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1 **General Practitioner views of an electronic high-risk medicine proforma to facilitate**
2 **information transfer**

3 **Gordon F. Rushworth, Lesley Diack, Ian G. Rudd, Derek Stewart**

4 **Int J Clin Pharm (2015) 37:4–7**

5 **Abstract**

6 **Background**

7 The potential of warfarin related harm is increased if clinicians lack the full patient specific
8 information to make informed decisions – an e-proforma has been developed to communicate this
9 information on hospital discharge.

10

11 **Objective**

12 To determine the views of general practitioners (GPs) on a warfarin discharge e-proforma.

13

14 **Method**

15 A cross-sectional survey of all GPs (n=272) within the Raigmore Hospital catchment area of NHS
16 Highland, Scotland.

17

18 **Results**

19 The response rate was 39.3% (107/272). 84 (78.5%) noticed recent changes to information supplied
20 on discharge for warfarin patients. 64 (59.8%) respondents thought this would result in more informed
21 prescribing with regards to dosing, while 65 (60.7%) felt this would improve safety. Accurate

1 completion, timely receipt of the e-proforma and a realistic date for subsequent INR tests were
2 considered important by GPs.

3

4 **Conclusion**

5 This study suggests the use of an e-proforma to communicate information about a high-risk
6 medication, warfarin, to GPs on discharge optimises safe, informed prescribing and monitoring in
7 primary care. The development of a discharge e-proforma for other high-risk medication as a patient
8 safety improvement measure should be explored.

9

10 **Impact of findings on clinical practice**

- 11 • Use of a warfarin prescribing e-proforma at discharge containing clinical information
12 including; warfarin doses for 7 days prior to discharge and 7 days after, indication, duration of
13 therapy, last INR result, target range and date for next INR test resulted in GPs believing they
14 are able to prescribe warfarin more safely post-discharge.
- 15 • Accurate and full completion of the e-proforma was a pre-requisite for GPs to perceive the
16 patient safety benefits to be obtained.
- 17 • The development of a discharge e-proforma for other high-risk medication as a patient safety
18 improvement measure should be explored.

19

20 **Key words:** Warfarin; patient safety; integrated care; primary care, high-risk medication

21

22 **Introduction**

23 The Scottish Patient Safety Programme (SPSP) is a clinical governance and quality initiative which

1 aims to reduce patient harm and improve outcomes. This programme has received wide critical
2 acclaim, with Scotland perceived as the first country to undertake a national approach to delivering
3 patient safety [1]. This approach was urgently warranted, evidenced from figures that around 10% of
4 patients admitted to United Kingdom National Health Service (NHS) hospitals experience medicines
5 related harm as a consequence of their admission, which could have been avoided in 50% of cases [2].
6 SPSP focuses on the use of evidence-based tools and practices to augment current systems thereby
7 increasing quality [3]. One of the initial points of focus is to reduce potential harm to patients
8 prescribed the oral anticoagulant warfarin.

9 The term 'integrated care' relates to the prompt transfer of information where joint working between
10 different healthcare professions is being employed to improve patient care [4]. However, there are
11 some complex challenges involved in maintaining continuity of care between settings [5, 6]. These
12 predominantly manifest as complications during the transfer of information between healthcare teams
13 or by healthcare teams not effectively engaging and educating patients about their medication on
14 discharge from hospital to primary care [7]. The risk to patients as a consequence of poor integrated
15 care can result in preventable re-hospitalisations and harm to patients [8].

16 The operational standard within Scotland is for anticoagulant prescribing and monitoring to be
17 completed within primary care, supported by access to specialists if required. It is therefore
18 imperative that the general practitioner (GP) has access to the most up-to-date information regarding
19 warfarin therapy. As part of the SPSP programme, NHS Highland (a Scottish geographically remote
20 and rural area) planned to improve the transfer of medication related information from hospital staff to
21 GPs at the point of patient discharge for all patients admitted or commenced on warfarin during
22 admission. After receiving feedback from GPs regarding clinical information required to undertake
23 warfarin management post-discharge safely, an e-proforma was added to the standard electronic
24 Immediate Discharge Letter (IDL) ie discharge summary. There was a definitive need for an e-
25 proforma as full clinical information was not being communicated to GPs on discharge. The IDL,
26 which originally reported - reason for admission; hospital treatment; duration of admission and
27 medication on discharge - was modified to include a warfarin specific e-proforma, with fields of:

1 warfarin doses for 7 days prior to discharge and 7 days after; indication; planned duration of therapy;
2 last international normalised ratio (INR) result; target INR range; and date for next INR test. The e-
3 proforma was included in the IDL which is emailed to GP practices at the point of discharge. Also, a
4 paper copy is printed on the ward for the patient. The warfarin discharge e-proforma was introduced
5 in May 2010.

6

7 **Aim of the study**

8 The aim of this study was to determine the views of GPs on the utility of an e-proforma to
9 communicate information regarding warfarin on discharge from hospital.

10

11 **Method**

12 A draft questionnaire was developed based upon anecdotal feedback from GPs regarding issues
13 relating to medicines information transfer at the point of patient discharge. The draft questionnaire
14 was reviewed for face and content validity by an expert panel of health service researchers before
15 being piloted with two prescribing support pharmacists, two GPs and one practice nurse. The final
16 questionnaire comprised items including: activities in prescribing and monitoring warfarin; views of
17 the impact of the e-proforma on aspects of patient management; and suggested changes to the e-
18 proforma. Question types were a combination of closed, 5-point Likert scales and open response
19 items.

20 All GPs within the Raigmore Hospital catchment area, identified from the NHS Highland website
21 (n=272), were included in the study. Each was mailed a study introductory letter, participant
22 information leaflet, questionnaire and reply paid envelope. The questionnaires were numbered to
23 allow follow-up of non-respondents who were sent up to two reminders at monthly intervals. Data
24 collection took place between November 2011 and January 2012.

1 Data were coded and entered into an SPSS database (SPSS Inc., Cary, NC version 21.0) and analysed
2 using descriptive statistics to profile respondents and their questionnaire responses.

3 The project was approved by the Ethical Review Panel of the School of Pharmacy and Life Sciences
4 at Robert Gordon University, Aberdeen, United Kingdom. The North of Scotland Research Ethics
5 Committee advised that NHS ethical review was not required.

6

7 **Results**

8 The response rate was 39.3% (107/272). Almost all were involved in managing warfarin patients after
9 discharge, principally prescribing (90.7%, 97) and monitoring (88.8%, 95). The majority of
10 respondents (78.5%, 84) reported awareness of changes to information provision following the
11 introduction of the e-proforma, with the remainder largely commenting that they had not noticed any
12 changes (12.1%, 13) or had yet to receive a e-proforma (3.7%, 4).

13

14 Responses to statements relating to aspects of the warfarin IDL e-proforma are given in Table 1,
15 highlighting the positive responses in terms of timeliness of information (52.3%, 56), improved
16 decision making (59.8%, 64), easier management (50.5%, 54) and patient safety (60.7%, 65). In
17 response to the question about warfarin stabilisation 49.5% (53) found there was no change in the ease
18 by which patients could be stabilised on warfarin although 39.3% (42) found it easier given the
19 additional information.

20

21 <Insert Table 1 here>

22

23 Data on specific aspects of information provision are given in Table 2, with positive responses on all
24 aspects of warfarin management.

1

2 <Insert Table 2 here>

3

4 Almost one fifth of respondents (16.8%, 18) suggested additions to the information provided
5 however, these suggestions related to the need for the data on the form to be complete and accurate ie
6 the sections for INR results, specific dates for duration of treatment and need for lifelong treatment.

7 The majority of respondents (71.0%, 76) commented that appropriate dates for GP INR testing were
8 only discussed with GPs prior to patient discharge either occasionally or not at all. Some (16.8%, 18)
9 stated that they were not able to access INR testing within the timescales stated on the e-proforma.

10 This was due to issues including GP practice manpower, a requirement for a home visit or in some
11 areas, the requirement for blood samples to be sent to central laboratory by post, all of which result in
12 delays.

13

14 **Discussion**

15 The key findings of this study were that the GP respondents were generally positive about the e-
16 proforma, perceiving a beneficial impact on patient care. Several limitations of this study require that
17 the findings are interpreted with caution. Although the 39% response rate was reasonable for a survey
18 of GPs, the responses are based on self-reports and there was no attempt to determine the validity or
19 reliability. However, despite these limitations, the findings are encouraging, with data provided from
20 just under half of all GPs in the area, the vast majority of whom were directly involved in the
21 management and prescribing of warfarin. The improvement in communication between secondary and
22 primary care, specifically with regards to the trends in dosing and INR results, was cited as a key
23 factor involved in this improvement. As a result over half felt that they were able to make more
24 informed, safe, patient management decision in a timely manner regarding prescribing of warfarin as
25 long as the e-proforma was accurately completed. In addition some minor changes to the form were

1 suggested including specifying the dates pre- and post-discharge in addition to all previous INR
2 results, not just the last INR. Despite this, half of GPs found there was no difference to the ease by
3 which a patient may be stabilised on warfarin. This is likely to be as a result of the general difficulty
4 involved with stabilising the INR for a patient prescribed warfarin.

5

6 The use of a discharge proforma to communicate, completely, complex information has been shown
7 to be effective for other clinical situations including after discharge for permanent pacemaker
8 insertion [9]. While this study focused on the use of a discharge e-proforma to communicate
9 information to GPs specifically about warfarin, the utility of an e-proforma should be explored for
10 other high-risk medications to achieve integrated care and improve patient safety. A recent systematic
11 review produced by a member of this research team has found a paucity of research on integrated care
12 supported electronically [10]. Further work is warranted to determine the direct impact on patient care
13 in terms of achieving desired patient outcomes and hospital readmissions. Also, an audit of the quality
14 of completion of the e-proforma by hospital staff is planned.

15

16 **Conclusion**

17 The introduction of the discharge warfarin e-proforma as an addition to the IDL was perceived
18 positively by GPs who considered that they were able to make more informed prescribing decisions
19 with improvement in patient care. Such an approach could be applied to other high-risk medication to
20 fully achieve integrated care.

21

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24 data entry. We also thank all respondents for their time contributing to this study.

25

1 **Conflict of Interest Statement**

2 The authors declare that there are no conflicts of interest.

3

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5 No funding was obtained to conduct this study.

6

7

1 **References**

- 2 1. Rooney KD, Leitch J. Advancing patient safety - The Scottish Patient Safety Programme
3 Anaesthesia News. 2009;260:20-1.
- 4 2. Department of Health, National Audit Office. A Safer Place for Patients: Learning to Improve
5 Patient Safety. London: National Audit Office; 2005. Available at:
6 <http://www.nao.org.uk/wp-content/uploads/2005/11/0506456.pdf>. Accessed Sept/22 2014.
- 7 3. Rooney KD, Leitch J. Quality and safety in NHS Scotland. The British Journal of Diabetes &
8 Vascular Disease. 2010;10:98-100.
- 9 4. Royal College of General Practitioners Scotland, Royal Pharmaceutical Society Scotland.
10 RCGP Scotland and RPS Scotland Joint Statement: Breaking down the barriers - how
11 pharmacists and GPs can work together to improve patient care. Available at:
12 [http://www.rpharms.com/current-campaigns--scotland-](http://www.rpharms.com/current-campaigns--scotland-pdfs/rpsscotlandrcgpjointstatement.pdf)
13 [pdfs/rpsscotlandrcgpjointstatement.pdf](http://www.rpharms.com/current-campaigns--scotland-pdfs/rpsscotlandrcgpjointstatement.pdf). Accessed Feb/24, 2014.
- 14 5. Coleman EA, Berenson RA. Lost in transition: challenges and opportunities for improving the
15 quality of transitional care. Ann Intern Med. 2004;141:533-6.
- 16 6. Rogers G, Alper E, Brunelle D, Federico F, Fenn CA, Leape LL, et al. Reconciling
17 medications at admission: safe practice recommendations and implementation strategies. Jt
18 Comm J Qual Pat Saf. 2006;32:37-50.
- 19 7. Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of
20 adverse events affecting patients after discharge from the hospital. Ann Intern Med.
21 2003;138:61-167.
- 22 8. Moore C, Wisnivesky J, Williams S, McGinn T. Medical errors related to discontinuity of
23 care from an inpatient to an outpatient setting. J Gen Int Med. 2003;18:646-51.
- 24 9. Taylor C. Improving e-discharge letters for permanent pacemaker insertions at Wansbeck
25 general Hospital. BMJ Qual Improv Report. 2013. DOI:10.1136/bmjquality.u201251.w772.
- 26 10. MacLure K, Stewart D, Strath A. A systematic review of medical and non-medical
27 practitioners' views of the impact of ehealth on shared care. Eur J Hosp Pharm. 2014;21:54-
28 62.

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1 **Table 1 – GP views on communication of information regarding warfarin at discharge and**
 2 **ongoing management of patients in primary care, % (n), N = 107**

Statement	Strongly agree	Agree	Unchanged	Disagree	Strongly disagree	Missing
You receive completed IDLs in a timely manner	4.7 (5)	47.7 (51)	28.0 (30)	9.3 (10)	5.6 (6)	4.7 (7)
The warfarin IDL has enabled you to better participate in decisions about warfarin dosing post-discharge	6.5 (7)	53.3 (57)	27.1 (29)	3.7 (4)	1.9 (2)	7.5 (8)
The treatment of warfarinised patients is easier to manage post-discharge	4.7 (5)	45.8 (49)	38.3 (41)	1.9 (2)	1.9 (2)	7.5 (8)
Warfarin stabilisation is easier to attain due to the increased information available on discharge	3.7 (4)	35.5 (38)	49.5 (53)	2.8 (3)	0.9 (1)	7.5 (8)
Changes to the warfarin IDL have resulted in improved safety	7.5 (8)	53.3 (57)	29.0 (31)	0.9 (1)	2.8 (3)	6.5 (7)
Changes to the warfarin IDL have made patients more aware of the risks and benefits of warfarin	1.9 (2)	21.5 (23)	56.1 (60)	11.2 (12)	1.9 (2)	7.5 (8)

3

4

1 **Table 2 – GP views on information contained within the e-proforma, % (n), N = 107**

Statement	Strongly agree	Agree	Unchanged	Disagree	Strongly disagree	Missing
'If the warfarin IDL has been completed accurately by hospital staff, do you feel that there is sufficient information given to allow for informed prescribing regarding...'						
Dosing	12.1 (13)	63.6 (68)	9.3 (10)	8.4 (9)	0.9 (1)	5.6 (6)
Indication	14.0 (15)	63.6 (68)	11.2 (12)	4.7 (5)	0.9 (1)	5.6 (6)
Duration of treatment	8.4 (9)	56.1 (60)	17.8 (19)	10.3 (11)	0.9 (1)	6.5 (7)
Communication of next expected INR test date	10.3 (11)	66.4 (71)	8.4 (9)	6.5 (7)	2.8 (3)	5.6 (6)
Understanding of the plan for treatment including review period	6.5 (7)	46.7 (50)	21.5 (23)	16.8 (18)	1.9 (2)	6.5 (7)

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