The Role of the Consultant Pharmacist in the Pharmaceutical Care of Elderly Patients in Intermediate Care

Final Report

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1.0 Introduction

1.1 Background

The proportion of elderly people within the population is increasing; the latest figures in Northern Ireland revealed that in June 2009, 1.6% (n=28 700) of the population was aged 85 years and over. This represents a 22% increase in the size of this age category over a seven-year period i.e.2002-2009. Based on these recent figures it is projected that by 2021, the number of persons aged 85 years and over in Northern Ireland will increase by 67% to a figure of 47 9001.

The Western Health and Social Care Trust (WHSCT) serves a population of approximately 300 000 people with the number of people aged 65 years or over accounting for 12% of these. One-third of the total older population live in the Derry District Council Area; however Fermanagh has the highest percentage of older people in its total population (15%). Statistics relating to population projections show an overall increase of 34% in the number of people aged 65 and over and living in the Western area by 2017. This represents the largest single increase of any HSCB area in Northern Ireland (see figure 1) and is significantly above the projected average increase for Northern Ireland as a whole2.

This change in local population demographics, also reflected throughout the UK, has enormous implications for healthcare resource planning in the future with both older patients and their older carers to be accounted for. Older people are three times more likely than younger people to be admitted to hospital following attendance at A&E; once there, they are more likely to stay and suffer life-threatening infections and falls2.

![Figure 1: Older People Projections (aged 65 years and over) by former Health Board Area in Northern Ireland, % change 2007-2017.](image)
1.2 Intermediate Care

The National Service Framework (NSF) for Older People set out a plan for optimal health and social care for the start of the 21st century. The document heralded a move within the NHS towards more patient-centred multidisciplinary care being delivered in the community setting, as opposed to the traditional model of hospital care. This new model of care has been referred to as ‘Intermediate Care’ or ‘Transitional Care,’ with older patients being the main recipients of this ‘new’ type of complex healthcare provision. Implementation of this new agenda requires release of resources from existing sources to fund new models of care in the community and developing closer integration between primary and secondary care.

The Department of Health defines Intermediate Care (IC) as:

- Services targeted at people who would otherwise face unnecessarily prolonged hospital stays or inappropriate admission to acute inpatient care, long-term residential care, or continuing NHS inpatient care.
- Services provided on the basis of a comprehensive assessment, resulting in a structured individual care plan that involves active therapy, treatment and opportunity for recovery.
- Services which have a planned outcome of maximising independence and enabling patients/users to resume living at home.
- Services which are time-limited, normally no longer than six weeks, and frequently as little as one or two weeks or less.
- Services which involve cross-professional working, with a single assessment framework, single professional records and shared protocols.

As part of the Department of Health’s Older People’s Prevention Package, the original 2001 Intermediate Care guidance has been updated to reflect subsequent service developments. Published in 2009, ‘Intermediate Care – Halfway Home’ updated guidance for the NHS and local authorities and re-emphasised that successful IC services are based on: competent multidimensional assessment of individual’s needs and potentials; interventions focused on individual patient goals; and effective teamwork and performance management.

In addition to patient age, the variables with the greatest relative influence on predicted risk of hospitalisation include the number of co-morbidities, polypharmacy and the presence of potentially inappropriate prescription drugs for elderly people; clearly, it makes sense that pharmacists, particularly those with a specialist interest in geriatric medicine, should be
actively included in the core team responsible for the management and transitional care of this vulnerable group of patients.

Locally, the Regional Strategy for Health and Well-being in Northern Ireland 2005-2025\textsuperscript{10} highlighted ‘responsive integrated services’ as a central policy direction for health and social services. In 2007 the DHSSPS issued a circular ‘Enhancing Primary and Community Services closer to home’\textsuperscript{11}; this confirmed that the key DHSSPS policy aim is to develop fully integrated primary and community care services that focus on people at greatest risk and reduce the inappropriate reliance on hospital services.

In December 2011, the Compton Review ‘Transforming Your Care’ was published; this report outlines the remodelling of Health and Social Care in Northern Ireland. Specifically relating to the care of older people, the review recommends there should be better integration of hospital and community services. With particular reference to intermediate care, the review states there is now the opportunity to create greater provision of intermediate care, increasingly using the independent sector to provide:

- Step-down beds for short-term rehabilitation following a stay in hospital;
- Step-up beds that provide short term support to prevent an admission into hospital and;
- Short-term reablement support to enable people to learn or relearn the skills necessary for independent living\textsuperscript{12}.

1.3 The Consultant Pharmacist

In 2003, the consultant pharmacist role was identified in ‘A Vision for Pharmacy in the new NHS’\textsuperscript{13}. This stated:

‘Pharmacists are successful in developing clinical and specialist roles in hospitals. We want to build on this success through establishment of consultant pharmacists’ posts. These will enable clinical excellence and leadership to be recognised. They should support medicines management in hospitals and play a leading role in training pharmacists and other health care professionals locally. They should be well placed to influence the use of medicines across the wider health care community.’\textsuperscript{13}

The Department of Health subsequently issued guidance in 2005 on the development of consultant pharmacists’ posts\textsuperscript{14}. This guidance outlines the context and functions of the consultant pharmacist. A consultant pharmacist post should be defined and developed based on local need and should be structured around four main functions:
1. Expert practice (usually comprising 50% of the job description)
2. Research, evaluation and service development
3. Education, mentoring and overview of practice
4. Professional leadership

Education, mentoring and research are key themes that must be central to the job description for individuals embarking upon this new career path. The role therefore requires innovation, should lead to improved patient care and establish a demonstrable link between clinical practice and service development (e.g. introduction and evaluation of new models of patient care). In providing clinical pharmacists with a new ambitious role, clinical excellence will be retained within the NHS and pharmaceutical professional leadership will be strengthened. While all consultant pharmacist posts will include the same four main functions, it is the variation in interpretation across different specialties and organisations that will result in significant similarities in the post nationally and subtle differences at a local level.

1.4 Regional Innovations in Medicines Management Project Funding
A pharmaceutical service-development project based on the recruitment of two consultant pharmacists (one each in the WHSCT and NHSCT) specialising in care of the elderly, and based in intermediate care, was proposed to the DHSSPSNI and granted funding in August 2011. This project sits under the work-stream of the Regional Innovations in Medicines Management.

The consultant pharmacists were recruited and the two-year long project was initiated in April 1st 2012. The project captured all aforementioned elements by placing the consultant pharmacists at strategic places within intermediate care with the WHSCT focusing on the community hospital (step-down) setting and the NHSCT concentrating on nursing home patients. This allows for exploration and evaluation of innovative new models of care within two different settings.

This report outlines the structure and outcomes of the project conducted within the WHSCT.
2.0 Consultant Pharmacist led Pharmaceutical Care in a WHSCT Community Hospital

2.1 Background and Project Design

Waterside Hospital is an intermediate care step-down community hospital located within the Gransha Park site, two miles from Altnagelvin Area Hospital. Prior to this project, there was no clinical pharmacy service presence on the wards, with the role of pharmacy hence being ‘supply only.’ Waterside was therefore identified as an ideal place to implement and evaluate a consultant pharmacist led case management intermediate care project. The hospital is made up of five wards, with two of the five being devoted to psycho-geriatric/dementia patients; these wards were not included in the project (wards 1 and 3).

In May 2012, a process mapping half day was held; this was attended by the project manager, consultant pharmacist, lead consultant, junior doctors, assistant directors, the head of pharmacy and medicines management and Waterside ward managers. The process mapping was facilitated by a Lean-trained facilitator. This resulted in mapping out of the system which patients passed through from acute to intermediate care and helped to steer the new direction of the proposed project using a collaborative approach. This initiative also demonstrated the use of PPI (with attendees being potential users of this new pharmacy service) for informing the direction of travel with the proposed model and new service development.

The initial project was designed as a randomised controlled trial (RCT); however ethical approval was not achieved. Given the time frame and duration of time it would take to redesign the project and appeal this decision, it was decided to move forward with a service improvement and evaluation. The proposed new patient care pathway placed the consultant pharmacist at the interface between acute care in Altnagelvin Area Hospital and intermediate care in Waterside hospital where a caseload of complex needs elderly patients would be identified and entered into individualised pharmaceutical care plans (see Figure 2). Opinion was sought on the new project design from the Trust Research Director (Dr M O’Kane); Dr O’Kane confirmed the project to be service evaluation not requiring research governance or ethical approvals. This ultimately did not hinder progress with the project, and indeed, unforeseen circumstances e.g. a major fire at Altnagelvin Area hospital and subsequent redesign of care of the elderly ward services, would have made a RCT project design difficult to achieve and maintain. Elements of the project were implemented in phases according to resources e.g. post-discharge telephone calls were introduced in October 2012.
It is also important to note that Care of the Elderly wards were reorganised after the major fire event in Altnagelvin Area Hospital (November 2012). Wards 2, 4 and 5 temporarily increased their bed numbers and ward 4 was stepped up to sub-acute status. Currently (February 2014) ward 4 (24 beds including 3 continuing care patients) is a mixture of sub-acute and rehabilitation patients, ward 2 (24 beds including 3 continuing care patients) have remained fully committed to rehabilitation patients and ward 5 was closed (end of 2013).

A consultant pharmacist was appointed temporarily on secondment from the NHSCT for six months in April 2012 (S Toner) in order to provide maternity cover for the WHSCT consultant pharmacist who returned to work in October 2012 (C Darcy). Therefore continuity of the newly implemented model of care was maintained.
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Unplanned Acute Admission to Altnagelvin Area Hospital

Aged ≥ 65 years
To be transferred to wards 2, 4 or 5 of Waterside Hospital

Consultant Pharmacist Case Management
- Ward Rounds
- Pharmaceutical care plan
- Clinical Interventions Recorded (EPICS, Eadon criteria graded)

Discharged to Waterside Hospital, Wards 2, 4 or 5

Discharged to Own Home/Nursing Home/Other

Continuing Case Management e.g.
Follow-up phone calls. Pharmacy input into post-discharge review clinics
Communication with GP and community pharmacists

Patient Outcomes
- 30/90 day Unplanned Readmission Rate
- Length of stay if readmitted within 30/90 days
- Length of time to first readmission within 90 days
- Referral to ‘Managing Your Medicines’ (Home destination)
- Medication Adherence

Data Collection

Follow-Up

Entry into IC

Figure 2: The WHSCT model of consultant pharmacist case management of elderly patients in intermediate care (Waterside Hospital)

*IMM = Integrated Medicines Management
2.2 Consultant Pharmacist Case Management Model

The consultant pharmacist assumed pharmaceutical care responsibility for the patient throughout their stay in intermediate care and for a minimum of 30 days post-discharge. On admission to Waterside Hospital, the consultant pharmacist assessed each patient’s medications and determined the appropriateness of each drug and regimen as a whole using the Medication Appropriateness Index (MAI)\textsuperscript{16} (Appendix 1). Based on this, medications were stopped/started/amended. Clinical interventions made on admission and throughout the stay in Waterside were recorded on EPICS and graded according to the Eadon criteria\textsuperscript{17} (Table 1). A written Pharmaceutical Care Plan (PCP) was then implemented for each patient.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention which is detrimental to patient’s well-being</td>
<td>1</td>
</tr>
<tr>
<td>Intervention is of no significance to patient care</td>
<td>2</td>
</tr>
<tr>
<td>Intervention is significant but does not lead to an improvement in patient care</td>
<td>3</td>
</tr>
<tr>
<td>Intervention is significant and results in an improvement in the standard of care</td>
<td>4</td>
</tr>
<tr>
<td>Intervention is very significant and prevents major organ failure or adverse reaction of similar importance</td>
<td>5</td>
</tr>
<tr>
<td>Intervention is potentially life-saving</td>
<td>6</td>
</tr>
</tbody>
</table>

Medication-related educational needs of patients and their carers were also identified and addressed by the consultant pharmacist on an individual or group basis. Adherence issues were identified by the consultant pharmacist and recommendations made. Contact was made with the GP and community pharmacist as needed on discharge. Case management continued via a follow-up telephone call to the patient; clinical interventions made at this time were also recorded on EPICs.

2.3 Remodelling of the Pharmacy service to Waterside

Initial work on the wards required the consultant pharmacist to review procedures relating to medication supply, stock holding and patient discharge. One Stop Dispensing was introduced and ward stock was reviewed. Use of Patients Own Drugs was encouraged and the ward was supplied with eight weeks of patient drugs as opposed to four (reflective of the average length of stay in this sector and post-discharge supply needed), thereby reducing the burden of work in the Altnagelvin hospital site dispensary.
2.4 Data Collection and Analysis

Data on clinical interventions and their grading was recorded on EPICS and downloaded into Excel for analysis. Specific patient data including demographics, medical and medication history, MAI scores, and outcomes e.g. readmission rates were entered into SPSS version 21 for exploration and analysis. Drugs which were stopped/started were primarily costed out using the NHS dictionary of medicines and devices (dm+d - accessed October, 2013). Where no cost was available on dm + d. the the British National Formulary (BNF 66) (September 2013) was referred to.

Continuous data was plotted and explored and tested for normality of distribution. Dependent upon this, a t-test, Mann-Whitney U (unpaired data) or Wilcoxon signed ranks test (paired data) was applied to the data (p≤0.05). For example, to compare total MAI on admission and discharge for individual drugs and entire medication regimens, the Wilcoxon Signed Rank test was applied with statistical significance set at p≤0.05.

Subgroups of interest e.g. those receiving a compliance aid, were also selected and explored for demographics and subsequent healthcare resource usage outcomes. Outcomes for these patients were explored using appropriate statistical tests.

2.5 WHSCT Project Results (Final analysis, February 2014)

From May 1st 2012 to the end of June 2013, a total of 508 patients were seen by a consultant pharmacist who implemented individualised Pharmaceutical Care Plans; for ethical reasons, all patients admitted to Waterside wards 2, 4 and 5 were given the opportunity to be managed by the consultant pharmacist regardless of age; 486 of these patients were aged over 65 years. The project was allowed time to embed with this report therefore presenting data only on those included in this service in Waterside hospital over a 12-month period i.e. between July 1st 2012 and June 30th 2013. A complete data set including 90 day readmission rates was available for 453 patients (162 male and 291 female); 98 patients were case managed by S Toner and the remaining 355 case managed by C Darcy. The average age of these patients was 82.8±7.1 years (n=453). The average length of stay in acute care in Altnagelvin Area Hospital prior to discharge into Waterside hospital was 16.4±16.3 days with their subsequent average length of stay in intermediate care being 29.5±30.8 days. 127 (28%) patients were recorded as widowed, 147 (32.5%) were noted as being married and 70 (15.5%) had never married. Twenty-one patients (4.6%) died during the baseline admission in Waterside hospital. The original source of their
admission to acute care is broken down in Table 2 with the majority having been living in their own home (n=380, 83.9%).

**Table 2: Source of admission of patients admitted into acute and then intermediate care (n=453)**

<table>
<thead>
<tr>
<th>Source of Admission</th>
<th>No. of Patients</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private nursing home</td>
<td>31</td>
<td>6.8</td>
</tr>
<tr>
<td>Residential Home</td>
<td>16</td>
<td>3.5</td>
</tr>
<tr>
<td>Trust Nursing Home</td>
<td>8</td>
<td>1.8</td>
</tr>
<tr>
<td>Own home</td>
<td>380</td>
<td>83.9</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
<td>3.1</td>
</tr>
<tr>
<td>Unknown/Missing data</td>
<td>4</td>
<td>0.9</td>
</tr>
</tbody>
</table>

The average number of drugs taken by these patients upon admission to Waterside, and after completion of medicines reconciliation, was 10.7±4.3 (Range = 0 to 25, n=453). Eleven patients were recorded as having experienced an adverse drug reaction leading to the initial admission to acute hospital care. The drugs implicated in these ADRs were warfarin (n=1), benzodiazepines (n=1), NSAIDs (n=1), penicillin (n=2), opioid analgesics (n=2) and calcium-channel blockers (n=3).

2.6 Medication Appropriateness Index

The MAI of each drug was determined on admission to, and discharge from, Waterside Hospital. The total MAI score for each drug regime was also calculated on admission and discharge. Note that a lower score indicates more appropriate treatment. C Darcy independently assessed nine patients originally seen by S Toner; the total MAI on admission through to discharge from Waterside was statistically significantly reduced (Wilcoxon Signed Rank test, p=0.018, n=9).

Three hundred and fifty-five patients seen by C Darcy had 3674 drugs individually assessed for medication appropriateness. The individual drug MAI scores on admission and then on discharge reduced by a statistically significant figure (Wilcoxon signed rank test, p<0.001). The total MAI scores also reduced by a statistically significant amount from admission to Waterside through to discharge (Wilcoxon signed rank test, p<0.001, n=355). The figures are shown in more detail in Table 3.
Table 3: The Medication Appropriateness Index Scores for drugs on admission to, and discharge from, Waterside hospital (n=355 patients)

<table>
<thead>
<tr>
<th></th>
<th>MAI on admission to Waterside (individual drug)</th>
<th>MAI on discharge from Waterside (individual drug)</th>
<th>MAI on admission (Total score)</th>
<th>MAI on discharge (Total score)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N = 3674 drugs</strong></td>
<td>0.7</td>
<td>0.2</td>
<td>7.1</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>0.0</td>
<td>0.0</td>
<td>6.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>8.0</td>
<td>8.0</td>
<td>27.0</td>
<td>14.0</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>1.4</td>
<td>0.7</td>
<td>5.7</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Variance</strong></td>
<td>2.0</td>
<td>0.6</td>
<td>32.9</td>
<td>6.9</td>
</tr>
</tbody>
</table>

2.7 Clinical Interventions and Grading (EPICS)

Clinical interventions made by the consultant pharmacists over 12 months were recorded on EPICs. All patients had pharmaceutical care plans (PCP) implemented (n=453). A total of 1122 interventions were made with 84% being self-graded as Eadon Grade 4 or above (with grade 4 indicating the intervention is significant and results in an improvement in the standard of care). Seven interventions were graded as a 5 with none being graded at level 6.

2.7.1 Eadon Grading Independent Assessment

Ten drug interventions graded by the consultant pharmacist using Eadon criteria were presented to four consultant geriatricians to independently grade and check for consistency of agreement. Examples of interventions included: stopping lidocaine patches and starting more appropriate and effective analgesia; detection of opiate toxicity; and sodium valproate not being titrated to the correct therapeutic dose. The results of this are shown in Table 4. Reliability analysis of this data yielded a Cronbach’s alpha of 0.909 indicating excellent consistency of interpretation of the scenarios presented. An intra-class correlation (two-way fixed effects model where people effects are random and measure effects are fixed) of 0.667 (95% confidence interval 0.406, 0.883, p<0.001) represented a good level of agreement between the five raters. This confirms the validity of the pharmacist self-grading within acceptable parameters.
Table 4: Eadon Grading of 10 Clinical Drug Interventions Made by the Consultant Pharmacist.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Consultant Pharmacist Eadon Grade</th>
<th>Consultant Geriatricians</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

* 5 was entered into reliability analysis

2.7.2 Eadon Grading and Costing of Pharmacist Interventions

The School of Health and Related Research at Sheffield University (ScHARR) have defined the costs related to medication errors. Clinical Interventions lead to prevention of these medication errors; the financial values assigned to these by ScHARR are shown in Table 5, together with the Eadon criteria representative of whether the intervention can prevent a potentially significant, potentially serious or potentially lethal event\(^{18, 19}\).

Table 5: Costs related to medication errors

<table>
<thead>
<tr>
<th></th>
<th>Cost Avoidance</th>
<th>Eadon criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ScHARR model(^{19})</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potentially Lethal</td>
<td>£1085-£2120</td>
<td>6</td>
</tr>
<tr>
<td>Potentially Serious</td>
<td>£713-£1484</td>
<td>5</td>
</tr>
<tr>
<td>Potentially Significant</td>
<td>£65-£150</td>
<td>4</td>
</tr>
<tr>
<td>Minor</td>
<td>£0-£6</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Table 6 shows the combining of the ScHARR cost avoidance (cost saving) figures with the clinical interventions made by the consultant pharmacist over a 12-month period. The cost savings are reflective of clinical interventions resulting in prevention of subsequent healthcare resource usage including: avoidable hospital bed days; subsequent outpatient attendances; and reduced non-elective readmissions.
Table 6: Cost avoidance via Consultant Pharmacist Clinical Interventions in Intermediate Care over a Twelve Month Period (July 1st 2012 to June 30th 2013)

<table>
<thead>
<tr>
<th></th>
<th>Cost Avoidance</th>
<th>Eadon Criteria</th>
<th>No. of Interventions Made</th>
<th>Cost Avoidance £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially Lethal</td>
<td>1085-2120</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Potentially Serious</td>
<td>713-1484</td>
<td>5</td>
<td>7</td>
<td>4991 – 10 388</td>
</tr>
<tr>
<td>Potentially Significant</td>
<td>65-150</td>
<td>4</td>
<td>943</td>
<td>61 295 – 141 450</td>
</tr>
<tr>
<td>Minor</td>
<td>0-6</td>
<td>1-3</td>
<td>172</td>
<td>0-1032</td>
</tr>
<tr>
<td>TOTALS</td>
<td>-</td>
<td>-</td>
<td>172</td>
<td>66286 – 152870</td>
</tr>
</tbody>
</table>

2.8 Compliance Aids

Data on the use of compliance aids was recorded for 429 of the 453 patients; 181 (40.0%) were found to be using a compliance aid (weekly monitored dosage system, MDS). The average age of patients using a compliance aid was 83.0±7.0 years who were taking 11.3±4.1 drugs (after med rec) on admission to Waterside hospital. These patients stayed in Waterside for 28.2±21.5 days. Fifty of these patients were non-electively readmitted within 90 days post-discharge from Waterside. Their average length of stay on readmission was 14.0±16.4 days (range= 1 to 92 days) and their length of time until their first unplanned readmission was 31.3±24.2 days (range = 1 to 90 days). Comparison to outcomes of those not in receipt of MDS trays did not yield statistically significantly differences in terms of lengths of stay in hospital or time to first readmission (Independent samples Mann-Whitney U test). Patients in receipt of MDS did experience a higher readmission rate, with this tending to statistical significance in this group (20.2% no MDS versus 27.6% in receipt of MDS, Chi-squared p=0.07, odds ratio = 1.51).
Table 7: Comparison of patients in receipt and not in receipt of MDS (n=453).

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>No of medicines on admission to Waterside</th>
<th>Total MAI on admission</th>
<th>Total MAI on discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>No MDS</td>
<td>82.6±7.3</td>
<td>10.2±4.4</td>
<td>6.7±6.0</td>
<td>1.8±2.4</td>
</tr>
<tr>
<td>Receipt of MDS</td>
<td>83.0±7.0</td>
<td>11.3±4.1</td>
<td>7.6±5.4</td>
<td>2.4±2.9</td>
</tr>
<tr>
<td>Statistical significance</td>
<td>p value</td>
<td>0.53*</td>
<td>0.011*</td>
<td>0.051*</td>
</tr>
</tbody>
</table>

*Independent samples t-test
*Mann-Whitney U test

It has been anecdotally noted by the consultant pharmacist that patients being discharged on MDS trays often cause on average a two-day ‘bed-block’ as they wait for tray-related issues to be resolved. On average, nursing staff also have to make three calls per patient to enable problems to be addressed. Assuming 20-40% of patients in receipt of a MDS could have their discharge expedited if their compliance was properly assessed and issues resolved satisfactorily on discharge, annual cost savings of £15400 to £30800 could be realised. This is based on 500 patients per year being case managed by a consultant pharmacist with approximately half being in receipt of a MDS (based on figures noted in this project). A further cost saving in nursing time would also realise approximately £2400 annually (based on 3.2 weeks of a band 6). The project team are now also involved in the regional redesign of provision of MDS and assessment of adherence projects and will map out a new pathway for this within intermediate care.

2.9 Post-discharge Telephone Calls

From October 2012 to July 2013, approximately one-third of the patients seen by C Darcy in Waterside hospital subsequently received a post-discharge telephone call on average 26.3±11.3 days after discharge (destination to home only from Waterside Hospital). Table 8 describes the patients in receipt or not of a telephone call. No targeting of patients was used therefore it can be assumed that those who received a phone call were randomly selected by the consultant pharmacist. Initial figures show that this service can be realistically delivered to five patients per week by the consultant pharmacist.
Table 7: Comparison of patients in receipt or not of a post-discharge follow-up telephone call from the consultant pharmacist (n=355).

<table>
<thead>
<tr>
<th>Age on admission to Waterside</th>
<th>No of medicines on admission</th>
<th>Total MAI on admission</th>
<th>Total MAI on discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>No phone call (n=207)</td>
<td>82.7±7.3</td>
<td>10.9±4.4</td>
<td>7.2±6.0</td>
</tr>
<tr>
<td>Received phone call (n=148)</td>
<td>83.0±6.9</td>
<td>10.2±4.1</td>
<td>7.1±5.4</td>
</tr>
<tr>
<td>Statistical significance p value</td>
<td>0.614</td>
<td>0.113</td>
<td>0.775</td>
</tr>
</tbody>
</table>

Of those who received a phone call, 15 (10.1%) patients were non-electively re-admitted within 30 days and 27 (18.2%) experienced an unplanned readmission within 90 days. In contrast, of those who did not receive this telephone follow-up, 51 (16.7%) were non-electively readmitted within 30 days (chi-squared p=0.05, odds ratio = 1.8) and 77 (25.2%) experienced an unplanned readmission within 90 days with this difference tending to statistically significant (Chi-squared p=0.092). However the follow-up telephone call did not statistically significantly impact upon time to readmission (27.0±23.9 days, no phone call versus 34.3±29.8 days, phone call received) or length of stay on readmission (13.5±13.8 days no phone call, versus 13.2±18.9 days phone call received).

2.9.1 Follow-up telephone call interventions

Sixty-eight (45.9%) patients phoned by the consultant pharmacist required one or more interventions; these were categorised and graded according to Eadon criteria. All 122 interventions made were graded at Eadon 4 i.e. potentially significant. Table 9 summaries the interventions made by the consultant pharmacist together with the potential cost savings again using the ScHARR model. These patients were noted to need an average of 1.8 interventions per contact made. Potential annual savings via reduction in unnecessary healthcare resource usage from this post discharge service could be in the range of £10 573 to £24 400.
Table 9: Interventions made by the consultant pharmacist in response to a post discharge telephone call (n=68 patients) over a nine-month time period

<table>
<thead>
<tr>
<th>Type of intervention</th>
<th>No. of interventions made</th>
<th>Cost saving £ (ScHARR model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign Posting</td>
<td>16</td>
<td>1040 - 2400</td>
</tr>
<tr>
<td>Patient Education</td>
<td>50</td>
<td>3250 - 7500</td>
</tr>
<tr>
<td>GP contact required</td>
<td>17</td>
<td>1105 - 2550</td>
</tr>
<tr>
<td>Community pharmacist contact required</td>
<td>5</td>
<td>325 - 750</td>
</tr>
<tr>
<td>Secondary care HP contact required</td>
<td>5</td>
<td>325 - 750</td>
</tr>
<tr>
<td>Dosage adjustment</td>
<td>13</td>
<td>845 - 1950</td>
</tr>
<tr>
<td>Home visit</td>
<td>2</td>
<td>130 - 300</td>
</tr>
<tr>
<td>General advice</td>
<td>14</td>
<td>910 - 2100</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>122</strong></td>
<td><strong>7930 - 18300</strong></td>
</tr>
</tbody>
</table>

2.10 Patient Outcomes

Of the 431 patients discharged alive from the Waterside Hospital, 66 (15.3%) were non-electively readmitted to hospital within 30 days and 104 experienced a non-elective readmission within 90 days (24.1%). Of those who were readmitted within 90 days, the average length of time to that first readmission was 18.9 ± 25.6 days and the length of stay on readmission was 13.4±15.2 days. Figure 3 shows the total number of non-elective readmissions within 90 days.

Figure 3: Number of unplanned readmissions 90 days post-discharge from Waterside Hospital
The Role of the Consultant Pharmacist in Pharmaceutical Care of Elderly Patients in Intermediate Care

February 2014

Ninety-day readmission rates for patients discharged from Waterside in April to June 2011 were 37.8% with an initial length of stay being 38.2 ± 40.9 days (versus 34.2±37.9 days for Jul to Dec 2012). There therefore appears to be a significant reduction in non-elective readmissions and length of stay in Waterside since implementation of this project. Rather than assign this solely to the consultant pharmacist role, cost savings as a result will not be directly attributed. The previously calculated SchARR\textsuperscript{19} model has already incorporated and accounted for such healthcare resource usage savings as a direct result of clinical interventions made by the pharmacist.

2.11 Drug Costs

Drugs started and stopped as a result of clinical interventions and medication review by the consultant pharmacist were costed using the dm & d (or latest edition of BNF where no cost was available from this source). Results from July 2012 to July 2013 are shown in Table 10.

**Table 10: Drug Cost savings following clinical review by a consultant pharmacist**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>No. of Items Stopped</th>
<th>Cost of Items Stopped</th>
<th>No. of Items Started</th>
<th>Cost of Items Started</th>
<th>Difference (i.e. savings made)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarter 1</td>
<td>Jul-Sep ’12</td>
<td>153</td>
<td>£19,481.14</td>
<td>38</td>
<td>£1,924.31</td>
</tr>
<tr>
<td>Quarter 2</td>
<td>Oct-Dec ’12</td>
<td>158</td>
<td>£23,481.79</td>
<td>47</td>
<td>£4,574.40</td>
</tr>
<tr>
<td>Quarter 3</td>
<td>Jan-Mar ’13</td>
<td>132</td>
<td>£21,603.64</td>
<td>28</td>
<td>£825.15</td>
</tr>
<tr>
<td>Quarter 4</td>
<td>Apr-Jul ’13</td>
<td>161</td>
<td>£11,508.61</td>
<td>31</td>
<td>£923.90</td>
</tr>
</tbody>
</table>

The total savings as a result of clinical medication review by a consultant pharmacist is in the order of £68k annually. This more appropriate prescribing has been shown in other studies and projects to result in reduced non-elective readmission rates, increased lengths of time to readmission and reduced lengths of stay (baseline and on non-elective readmission). These potential cost savings are not reflected in the figure of £68k which is based on drug cost savings alone.
2.12 Remodelling of Waterside Pharmacy Services

The review of stock held on wards 2, 4 and 5 has led to return of stock thereby releasing a one-off amount of £4000. Although this has been recorded once, the on-going assumption is that only necessary stock will be ordered, and small cash savings will continue to accrue.

2.13 Self Administration of Medicines Scheme

The Waterside rehabilitation wards were identified as an ideal site for a self-administration of medicines (SAM) scheme. A pre-launch consultation (March 2013) on feasibility and acceptability was done via both nursing staff (n=10) and patient questionnaires (n=9), thereby demonstrating Patient and Personal involvement (PPI) as an integral step in the development and implementation of this new service in Waterside hospital. Referral was made to the NHS Scotland SAM toolkit\(^\text{20}\) and based on this a SAM Proforma was designed, tested and revised. The scheme and associated paperwork was presented to, and welcomed by, the trust D&T committee (April 2013). The first patient was introduced to the scheme May 2013; the scheme is on-going and available to suitable patients where there appears to be an issue with patient independence and medicines management. Referral into SAM is routinely made via the Multidisciplinary team (MDT).

2.14 Consultant Pharmacist and Educational Role

The consultant pharmacist has been involved in the following educational activities:

- Teaching and education of patients/carers.
- Training and education of professionals at both a local and regional level.
- Lectures on medicines and older people delivered to undergraduate pharmacy students (University of Ulster).
- Education of specific patient groups e.g. Parkinson’s patients.
- Bi-annual Trust-wide staff training e.g. falls and dementia.
- Collaboration with the Northern Ireland Centre for Pharmacy Learning and Development (NICPLD) to design and deliver formal training to pharmacy technicians, pharmacists and AHP on topics which included Patients Own Drugs (PODs), Medicines Reconciliation, Dementia and Nursing Home patient reviews.
3.0 Invest to Save

3.1

Summary of WHSCT Cash Saving/Releasing and Productivity.

Table 11 summarises the cash savings/release and productivity realised during the WHSCT IC project. The total measureable potential savings for the duration of this project (two years) are estimated in the range of £328.5k to £560k, thereby demonstrating an ‘invest to save’ return in the range of £2.35 to £4.00 per £1.00 invested (based on an annual cost of £70k).

Table 11: Summary of cash releasing/saving and productivity in the WHSCT

<table>
<thead>
<tr>
<th>Nature of Project Savings over 12 months:</th>
<th>July 2012 - 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Releasing/ Saving (realised)</td>
<td>£68 000 (Drug Costs)</td>
</tr>
<tr>
<td>Productivity (realised)</td>
<td>£4000 (Ward stock returns)</td>
</tr>
<tr>
<td>Both Cash releasing/saving &amp; Productivity (realised)</td>
<td>£66 286 – 152 870 (Clinical Interventions, Waterside)</td>
</tr>
<tr>
<td></td>
<td>£10 573 to £24 400 (Post-discharge telephone follow-up)</td>
</tr>
<tr>
<td>Cash Saving (potential)</td>
<td>£15 400 - £30 800 (appropriate adherence assessment &amp; use of MDS)</td>
</tr>
<tr>
<td>Total Amount:</td>
<td>£164 259 - £280 070</td>
</tr>
</tbody>
</table>

The improvement in quality of care and in quality of life of patients in receipt of this type of innovative care is not quantified in these monetary figures, but quality is often also associated with increased improvement in patient safety leading to reduced potential adverse events, especially adverse drug events, which may have been previously missed due to lack of pharmaceutical care in the intermediate care setting.
4.0 Future Developments in the WHSCT

The case management of patients by the consultant pharmacist through from acute to intermediate care and back out into the community has continued into 2014.

The project team are also involved in the medicines adherence project (another RIMM work-stream) and are testing the use of the NISAT domain 4 medicines management within the intermediate care setting. This acts as a baseline assessment/referral tool for more in-depth adherence assessment to be performed within the patient’s home setting; the consultant pharmacist is involved in the development and testing of this particular tool.

Consultant pharmacist services are also being accessed by the Older People Assessment and Liaison Service (OPAL). Patients are presently identified by OPAL in the A&E, inpatient and rapid access clinic settings. Where the destination for the patient is to be Waterside, contact is made with the consultant pharmacist whose role is to facilitate the safe and effective transfer of patients across the acute/intermediate care interface, ensure appropriateness/timeliness of medicines and initiate a comprehensive medicines review. Participation in falls clinics has been delayed; whilst an ortho-geriatrician has been appointed, the context of the delivery of the clinics has still to be agreed and established.
References


Appendix 1: Medication Appropriateness Index (Hanlon JT et al. 1992)\textsuperscript{16}


\textbf{Medication Appropriateness Index}

Patient ID# __________ Evaluator _________________ Date __________________

Drug Code __________

\textbf{Drug}___________________________________________________

\textbf{To assess the appropriateness of the drug, please answer the following questions and circle the applicable rating:}

1. Is there an indication for the drug? A_______ B_______ C_______ Z
   \textit{Indicated} \textit{Not Indicated} \textit{DK}
   Comments:

2. Is the medication effective for the condition? A_______ B_______ C_______ Z
   \textit{Effective} \textit{Ineffective} \textit{DK}
   Comments:

3. Is the dosage correct? A_______ B_______ C + or C - Z
   \textit{Correct} \textit{Incorrect} \textit{DK}
   Comments:

4. Are the directions correct? A_______ B_______ C_______ Z
   \textit{Correct} \textit{Incorrect} \textit{DK}
   Comments:

5. Are the directions practical? A_______ B_______ C_______ Z
   \textit{Practical} \textit{Impractical} \textit{DK}
   Comments:

6. Are there clinically significant drug-drug interactions? A_______ B_______ C_______ Z
   \textit{Insignificant} \textit{Significant} \textit{DK}
   Comments:

7. Are there clinically significant drug-disease/condition interactions? A_______ B_______ C_______ Z
   \textit{Insignificant} \textit{Significant} \textit{DK}
   Comments:

8. Is there unnecessary duplication with other drug(s)? A_______ B_______ C_______ Z
   \textit{Necessary} \textit{Unnecessary} \textit{DK}
   Comments:

9. Is the duration of therapy acceptable? A_______ B_______ C_______ Z
   \textit{Acceptable} \textit{Not acceptable} \textit{DK}
   Comments:

10. Is this drug the least expensive alternative compared to others of equal utility? A_______ B_______ C_______ Z
    \textit{Least expensive} \textit{Most expensive} \textit{DK}
    Comments:
Appendix 2: Conference Abstracts

FIP conference, Dublin 2013, poster

Abstract accepted for International Quality Conference, Paris, April 2014

Abstract accepted for UKCPA Autumn symposium 2013

All-Ireland Quality Conference March 2014, abstract accepted for poster presentation

Abstract submitted for BGS Spring Conference - acceptance pending


Pharmacy Management NI seminar, October 2013, oral presentation (C Darcy)
Appendix 3: Project Awards

C-TRIC TMED 4 conference 2013 - oral presentation 1st prize (C Darcy)

GAIN 2nd annual conference, 2013 poster - 1st Prize

Shortlisted for CTRIC TMED Health Challenge, 2013 (C Darcy)

Shortlisted for Institute of Healthcare Management HSC Quality Award 2013