OPTIMISING WARFARIN MANAGEMENT:

AN EXPLORATION OF PHARMACIST-DELIVERED MODELS OF

CARE

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DECLARATION OF ORIGINALITY

This thesis contains no material that has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due reference is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

Ella Claire van Tienen

9 October 2012
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ABSTRACT

Warfarin has been the mainstay of preventing and treating thromboembolism for over 50 years and is currently taken by over 200,000 Australians. Optimal management of warfarin relies on regular monitoring of the International Normalised Ratio (INR), appropriate dose adjustment, effective communication and comprehensive patient education. Therapy may be managed by a range of healthcare providers in a variety of settings, and by patients themselves, although management in Australia has tended to focus on traditional office and pathology-based models. Internationally, however, alternative models of care are playing an increasingly significant role with positive results and pharmacists have been shown to be effective in improving the quality use of warfarin through a variety of these service delivery models.

The main objective of this thesis was to examine the effect of using pharmacist-delivered models of care on warfarin management within Australia through a number of complementary projects.

Guidelines recommend aiming for a target INR control of upwards of 70% time in range. Internationally, community-based studies consistently demonstrate suboptimal levels of INR control, although little data is available on the level of control achieved through usual models of care in Australia. A retrospective cross-sectional study of INR results from 442 Australian veterans was undertaken to determine the INR control of a usual care population. The mean time in INR range was 61.8% in this population. This suggests a potential role for strategies aiming to improve INR control among Australian patients in line with best practice guidelines.

Review of the literature suggested pharmacists could play a role in improving warfarin management through optimising the delivery of education, improving access to INR testing and facilitating patient self-monitoring. A series of sub-projects
were designed to develop and pilot tools to support pharmacists in addressing these strategies.

A website was designed to provide patients and health professionals with educational resources regarding anticoagulation. The site aimed to be a comprehensive and reliable online resource and was promoted directly to pharmacists. It received high levels of utilisation, with almost 250,000 views in 12 months, and positive feedback from health professionals and patients, and proved to be an important educational resource that was an easy and accessible tool for pharmacists to use to complement face to face counselling services and further improve patients' knowledge about warfarin therapy.

Tools and resources were developed to improve access to INR testing by facilitating the introduction of anticoagulation services, including pharmacist-delivered INR clinics, in Australia. A pilot was conducted in three rural community pharmacies, with a subsequent project involving 36 pharmacies. While the resources received positive feedback from participating pharmacists, the rate of successful service implementation was low. Despite the perceived benefits to the communities, the current model of healthcare remuneration in Australia impacted on the long term financial viability of such services.

Development, implementation and evaluation of a pharmacy-centred pathway to enable patient self-monitoring (PSM) was also undertaken. Forty-eight patients successfully underwent training and participated in PSM for a median of 16.9 months. INR control data during PSM was compared to that from the six months prior to entering the study for 46 of the 48 patients. There was a significant improvement in INR control, with the mean time in range increasing from 64.0% to 72.9% \((p<0.05)\). Clinical data analysis was complemented by a qualitative exploration of 38 patients' experiences of self-monitoring and the impact of PSM on
various aspects of their lives. It was found that patients discussed PSM positively, describing it passionately and as something of value, which reduced their anxiety and freed them to carry on with their lives.

The results of these projects suggest that expansion of the professional services offered by pharmacists has the potential to improve the control of warfarin therapy in Australia. Changes in remuneration for healthcare services are likely to increase the viability of pharmacist-delivered INR services and the uptake of PSM. Despite the arrival of newer oral anticoagulant agents, the use of warfarin is likely to continue for many years. Optimising warfarin management is arguably the safest and most clinically and cost-effective option for preventing and treating thromboembolism at this point in time. Pharmacists can play an important role in improving warfarin management by embracing opportunities to deliver professional services aimed at optimising outcomes for Australians taking warfarin.
ACKNOWLEDGEMENTS

*If I have seen further it is only by standing on the shoulders of giants.*

Isaac Newton, 1676

While I am certainly under no illusion that the contents of this thesis comes even close to resembling the brilliant work of Newton, the sentiments he expressed in his letter to Robert Hooke strongly echo my own. This thesis, and the work contained within it, would have been unimaginable without the dedicated support and encouragement of a huge number of extraordinary people.

I would like to start with my incredible supervisors, Professor Gregory Peterson and Dr Luke Bereznicki from the School of Pharmacy, and Dr Emily Hansen from the School of Sociology. They are all inspirational researchers who have helped me through various stages of my PhD journey. Not only have they shown me invaluable guidance and patience, they have allowed me the flexibility to take my research in unforeseen directions.

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My thanks go to the various members of the project teams who assisted with the research projects within the University of Tasmania, especially Peter Gee for his technical abilities, Kimbra Fitzmaurice for incredible management skills and being a wonderful sounding board, and Dr Shane Jackson for encouraging me to return to university and begin the PhD journey.

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While the above people and organisations have been instrumental in assisting me with the nuts and bolts of the research projects I have undertaken on this journey, I could not have ever completed any of these projects without the unwavering support of my family. My parents have been particularly amazing, always there to rationally talk through any issues in the bad times and support and encourage me and my ideas in the good times. They have always instilled in me the confidence that I have the ability do anything I want to, and while there were moments where I wasn’t always sure that this was a journey I wanted to complete, they were there to give me the confidence and perseverance to progress to the next step.

Finally, I want to thank my wonderful husband, Ian, and my beautiful little Olita. It takes a very special person to put up with the madness that accompanies one pursuing a PhD, and Ian is certainly one of these special people. Not only did Ian encourage me to start this journey, he even married me in the midst of some of my maddest times. For his never ending commitment to me, and for always supporting me through this crazy endeavour, despite all the time and attention it took away from him, I owe him my deepest gratitude forever.
PUBLICATIONS

All publications listed resulted from work described in this thesis

Note: The candidate changed her surname from Jeffrey to van Tienen in early 2010.

Peer-reviewed journal publications

Peterson GM, Stafford L, van Tienen EC, Bereznicki LRE. Anticoagulant therapy in the elderly: the importance of health literacy, Australian Pharmacist, 2012;31(1):32-34


Stafford L, van Tienen EC, Bereznicki LRE, Peterson GM. Anticoagulation monitoring services. Australian Pharmacist. 2010;29(3):221-225


Conference abstracts


Stafford L, Peterson GM, Bereznicki LRE, van Tienen EC, Jackson SL. Outcomes of a pharmacist-led post-discharge warfarin management service adverse events, warfarin knowledge and patient satisfaction. Society of Hospital Pharmacists of Australia 2010 Tasmanian Branch Symposium, 21-23 May 2010, Port Arthur, Tasmania


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