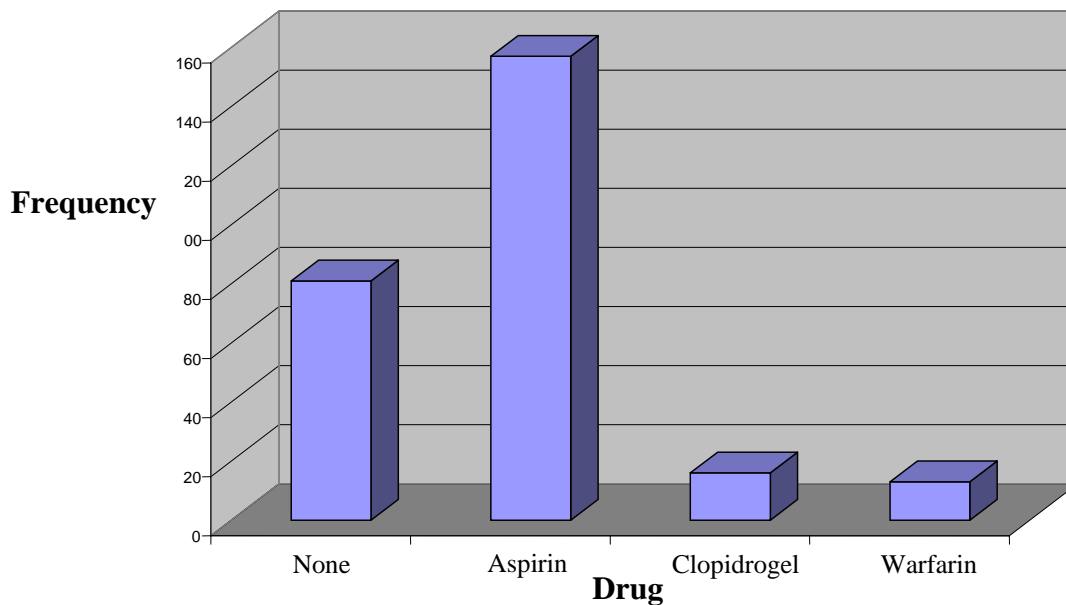
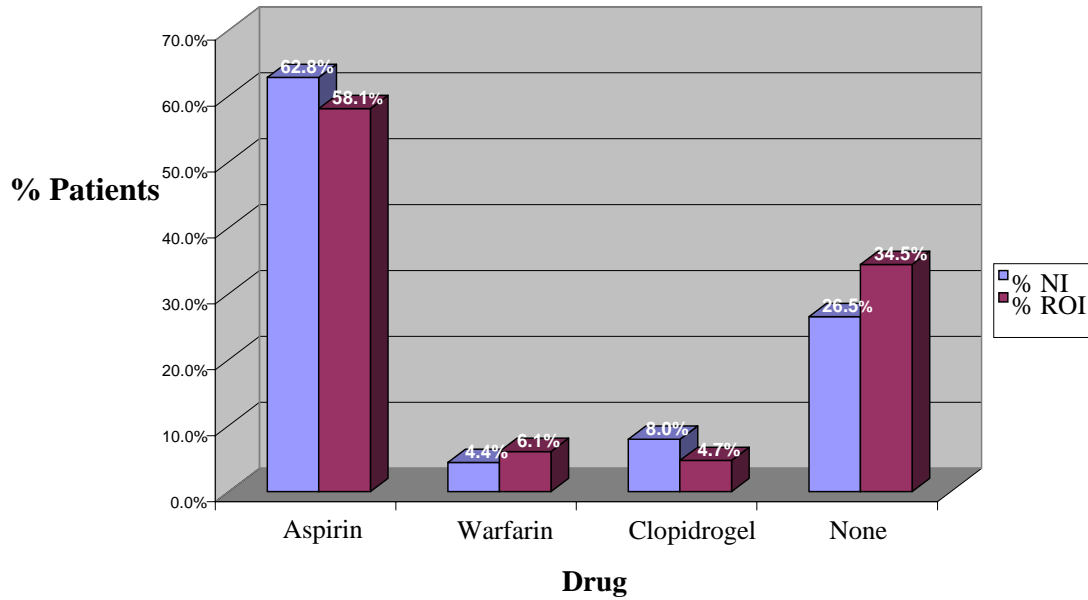


Table 10 Antiplatelet drugs

	Frequency	% of Patients
None	81	31.0%
Aspirin	157	60.2%
Clopidogrel	16	6.1%
Warfarin	14	5.4%
n = 261	Missing = 0	

Fig 7 shows that 60% of patients were taking aspirin, while almost equal numbers were receiving clopidogrel or warfarin while 31% were not on any antiplatelet therapy.

Fig 8 Antiplatelet Medication Profile by Jurisdiction



Different trends in the prescribing of antiplatelet drugs were apparent in the two jurisdictions (Fig 8). Whereas the proportion of patients receiving aspirin were similar in each jurisdiction, the proportion of patients prescribed clopidogrel in Northern Ireland was almost twice that in the Republic. Substantially more patients were not currently receiving therapy in the Republic 34.5% compared to 26.5% in Northern Ireland, although the observed differences were not statistically significant.

Fig 9 Hypoglycaemic Medication Profile

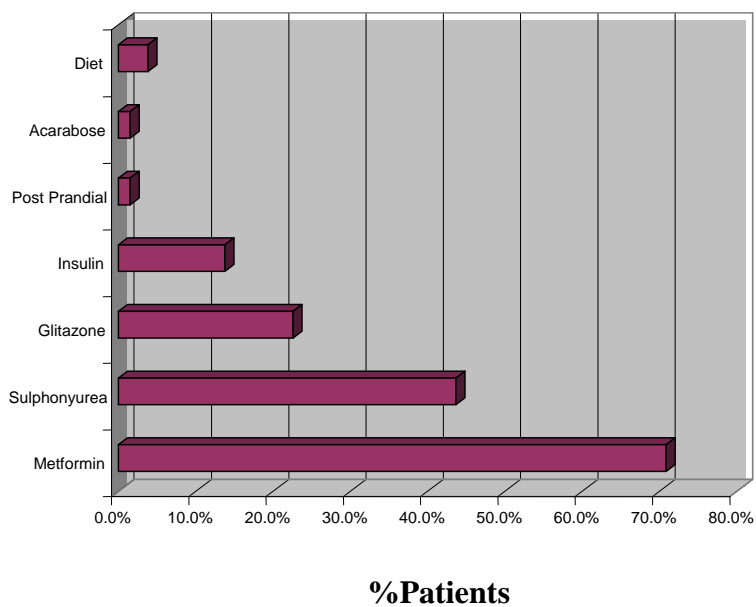
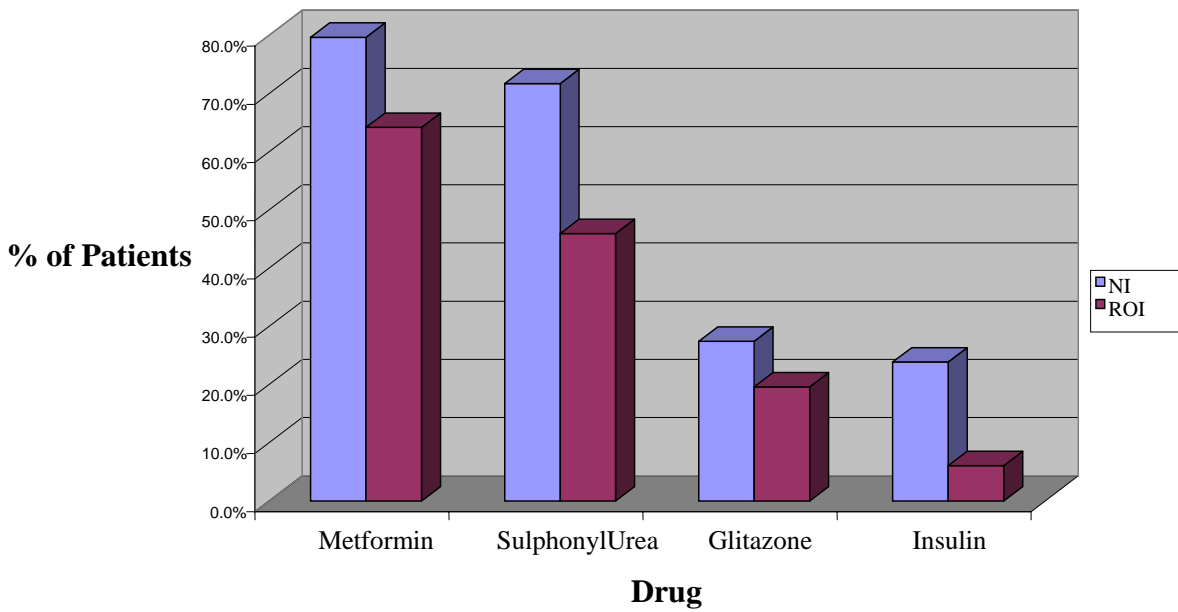


Table 11 Hypoglycaemic drugs

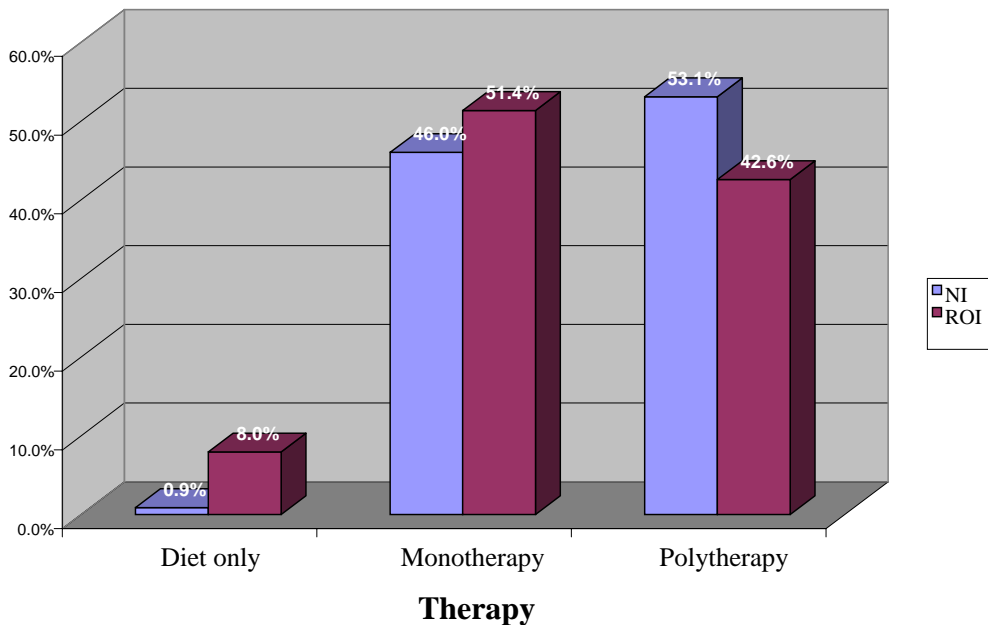
	Frequency	%
Metformin	185	70.9%
Sulphonyurea	114	43.7%
Glitazone	59	22.6%
Insulin	36	13.8%
Glitinides	4	1.5%
Acarbose	4	1.5%
Diet Only	10	3.8%
n= 261	Missing = 0	

Fig 10 Hypoglycaemic Medication Profile by Jurisdiction



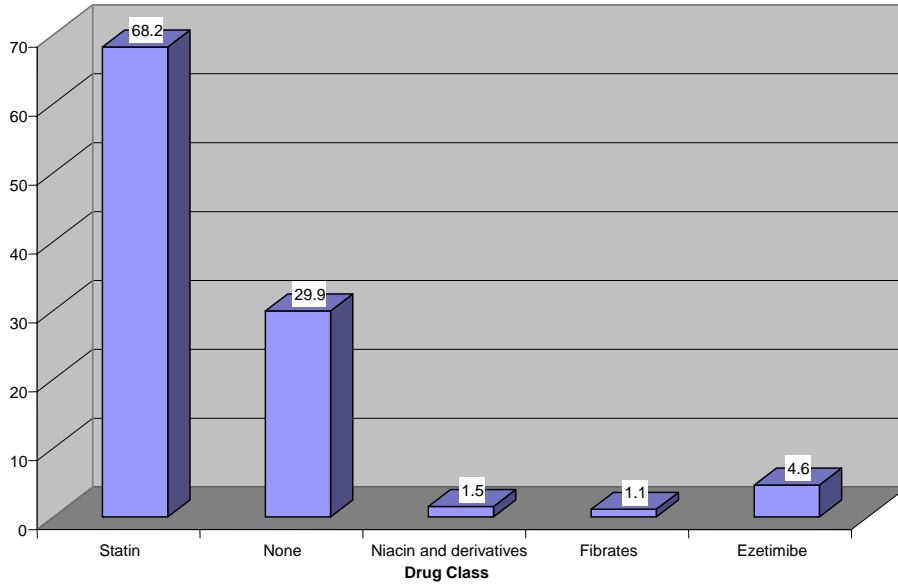
The greater percentage of patients prescribed different classes of hypoglycaemic agents in Northern Ireland compared to the Republic may indicate more aggressive medical treatment to meet the goals of blood glucose control (Fig 10).

Fig 11 Hypoglycaemic Therapy Type by Jurisdiction



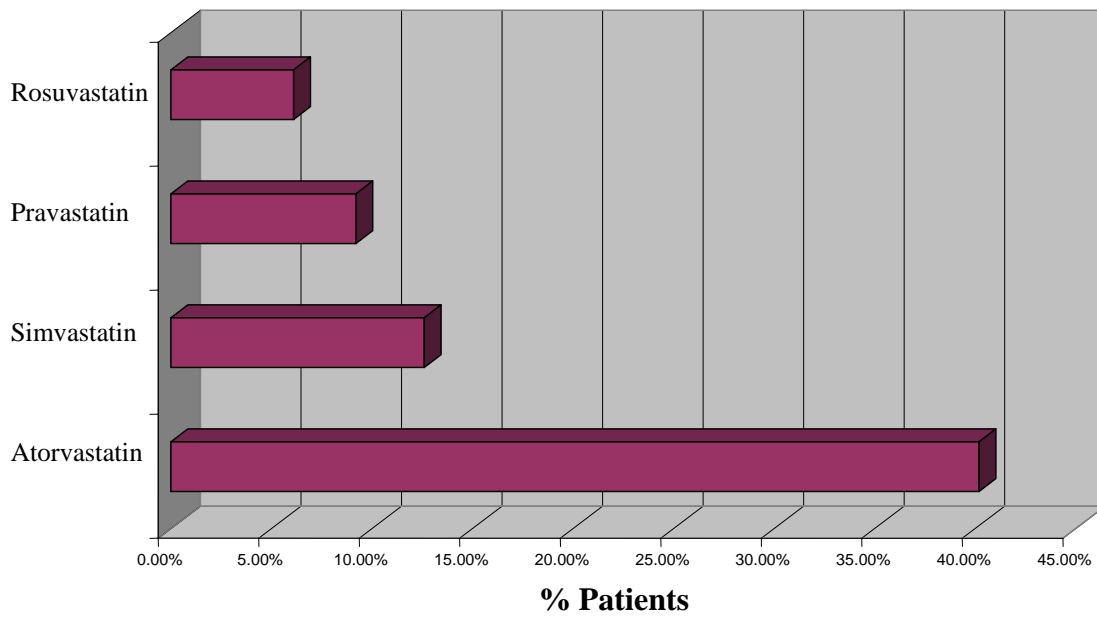
The majority of NI patients received polytherapy (53.1%) compared to 42.6% in the Republic of Ireland (Fig 11). There was a greater reliance on Diet alone and monotherapy in the Republic.

Fig 12 Lipid Lowering Drug Class Frequency %



The most frequently prescribed lipid lowering therapy consisted of statins (68.2%) while a significant cohort of 29.9% patients remained untreated (Fig 12).

Fig 13 Statin Class Analysis % Patients

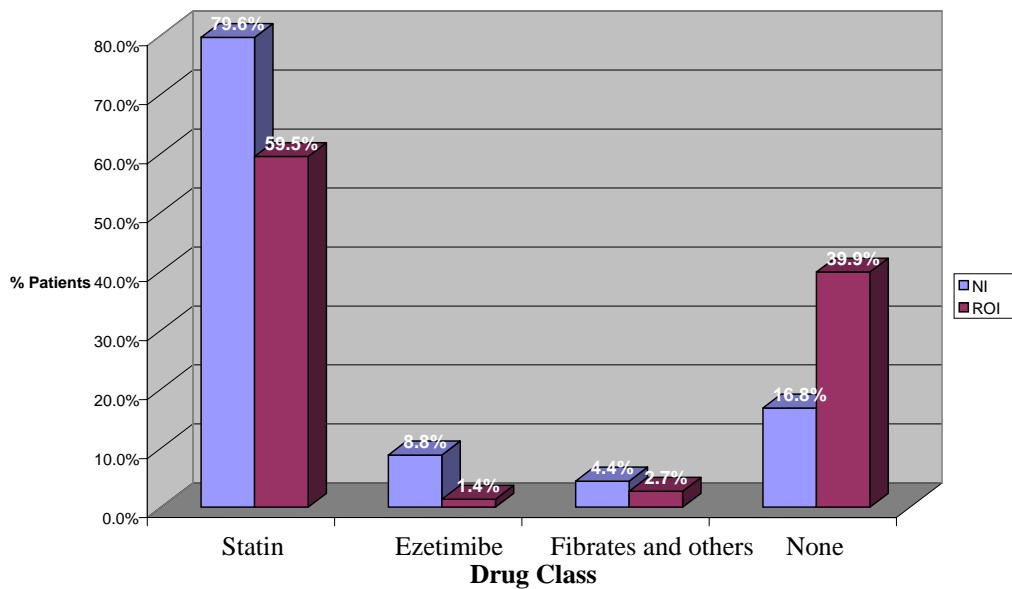


Atorvastatin was prescribed to almost twice as many patients as all other statins combined (Fig 13).

Table 12 Lipid Lowering drugs

Lipid Lowering Agent	Frequency	Percent
none	78	29.90%
Atorvastatin	105	40.20%
Simvastatin	33	12.60%
Pravastatin	24	9.20%
Rosuvastatin	16	6.10%
Ezetimibe	12	4.60%
Nicotinic acid	4	1.50%
Gemfibrozil	1	0.40%
Fenofibrate	1	0.40%
Bezafibrate	1	0.40%

Fig 14 Lipid Lowering Medication Profile by Jurisdiction



There was a significant difference (Chi Square; $P= 0.000$) between the two jurisdictions with a greater proportion of patients being prescribed evidence based preventative Lipid Lowering therapy in Northern Ireland. Almost 40% of patients in the Republic were not on therapy which was more than twice the number of patients in Northern Ireland (16.8%).

Fig 15 Antihypertensive Medication Profile

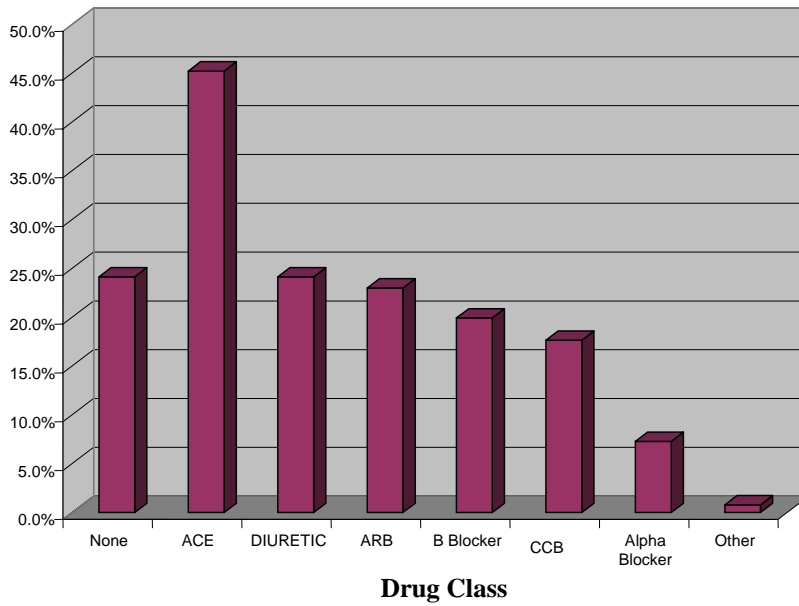
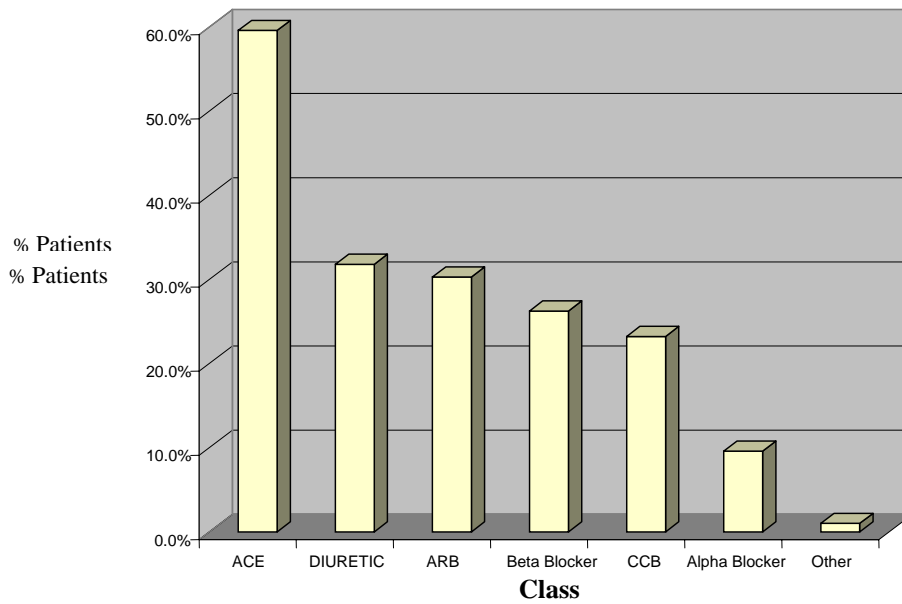


Fig 16 Antihypertensive medication profile of treated Patients



In line with NICE guidelines for the treatment of hypertension (14) the prescribing profile showed that the majority of patients were receiving Angiotensin Converting Enzyme Inhibitors (ACE), Angiotension Receptor Blockers (ARB) and Calcium Channel Blockers (CCB). However a significant number of patients 23% were not receiving any drug indicated for hypertension.

Fig 17 Antihypertensive Medication Profile by Jurisdiction

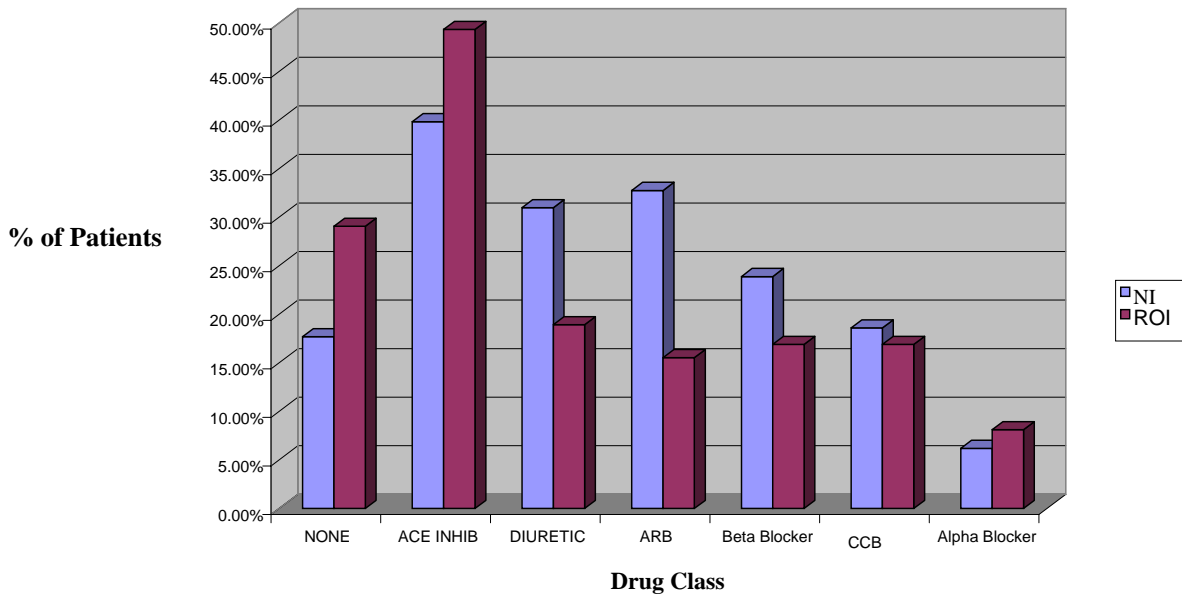
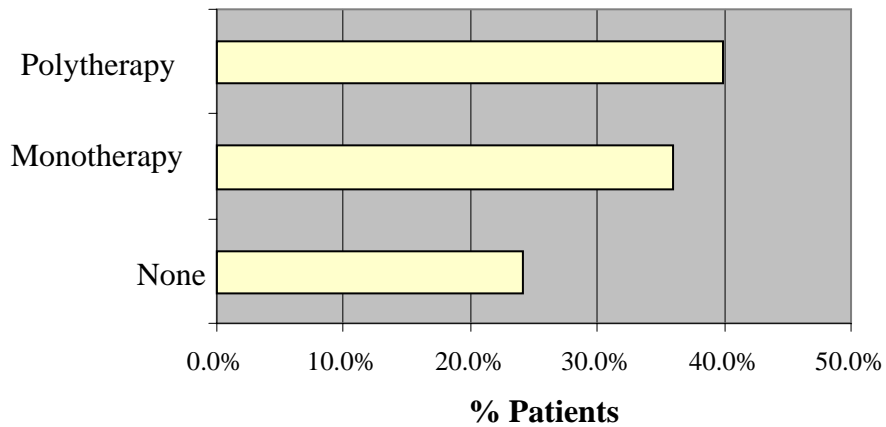
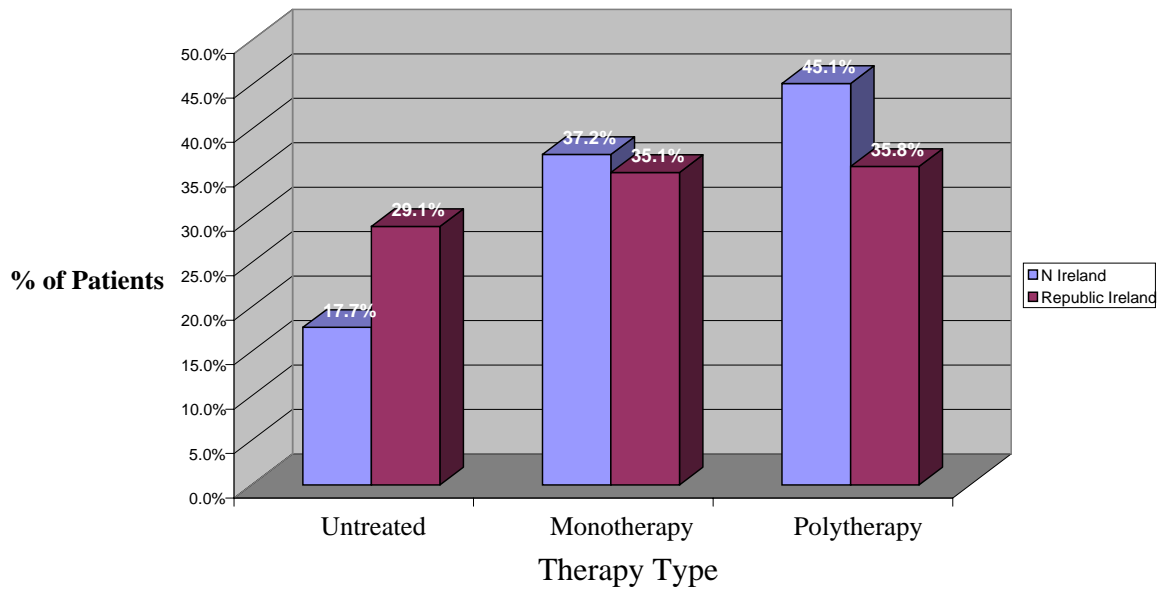


Fig 18 Antihypertensive Therapy Type



Current evidence based guidelines recommends aggressive therapy of Hypertension with multiple therapy (14). However, just over one third of patients (36%) of patients were receiving monotherapy and only slightly more, 40% were receiving multiple therapy. This may indicate sub optimal treatment.

Fig 19 Antihypertensive Therapy Type by Jurisdiction



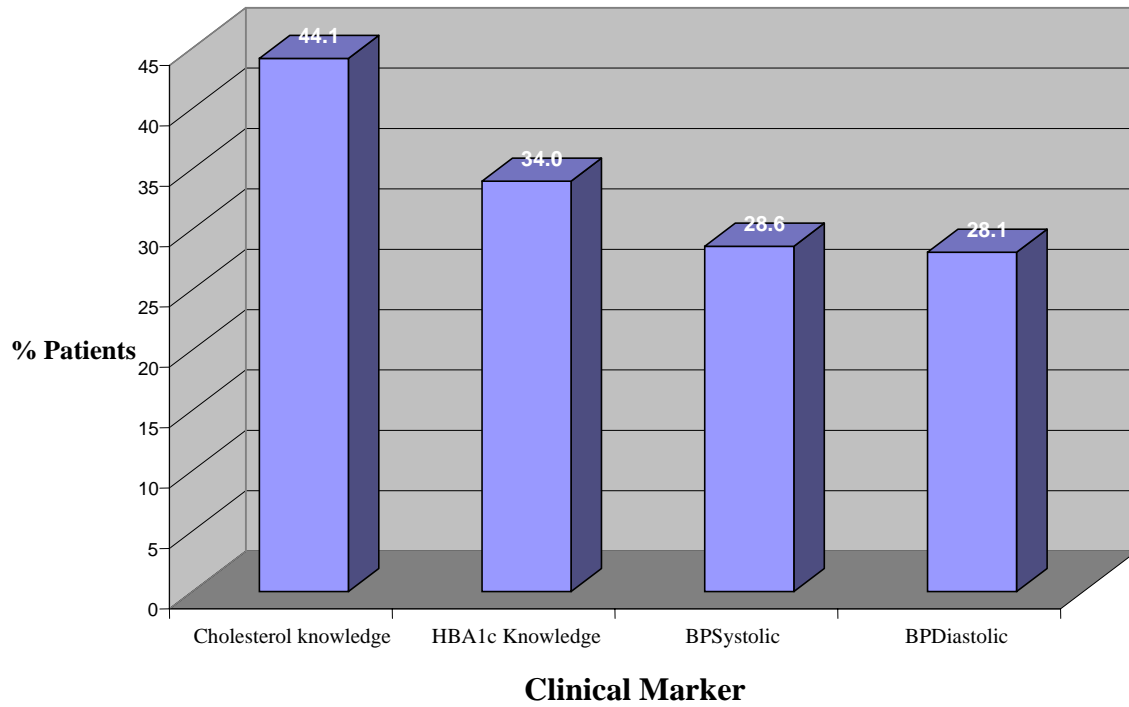
There were some differences between the two jurisdictions with significantly more patients untreated in the Republic compared to Northern Ireland (Fig 20).

Overall Synopsis of Medication Profiles

There was a significant difference between jurisdictions with comparatively lower levels of prescribing of preventative therapies in the Republic of Ireland. This difference in prescribing of preventative therapies was consistent with other findings that in Northern Ireland there was more aggressive medicinal prescribing to meet therapeutic and clinical goals. This was evidenced by the greater mean number of drugs prescribed, the larger percentage of patients on polytherapy for control of both blood glucose and hypertension.

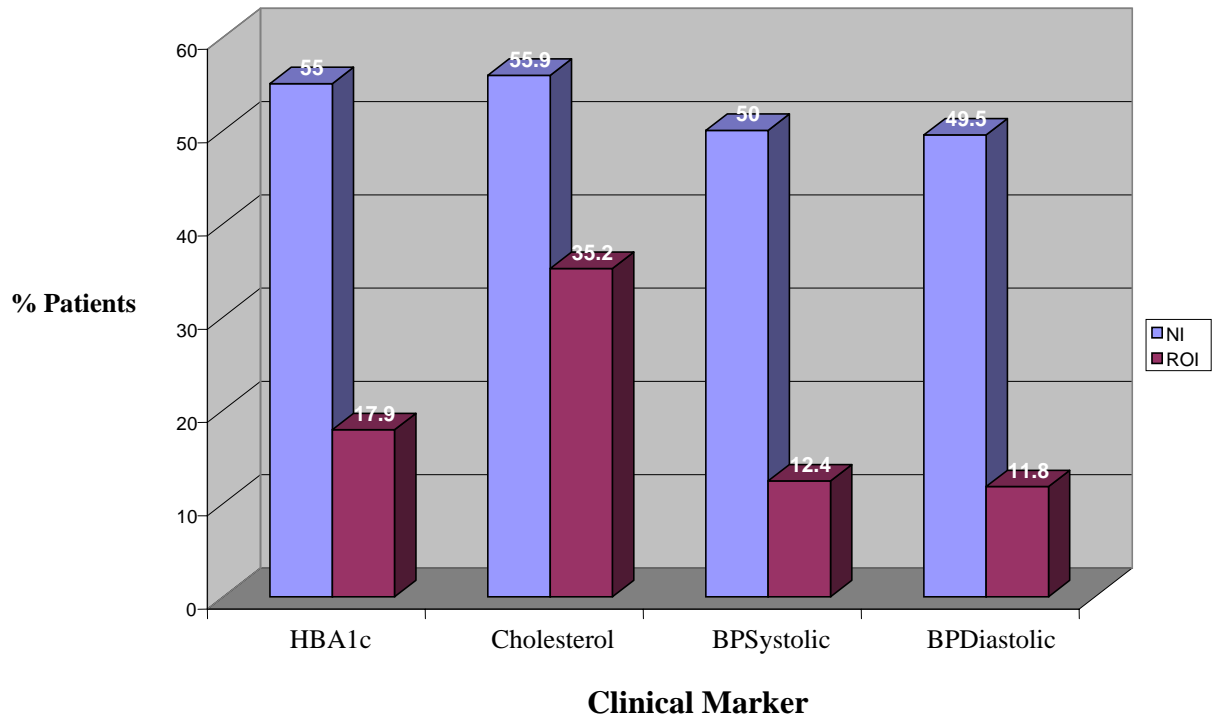
3.3. Patient Awareness of Clinical Values

Fig 20 Patient Awareness of Clinical Values



More patients were aware of their total Cholesterol level (44%) , with fewer (34%) being aware of their HBA1c and fewer again of their systolic and diastolic blood pressure (Fig 20).

Fig 21 Patient Awareness Level of Clinical Values by Jurisdiction



There was a significant difference in Patient's awareness of their Clinical Monitoring Values by jurisdiction ($P=0.000$). Patients in Northern Ireland were much more aware of their markers for Blood pressure and HBA1c (Greater than three fold difference) while the differential for Total Cholesterol was approximately one and a half fold (Fig 21).

3.4. Pharmacist Recommendations

The medicines management assessment consultation was carried out by 32 pharmacies with 258 patients. Of the original 33 pharmacies, one recorded patient's medication history only and did not have a consultation. This pharmacy was omitted from the analysis of pharmacist's recommendations and follow up.

Antiplatelet Medication Recommendations

Fig 22 Antiplatelet Medication Recommendations Frequency

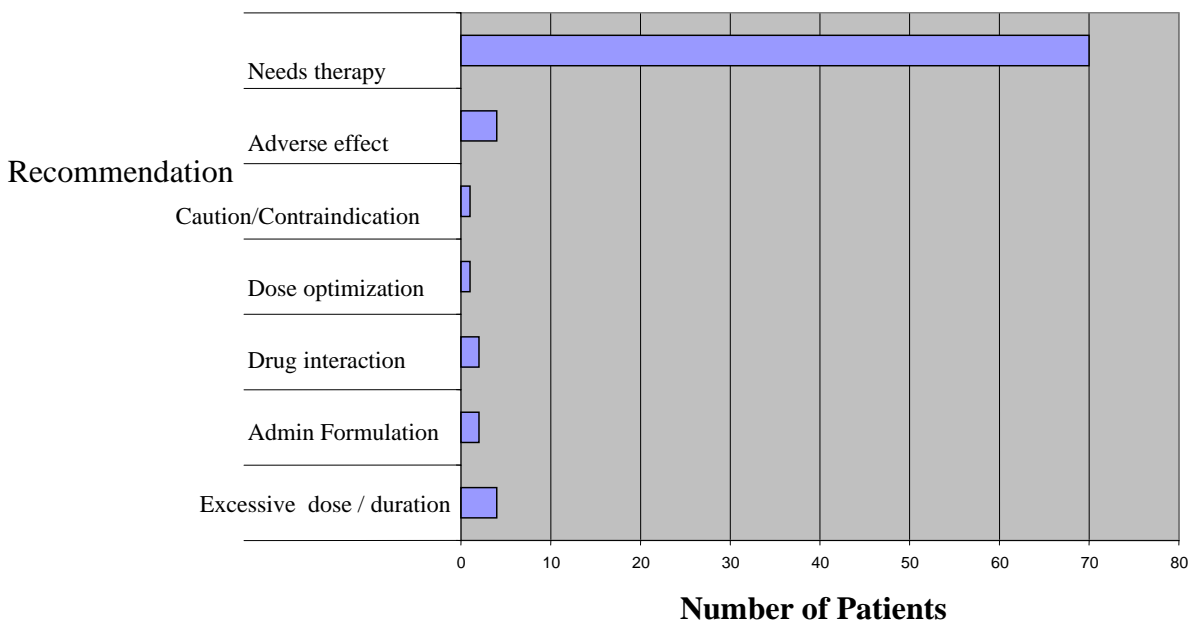


Fig.23 Pharmacists made recommendations for 84 patients (32.6%) concerning their antiplatelet medication; the most common recommendation was the need for therapy.

Fig. 23 Antiplatelet Medication Recommendations for patients not on therapy by Jurisdiction

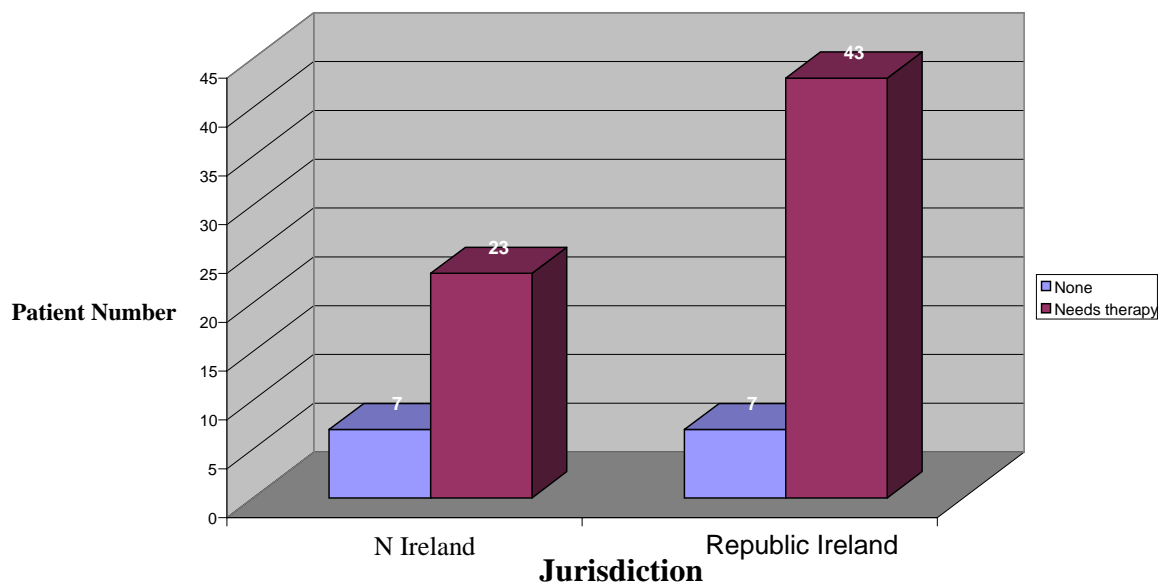
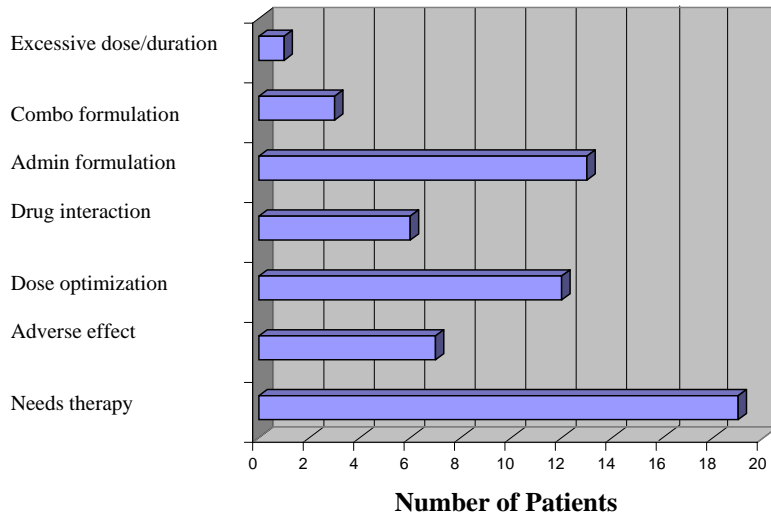


Table 13				Antiplatelet Recommendation		Total
				None	Needs therapy	
Jurisdiction	N Ireland	Count	within jurisdiction	7	23	30
		%		23.3%	76.7%	100.0%
Jurisdiction	Republic Ireland	Count	within jurisdiction	7	43	50
		%		14.0%	86.0%	100.0%
Total		Count	within jurisdiction	14	66	80
		%		17.5%	82.5%	100.0%

Figure 23 Of the 80 patients who were not on antiplatelet therapy at the initial assessment, 66 were recommended therapy by the pharmacist. The number recommended is higher in the Republic of Ireland than in Northern Ireland; this is consistent with the greater number of untreated patients in the Republic as seen in Fig. 8 . There was no significant difference between jurisdictions with respect to the proportion of recommendation for this patient cohort. This indicates consistency with respect to the intervention across the two jurisdictions.

Hypoglycaemic Medication Recommendations

Fig 24 Hypoglycaemic Medication Recommendations

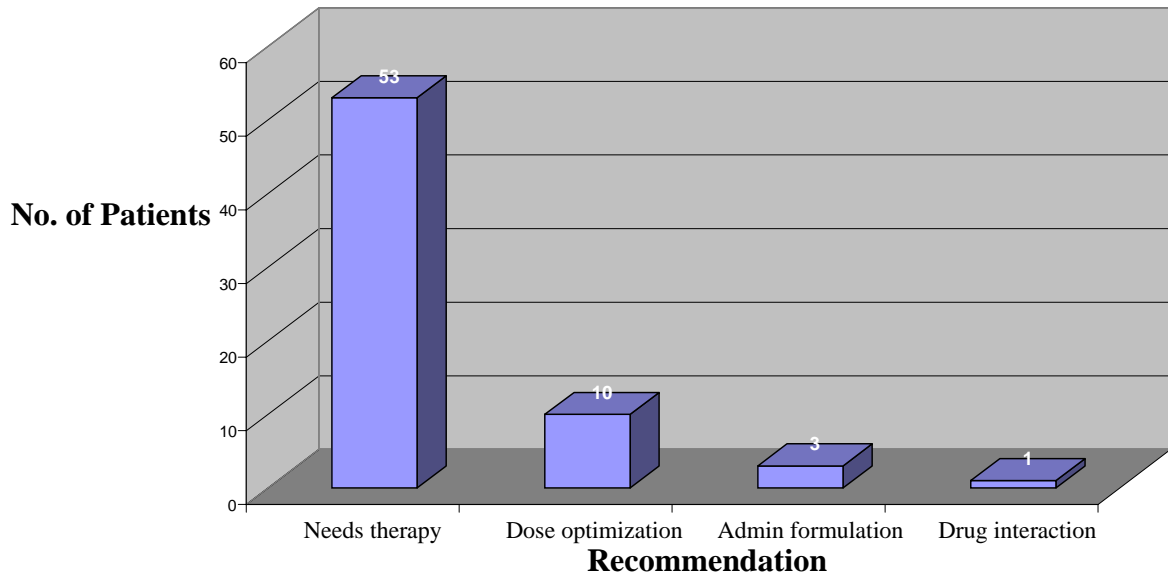


Pharmacists made 61 recommendations for 54 (20.9%) patients (Fig 24). Half of these (31; 50.8%) of these recommendations related to poor blood glucose control, while the need for dose optimization (12) or need for therapy (19) were also recommended quite frequently and changes to modified release formulations were recommended in 13 patients. Patient reported adverse effects (7) and pharmacist identified possible drug interactions (6) were other important recommendations.

In Northern Ireland 34 recommendations were made compared to 27 in the Republic of Ireland.

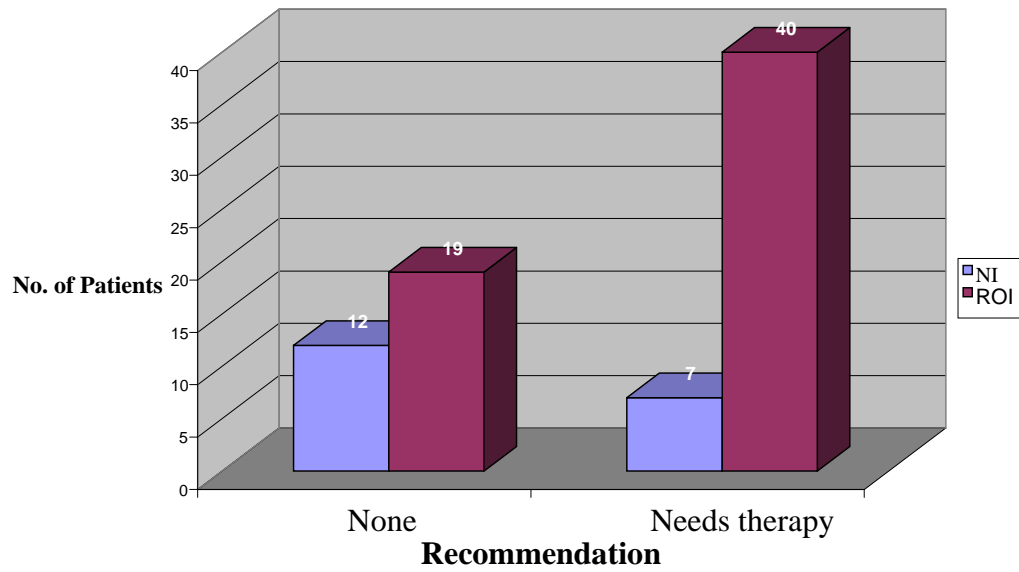
Lipid Lowering Medication Recommendations

Fig 25 Lipid Lowering Medications Recommendation Frequency Table



Pharmacists made recommendations on Lipid lowering therapy in 67 patients (26%). The need for therapy was recommended in 53 (20.5%) patients while dose optimisation was the next most prevalent recommendation in 10 (3.8%) patients . Notably pharmacists did not record any adverse effects and only one interaction as recommendations for action.

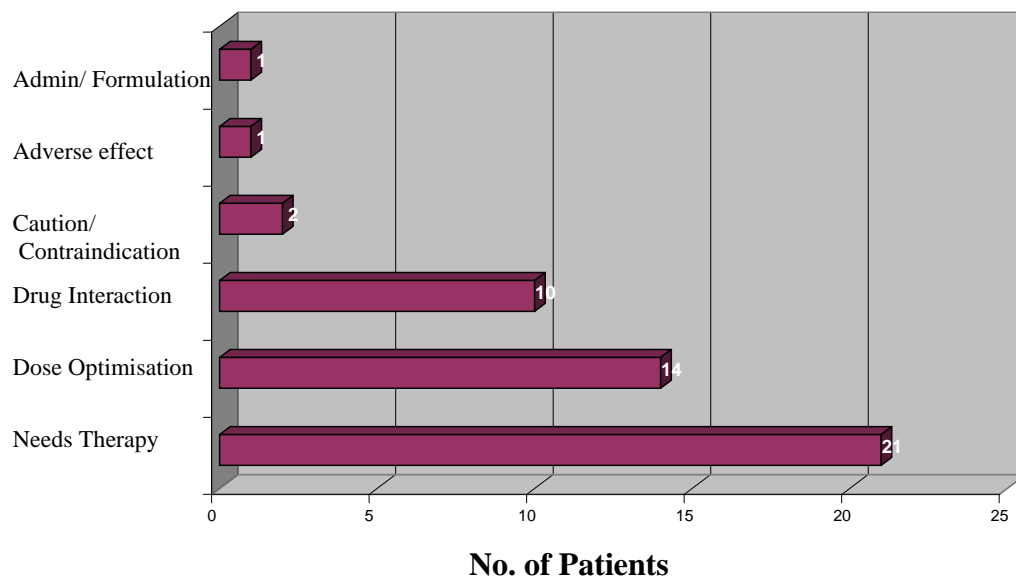
Fig 26 Lipid lowering medications recommendation for Patients not on therapy by Jurisdiction



The majority of patients recommended for therapy were in the Republic of Ireland (Fig 26). This is consistent with the higher percentage of untreated patients in that jurisdiction Fig. 14.

Antihypertensive Medication Recommendations

Fig. 27 Antihypertensive Medication Recommendations

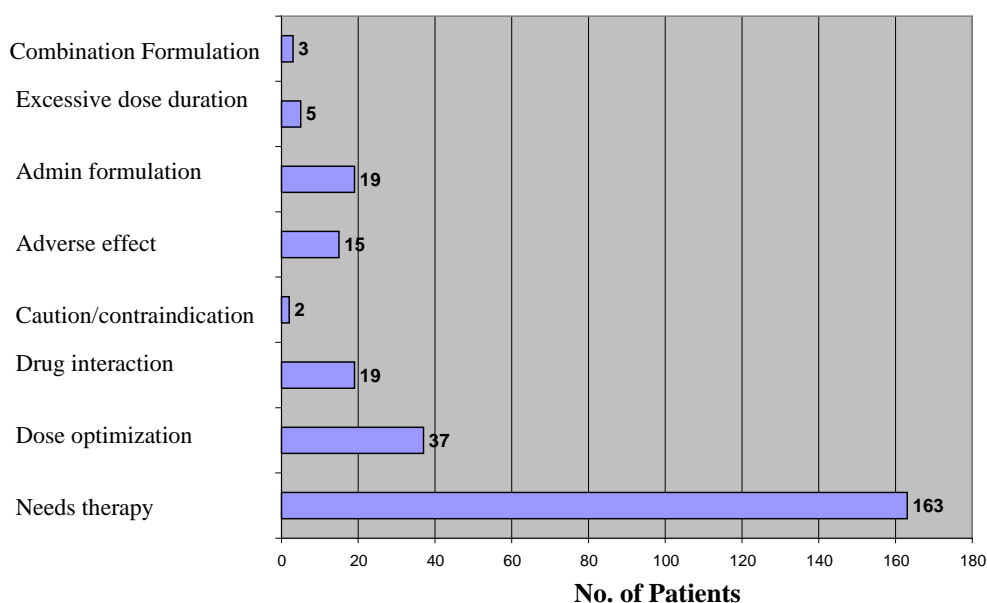


Pharmacists made 49 recommendations in 47 (18.2%) patients receiving antihypertensive medications (Fig 27). The majority of recommendations were concerned with the control of hypertension with recommendations for therapy (21) and drug optimisation (14) as the two most frequent categories. Recommendations on possible drug interactions was the next most common recommendation (10).

In Northern Ireland 22 recommendations were made with 27 in the Republic of Ireland.

Overall Synopsis of Medicines actions

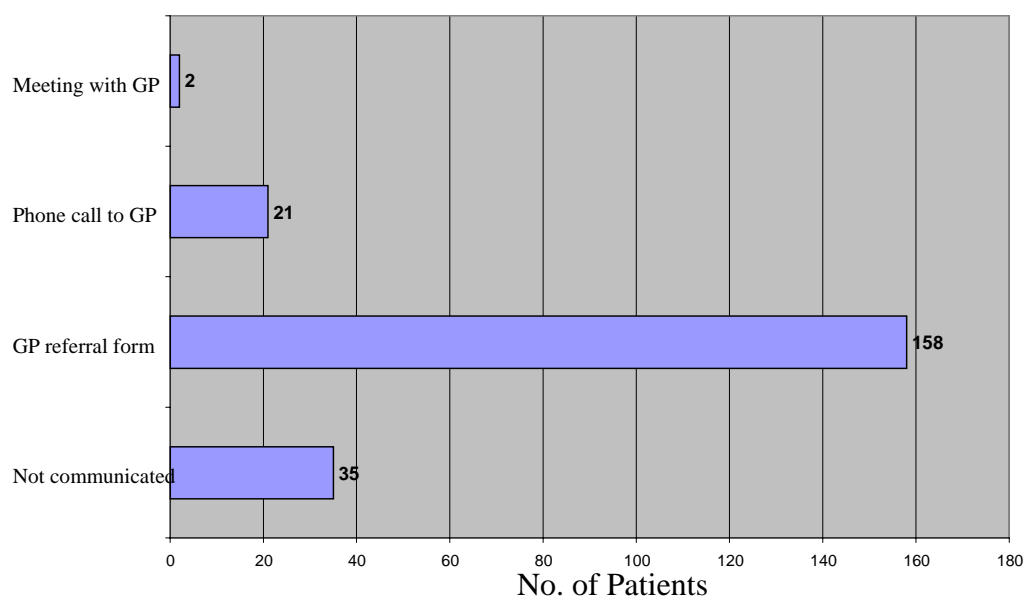
Fig 28 Overall Patient Medication Recommendations for Diabetes Related Drug Classes



The total number of recommendations was 263 for the 258 patients equating to a mean of 1.02 actions per patient (Fig 28). Three quarters of the recommendations related to existing sub optimal control of clinical markers or gaps in the use of evidence based preventative therapies. This consisted of recommendations on the need for therapy 62% and the need for dose optimisation 14%.

3.5. Communication with General Practitioner

Fig 29 Communication method to General Practitioner of Medicines Management Assessments



Communication of Assessments to the GP

Table 14

	Frequency	Percent	Valid Percent
Not communicated	35	14.1%	16.2%
GP referral form	158	63.7%	73.1%
Phone call to GP	21	8.5%	9.7%
Meeting with GP	2	0.8%	0.9%
Total	216	87.1%	100.0%
Missing	32	13.3%	
	248	100.0%	

Fig 29 Assessment information on 181 patients was communicated to the GP. The GP referral form (158) was the main method of communication of the outcomes of the assessment. Pharmacists were encouraged to communicate the results of the assessment to the GP even if there were no recommendations to the GP. Thus only a small number of assessments (35) were not communicated to the GP.

Fig 30 Communication Feedback from GP

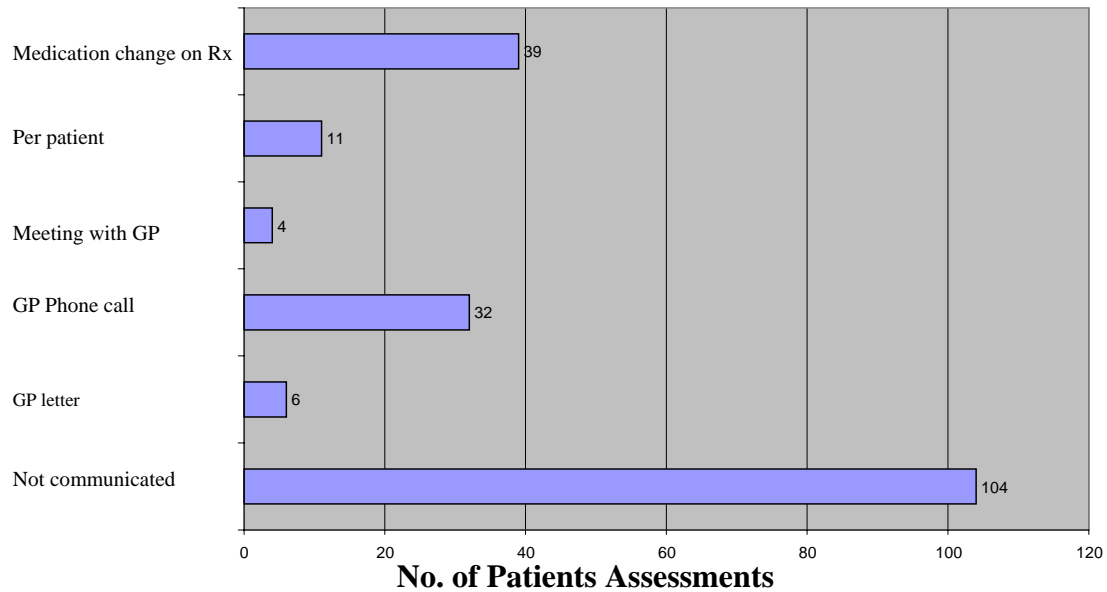


Fig 30 shows the communication feedback from GPs. In total there was feedback on 92 patient assessments from 181 communicated to the GP. This represents a response level of 50.8%. The level of direct feedback was quite low with 42 of the 92 patient assessments being conducted either by phone call, letter or a meeting with the GP. Indirect feedback was the most popular method either via the patient (11) or by medication change on the prescription (39). This leaves just under 50% non responders. Documented feedback from pharmacists showed a mixture of positive and negative responses.

3.6.General Practitioner Follow Up Actions

Table 15 Antiplatelet medication recommendations and follow up action cross-tabulation

Antiplatelet Recommendations		Antiplatelet follow up action			Total
		No change	Change	Medication commenced	
None		109	0	1	110
Needs therapy		41	0	21	62
Adverse effect		2	1	2	5
Dose optimization		1	0	0	1
Drug interaction		1	0	0	1
Admin formulation		1	0	0	1
Excessive dose / duration		2	2	0	4
Total		157	3	24	182

Originally recommendations were made for 84 patients (Fig 22).

Of these 72 patients were followed up and 25 of these patients had medication commenced or changed (34.7%). Of the 62 patients who were followed up and were recommended antiplatelet therapy one third of these subsequently received this class of medication for the first time.

Fig 31 Antiplatelet Medication Follow Up Actions by Jurisdiction

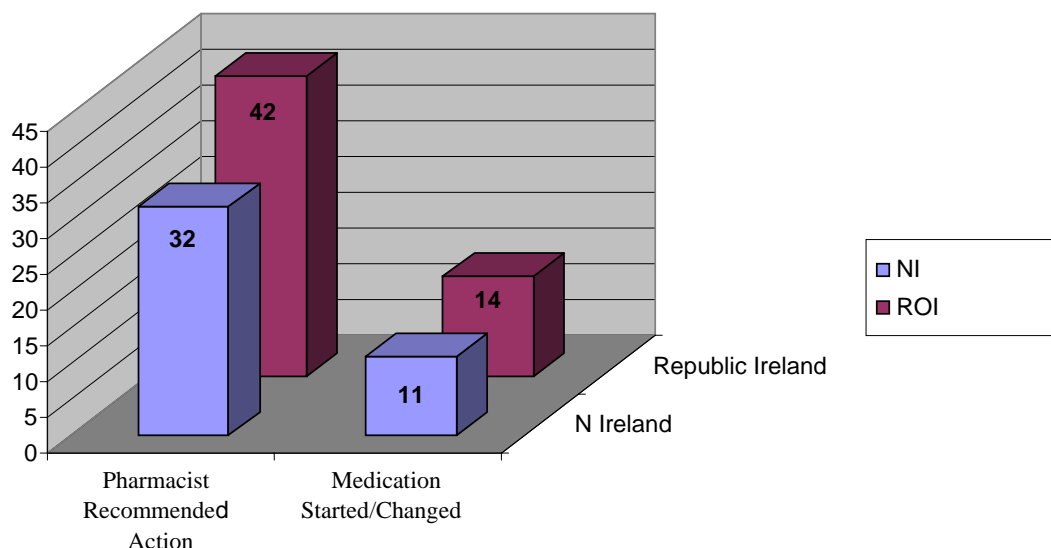


Fig 31 The response rates by jurisdiction were very similar (33%). This suggested that the GP's were equally receptive to the pharmacist's intervention and responded to it.

Table 16 Hypoglycaemic medication recommendations and follow up action

Hypoglycaemic Medication Recommendation	Hypoglycaemic Medication Follow Up Action			Total
	No change	Change	Medication commenced	
None	126	9	2	137
Needs Therapy	16	2	0	18
Adverse Effect	4	1	1	6
Dose Optimization	10	1	1	12
Drug Interaction	4	2	0	6
Administration Formulation	7	2	0	9
Combination Formulation	2	0	0	2
Excessive dose/duration	1	0	0	1
Total	170	17	4	191

Originally 54 patient assessments included recommended actions Fig 24

All of these assessments were followed up and changes shown in Table 16

Of these original 54 patients where recommendations were made 10 had drug changes or new medication commenced at follow up. This is an 18.5% response rate. The 10 changes made were made in response to the spectrum of recommendations from therapy need to formulation change.

An important finding for patients hypoglycaemic medications profile was for the 137 patients where the pharmacist had initially not made any recommendations, 11 patients (8%) had changes made to their hypoglycaemic medications or new hypoglycaemic medication commenced. This findings demonstrates the challenge for prescribers in reaching target clinical markers with pharmacotherapy. Whereas the response rate (8%) is lower than for those patients where the pharmacists had made recommendations, the rate may have been improved because GP's were aware of the project and also had detailed clinical data available on each patient. In the case of the 137 patients whom the pharmacist had not made any recommendations , the original pharmacist assessments were communicated to the GP in 115 cases.

Fig 32 Hypoglycaemic Medication Recommendation Follow Up Actions by Jurisdiction

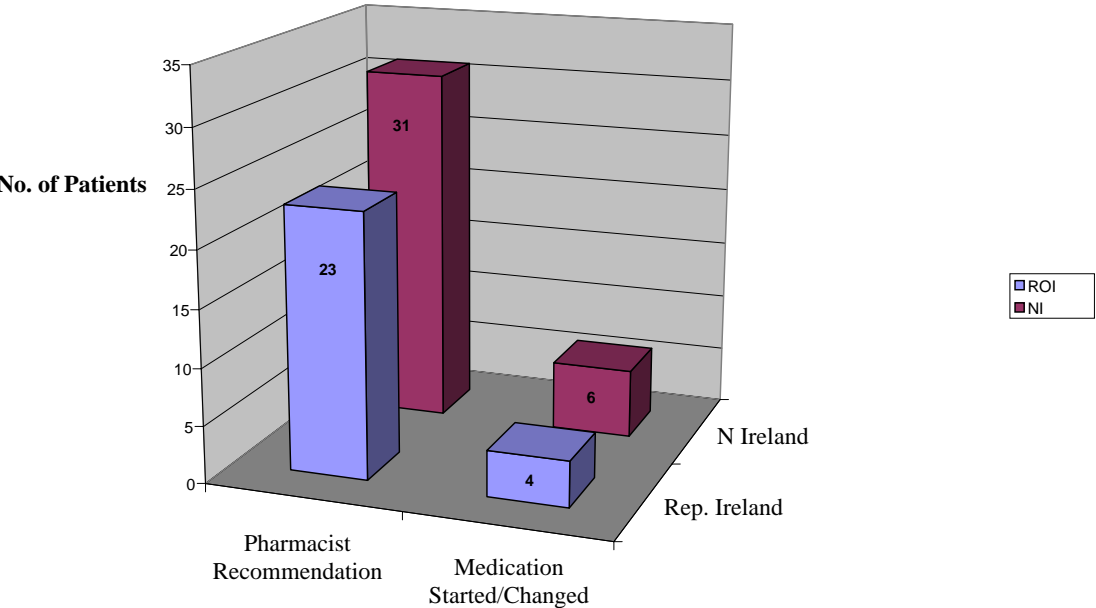


Fig 32 The Follow up actions by jurisdiction were not significantly different

Table 17 Lipid Lowering medication Recommendations follow up action

Lipid Lowering Recommendations * Lipid Lowering medication follow up action Crosstabulation				
	Lipid Lowering medication follow up action			
Lipid Lowering Recommendations	No change	Change	Medication commenced	Total
None	110	6	4	120
Needs therapy	36	0	15	51
Drug interaction	1	0	0	1
Administration formulation	1	0	0	1
Dose optimization	7	1	0	8
Total	155	7	19	181

Originally recommendations were made for 67 patients (Fig 25) and 61 patient follow ups were recorded and of these 16 patients (26.2%) had changes made to their medication profile. The majority of changes were around the need for therapy and of the 51 patients who were followed up 15 (29.4%) were commenced on lipid lowering medication.

An important finding was that for the patient cohort who were not recommended for medication action (120), 6 had changes made to their lipid lowering therapy and 4 had medication commenced giving an additional 10 (8.3%) patients whose therapy was changed after the medication review.

Fig 33 Lipid Lowering Medication Follow-up actions by Jurisdiction

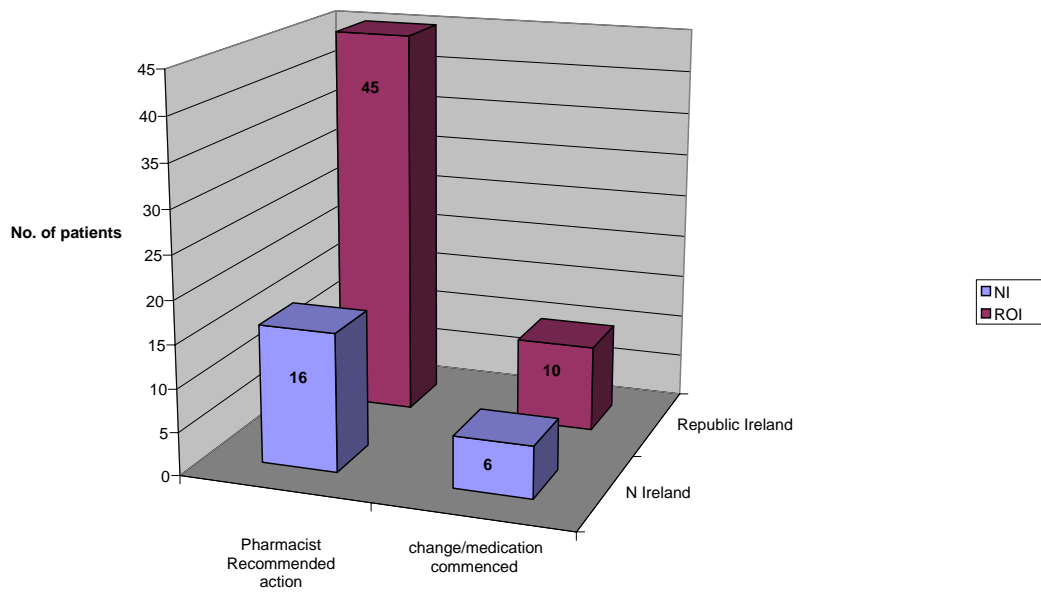


Fig 33. While the number of actions taken in response to the pharmacist’s recommendations appeared to be greater in Northern Ireland it was not statistically significant.

Table 18 Antihypertensive medication action follow up action

		AntiHypertensive follow up action			Total
		No change	Change	Medication commenced	
Antihypertensive Recommendation	None	122	10	5	137
	Needs therapy	16	1	2	19
	Adverse effect	1	0	0	1
	Caution/contraindication	2	0	0	2
	Drug interaction	6	1	1	8
	Admin formulation	1	0	0	1
	Dose optimization	9	3	0	12
Total		157	15	8	180

In the original assessment pharmacists made 49 recommendations in 47 patients concerning their pharmacotherapy (Fig 27). Follow up was recorded for 43 patients. Of these, 8 patients (18.6%) had medication changes made and 6 of the 8 changes were in response to the need for therapy or commencement of therapy. As has been observed in the other drug categories there were a number of significant changes made for patients who were not originally recommended action by their pharmacists; 15 (10.9%) patients out this cohort of 137 patients had medication changes made.

Fig 34 Antihypertensive Therapy Medication Followup by Jurisdiction

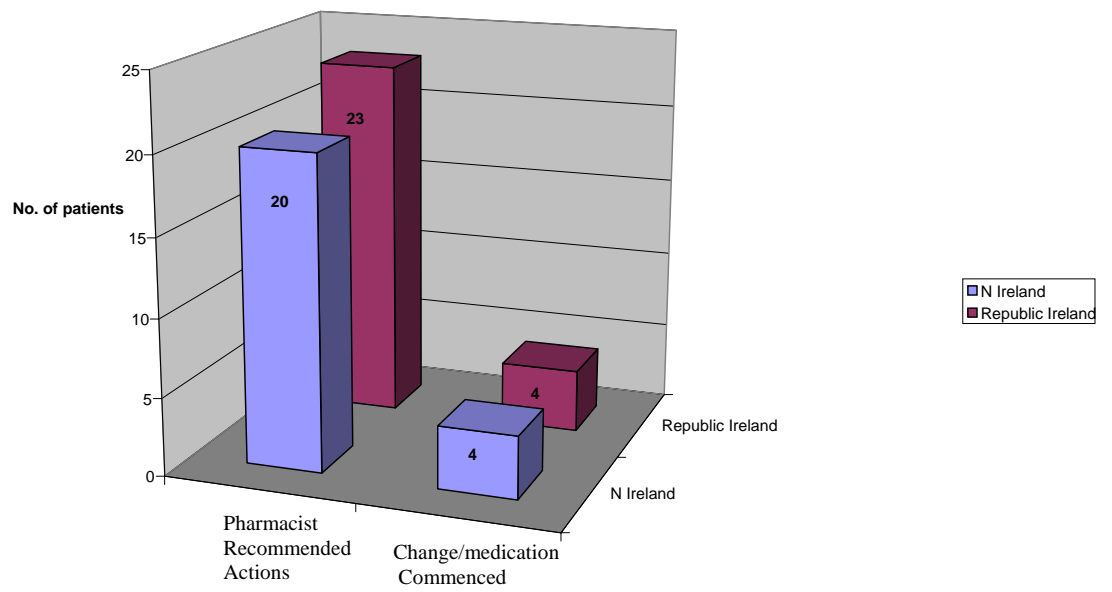
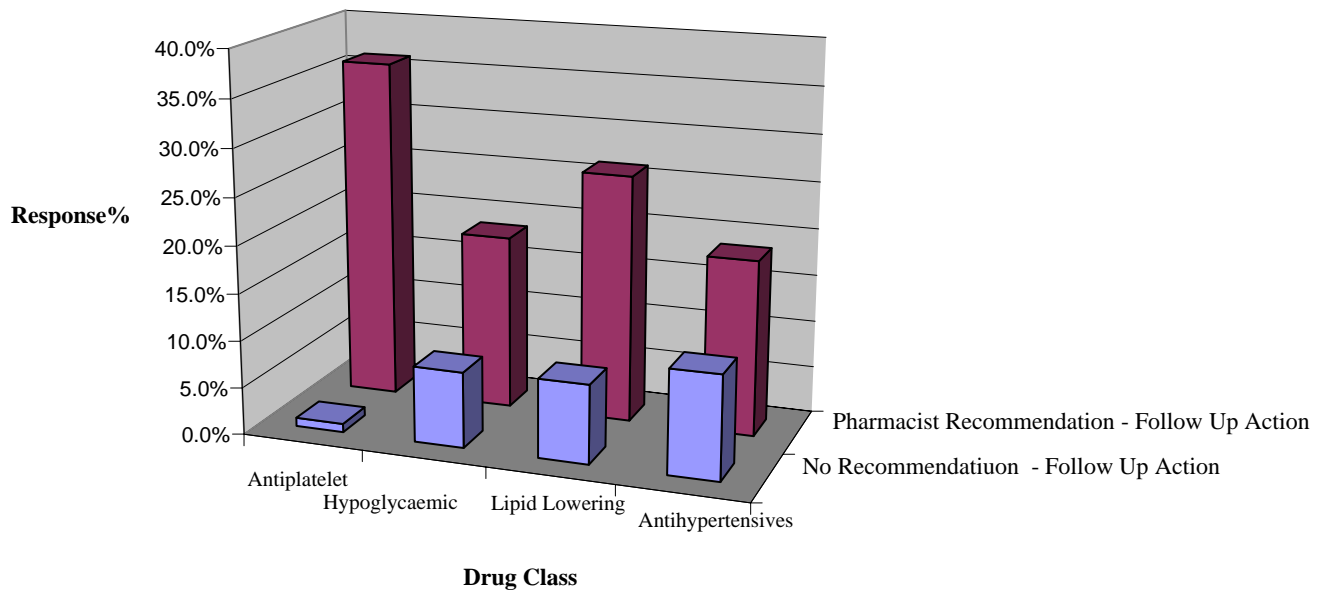


Fig 34 There were no significant differences in the follow up action in response to the pharmacist's intervention by jurisdiction for the antihypertensive drug group.

Fig 35 Overall Follow Up Actions to Pharmacist Recommendations



The overall picture for follow up actions to the pharmacist recommendations is shown in Fig 35. The greatest response level to the pharmacist recommendations was for the Antiplatelet and Lipid Lowering drugs. For these two drug classes the difference in response to the pharmacist's recommendations and changes made even when the pharmacist had made no recommendation combined to form a substantial cohort. For the Hypoglycaemic and Antihypertensive groups the difference was smaller and thus the effect of the intervention was less clear.

4. Discussion

The pharmacist intervention model of Medicines Management was successful in achieving widespread community pharmacist, general practitioner and patient engagement across the CAWT region. The mixture of rural and urban centres served as a heterogeneous sample in which to deliver the intervention. The intervention was delivered in a structured and timely manner with a high degree of patient follow up.

This is in contrast to the original pharmaceutical care intervention model which pharmacists were only able to deliver at a limited number of sites to a small group of patients.

The gender distribution of patients showed a majority of males, consistent with the finding of the CAWT Health promotion campaigns (12). In view of the higher incidence of diabetes in females (2) this may indicate some bias on the intervening pharmacist's part or upon the willingness of female patients to accept the intervention.

Initial assessments appeared to show sub-optimal pharmacotherapy of type 2 diabetes with respect to established evidence-based guidelines. A substantial proportion of patients were receiving either monotherapy or no drug therapy in the four categories assessed - antiplatelet, hypoglycaemic, lipid lowering and antihypertensive drugs. Since the details of the patient's medical history were not available to the pharmacists it is not possible to infer that underprescribing of these preventative drugs was widespread. However there was a significant difference between the two jurisdictions with evidence of more aggressive pharmacotherapy to achieve treatment goals in Northern Ireland. This may reflect differences in the approach to attaining treatment goals for type 2 diabetes between NI and ROI. In particular the Quality Outcomes framework (QOF) in Northern Ireland may have acted as a significant driver for attaining treatment goals. Other workers, using prescribing data based upon pharmacy claims for payment (15) have shown that prescribing the NW of the Republic of Ireland of preventative drugs was lower than elsewhere in the Republic. The data in this study also seems to reflect this less intensive approach to treatment.

There was a significant lack of patient awareness of diabetes clinical monitoring parameters and their targets. There was a major difference between jurisdictions with the Republic of Ireland having significantly lower awareness. In Northern Ireland half of patients were aware of their clinical marker values and this was a consistent finding for each of the different markers. In the Republic, whereas one third of patients were aware of their total cholesterol level, which is perhaps the most widely known of all such values in Society as a whole, only one in eight were aware of their HBA1c and blood pressure. These low levels of knowledge could reflect several different factors working alone or in combination; patient education about drugs may be of low priority; since Type 2 diabetics do not routinely monitor their blood glucose levels, their HBA1c values may be taken less frequently by the hospital clinic and so be less familiar to them; conversely, blood cholesterol is monitored in many conditions and may be the most widely known clinical value among the public; blood pressure is represented as two numbers and it may be that the significance of both these numbers may not be clear to patients.

This highlights a large gap in diabetes patient knowledge which would severely hamper the patient's capability for self care. The need for structured education of patients with Type 2 diabetes would appear to be both extensive and potentially valuable.

Pharmacists made 263 recommendations on patient's medications equating to one recommendation per patient. The need for therapy was the main recommendation made by pharmacists. This is one of the principal Drug-Related Problems recognised in the Pharmaceutical Care approach. There was no difference between ROI and NI in these recommendations indicating consistency with respect to the intervention across the two jurisdictions.

These recommendations were responded to in 92 cases by GPs resulting in an increase in the percentage of patients on evidence based medication at follow up. This indicates that this type of review can significantly increase the appropriate usage of drugs in this group of patients.

The pharmacist intervention was successful in increasing the percentage of patients on evidence based medication at follow up; 59 prescribed medication changes were made following the pharmacist's recommendations in 258 patient - approximately 22% of patients.

Undoubtedly, the potential exists to engage with a larger cohort of pharmacists to deliver this service to a larger percentage of the diabetes patients in the CAWT region. The Medicines Management Programme demonstrated the need and feasibility of a brief Pharmaceutical Care intervention designed around a structured Medication Review.

This project increased communication between Community Pharmacists and GPs about these patients. In this project GPs did not give any feedback to the pharmacists in almost one half of the instances where a recommendation was made. Thus the pharmacists were left without any information despite remaining responsible for providing care associated with medicines for those patients. And in 5% of patient assessments the pharmacists reported that the GPs concerned refused to engage with the pharmacist at all. Chronic Diseases, such as diabetes, require a process of collaborative care that involves the patient, the prescriber and the pharmacist. Clearly, within the CAWT region there is some way to go before inter-professional communication and collaborative care is the norm and functions appropriately. Given the level of improvement in patient's drug therapy that the Medicines Management project produced, this failure to enter into the provision of care can only result in a poorer standard of treatment for Type 2 diabetics.

5. Conclusions

- Patients, GPs and pharmacists took part in the project across the entire CAWT region and the intervention was implemented, effective and compatible with the operation of the Health Services in each of the four Health Areas within CAWT.
- The pharmacist-initiated brief intervention model was successful in increasing the number of patients on evidence-based medicines for the treatment of diabetes and the prevention of the complications of diabetes.
- Patient knowledge of clinical markers was identified as an area suitable for structured education for people with type 2 diabetes
- Inter-professional communication was enabled and patient care improved; however the level of communication was insufficient to create a platform for universal patient-centred collaborative care in the Primary Care sector.
- This programme demonstrated the feasibility, value and potential of brief pharmaceutical care interventions around a structured medication review in patients with chronic disease. A similar approach could be taken for other conditions.
- The CAWT “*Health Promotion and the Care of Type 2 Diabetics in Primary Care: The contribution of the Community Pharmacist:*” project has shown that Community Pharmacists in NI and ROI can provide Health Promotion and Medication Review services that are consistent with evidence-based guidelines and standards of care for patients with type 2 diabetes mellitus.

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7. Appendices



Diabetes Medicines Management Patient Consent Form

Patient No.
Name
Address

Male/Female
Tel. No

_____ Doctor _____

Confidential Patient Record

Pharmacy
Stamp

- I wish to take part in the “Diabetes Medicines Assessment”
- I give my pharmacist (.....) permission to communicate the findings of the assessment to my doctor.
- I give permission for the transferring of information gathered during my assessment to the CAWT project officer, in such a fashion as to ensure my anonymity (i.e. that I personally cannot be identified), for the purpose of analysis as part of the CAWT Diabetes project. (This is necessary so that the success of the programme can be assessed.)

Signature of Patient: _____

Signature of Pharmacist _____



cooperation and working together
for health gain and social well being in border areas

Diabetes Medicines Management Assessment Form

Patient Details		Male	Fem
Patient No.	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
Age Group	<20 <input type="checkbox"/>	20-30 <input type="checkbox"/>	31-40 <input type="checkbox"/>
	51-60 <input type="checkbox"/>	61-70 <input type="checkbox"/>	70+ <input type="checkbox"/>
Smoker	yes <input type="checkbox"/>	no <input type="checkbox"/>	
Patient GP	<input type="text"/>		
Total no. of patient medications		<input type="checkbox"/>	

Antiplatelet Medication

Aspirin 75mg Clopidogrel

Aspirin + Clopidogrel Combination >12mnths

Aspirin + Dipyridamole

Comment

.....

.....

Hypoglycaemics

Metformin Sulphonylurea

Glitazone Insulin

Glitazone +Metformin Post Prandial Reg

Comment

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HBa1C No Data

Lipid Lowering Medication

Medication Name -----

Dose -----

Comment

.....

.....

TC No Data

Anti Hypertensives

Medication Name ----- Dose -----

Medication Name ----- Dose -----

Medication Name----- Dose -----

Medication Name----- Dose -----

Comment

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BP / No Data

Antiplatelet Medication

- Needs Therapy
- Adverse Effects
- Caution/Contraindication
- Dose Optimization
- Drug Interaction
- Admin/Formulation
- Excessive Dose/Duration

Recommendation

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Hypoglycaemics

- Needs Therapy
- Adverse Effects
- Caution/Contraindication
- Dose Optimization
- Drug Interaction
- Admin/Formulation
- Excessive Dose/Duration
- Combo formulation

Recommendation

.....
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Lipid Lowering Medication

- Needs Therapy
- Adverse Effects
- Caution/Contraindication
- Drug Interaction
- Admin/Formulation
- Dose Optimization

Recommendation

.....
.....
.....

Anti Hypertensives

- Needs Therapy
- Adverse Effects
- Caution/Contraindication
- Drug Interaction
- Admin/Formulation
- Dose Optimization

Recommendation

.....
.....
.....
.....

Problem Resolved

Patient Referred

Pharmacy Stamp

Diabetes Medicines Management GP referral

Antiplatelet Medication

<input type="checkbox"/> Needs Therapy	<input type="checkbox"/> Drug Interaction
<input type="checkbox"/> Adverse Effects	<input type="checkbox"/> Admin/Formulation
<input type="checkbox"/> Caution/Contraindication	<input type="checkbox"/> Excessive Dose/Duration
<input type="checkbox"/> Dose Optimization	

Suggested Action

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Hypoglycaemics

<input type="checkbox"/> Needs Therapy	<input type="checkbox"/> Drug Interaction
<input type="checkbox"/> Adverse Effects	<input type="checkbox"/> Admin/Formulation
<input type="checkbox"/> Caution/Contraindication	<input type="checkbox"/> Excessive Dose/Duration
<input type="checkbox"/> Dose Optimization	<input type="checkbox"/> Combo formulation

Suggested Action

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Lipid Lowering Medication

<input type="checkbox"/> Needs Therapy	<input type="checkbox"/> Drug Interaction
<input type="checkbox"/> Adverse Effects	<input type="checkbox"/> Admin/Formulation
<input type="checkbox"/> Caution/Contraindication	<input type="checkbox"/> Dose Optimization

Suggested Action

.....

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Anti Hypertensives

<input type="checkbox"/> Needs Therapy	<input type="checkbox"/> Drug Interaction
<input type="checkbox"/> Adverse Effects	<input type="checkbox"/> Admin/Formulation
<input type="checkbox"/> Caution/Contraindication	<input type="checkbox"/> Dose Optimization

Suggested Action

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Pharmacy Medicines Management Problems

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Diabetes Medicines Management Assessment Form Follow up Feb07

Communication of Assessment recommendations

The recommendations from the assessment in November (Overleaf) were communicated to the GP by
 GP Referral Form Phone call to GP Meeting with GP Not Communicated

GP Feedback

The Feedback from the GP on pharmacist's recommendations was communicated by
 GP letter GP Phone call Meeting with GP Patient Rx Change No Response

Clinical Values

Has the Patient to your knowledge had their clinical Markers Yes No Don't Know
 checked since you assessed the patient ? **Values** Total Cholesterol BP HBA1c

Anti Platelet Medication

Medication Commenced Changed No Change

New Meds _____

Stopped Meds _____

Feedback Comments

.....

Oral Hypoglycaemics

Medication Commenced Changed No Change

New Meds _____

Stopped Meds _____

Feedback Comments

.....

Lipid Lowering Medication

Medication Commenced Changed No Change

New Meds _____

Stopped Meds _____

Feedback Comments

.....

Anti Hypertensives

Medication Commenced Changed No Change

New Meds _____

Stopped Meds _____

Feedback Comments

.....

