

Institution: De Montfort University
Unit of Assessment: 3 Allied Health Professions, Dentistry, Nursing and Pharmacy
Title of case study: The management of Deep Vein Thrombosis (DVT) using the AUTAR scale.
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>Venous Thromboembolism (VTE) is a disease which comprises of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE). In 2005, VTE typically caused 25,000 - 32,000 deaths a year, at a typical annual cost to the National Health Service of £640 million (House of Commons Health Select Committee, 2005). However, this disease is mostly preventable (NICE, 2007).</p> <p>The Autar DVT risk assessment scale was developed to enable clinicians to stratify patients by their risk of developing DVT. The scale exceeded expectations, leading to the introduction of the first mandatory VTE risk assessment tool nationally and shifting the focus of VTE management from reactive treatment (which is resource exhaustive) to very cost effective, proactive, prevention.</p> <p>The scale continues to be used (both nationally and internationally), and to have impacts that are both financial (cost savings for hospitals) and relate to the wellbeing of patients, both through improved quality of life and reduced morbidity.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>Whilst Venous Thromboprophylaxis groups agreed that effective assessment was central to VTE prevention (ACCP, 2004; ICS, 1994; THRiFT, 1994), little research had been undertaken in this area until 1994 when the high incidence of preventable VTE in orthopaedic patients prompted a team of clinicians from the University Hospitals of Leicester NHS Trusts (UHLs) to initiate a project with Ricky Autar (a DMU Senior Lecturer) to develop a VTE risk calculator. The full project team comprised of: Ricky Autar (project leader), Medical Registrars (Mike Allen, William Harper), Director of Nursing (Angela North-Rose), Clinical Nurse Specialists (Nigel Goodrich, Bernadette Stribbling), Physiotherapist (David Jones) and Occupational Nurse (Janet Brown).</p> <p>Founded on an evidence-base of known VTE risk factors, the DVT risk assessment scale was developed at DMU (1994-1995). The DVT risk assessment scale comprised seven subscales, which were based upon biographical and clinical data which was routinely obtained from patients upon admission. A scoring protocol was developed, which allowed the stratification of patients into low, moderate and high risk, guiding clinicians to the optimal thromboprophylaxis choice.</p> <p>In 1995, the DVT risk assessment scale was piloted and tested on a small sample of orthopaedic patients and promising results were obtained, providing the data necessary to justify a more substantial research project.</p> <p>Between September 1998 and March 2002, the DVT scale was revised as new evidence from the research became available. The scale was tested for its reliability, predictive validity and practical application. This phase of the research was undertaken collaboratively with the University Hospitals of Leicester NHS trusts. Professor Frank Dewhurst and Senior Research Fellow Dr Nicholas Longford were the senior academic advisors at DMU for this phase of the project (both had been employed at DMU from 1990 to 2003). Professor William Harper from the University Hospitals of Leicester NHS Trust was the clinician advising on VTE management.</p> <p>To eliminate unusual, practice specific, relationships the risk calculator was tested on 150 patients across the orthopaedic, medical and surgical units. The three differing specialities provided a robust testing ground for validating the DVT scale. The variability of the patients' score showed that there was a good clinical representation of the population and allowed the generalisation of the findings. Five reproducibility studies across the medical, surgical and orthopaedic units confirmed the reliability of the DVT toolkit: 80% of medical, 90% of surgical and 93% of orthopaedic patients were correctly predicted.</p> <p>The scale, which by now had become colloquially known as the Autar DVT scale, continued (and continues) to evolve in light of clinical findings (e.g. see Autar, 2002; Autar, 2003; Autar, 2006; Autar,</p>

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2007; Autar, 2009a; Autar, 2009b; Autar, 2010; Autar, 2011). Keynote plenary talks at international research conferences (2003-2010) provided a good platform for sharing best practice.

Clinically, this research has yielded an evidence-based tool to customise risk calculation and facilitate the optimal choice of VTE prophylaxis for patients. Socio-economically, shifting the focus from VTE treatment to VTE prevention is highly cost effective and minimises the threat of potentially fatal pulmonary embolism or the chronic complication of post thrombotic syndrome (Autar, 2009; Autar, 2011). Whilst other scales have developed since, the Autar DVT scale was the first to address this issue in this way.

3. References to the research (indicative maximum of six references)

- Autar, R (2003) The management of deep vein thrombosis: the Autar DVT risk assessment scale re-visited. *Journal of Orthopaedic Nursing*. Vol 7: 114-124
- Autar, R (2007) NICE guidelines on reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients undergoing surgery. *International Journal of Orthopaedic Nursing*. 11: 169-176
- Autar, R (2009a) A review of the evidence for the efficacy of Anti-Embolism Stockings (AES) in Venous Thromboembolism (VTE) prevention. *Journal of Orthopaedic Nursing*. 13: 41-49
- Autar, R (2009b) Novel anticoagulants to revolutionise Venous Thromboembolism (VTE) management. *Journal of Orthopaedic Nursing*.13:165-171
- Autar, R (2010) Venous Thromboembolism in Hip Fracture patients undergoing Hip Fracture Surgery (HFS). *International Journal of Trauma and Orthopaedic Nursing*.15: 145-154
- Autar, R (2011) Evidence based venous thromboprophylaxis in patients undergoing total hip replacement (THR), total knee replacement (TKR) and hip fracture surgery (HFS). *International Journal of Orthopaedic and Trauma Nursing*. 15:145-154

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4. Details of the impact (indicative maximum 750 words)

The development, application and validation of the Autar DVT scale represents the watershed moment in VTE management. The scale has shifted VTE management from reactive, resource-exhaustive treatment to a cost-effective, proactive, prevention approach, a position endorsed by the recently revised VTE guidelines.

Autar was actively involved in the development of the initial NICE VTE guidelines in 2007 and is acknowledged for his contribution in the revised NICE VTE guidelines in 2010. The Autar scale is also cited in the Agency for Healthcare Research and Quality guidelines in the US.

Nationally, the publication of the first NICE VTE guidance in 2007 led to an announcement (by the Chief Medical Officer for England & Wales) in 2007 that all NHS trusts must have a VTE risk assessment strategy and venous thromboprophylaxis in place. Consequently, the first national mandatory VTE risk assessment (based on the Autar DVT risk assessment scale) was published in September 2008 (DH, VTE risk assessment, 2008).

Autar's work was explicitly acknowledged by Southampton University Hospitals NHS trust (2011) in setting up their Anti Embolism Stockings and DVT thromboprophylaxis protocols in surgical patients. (Southampton University Hospitals NHS Trust, 2011). The Southampton NHS trust VTE thromboprophylaxis protocol was granted national exemplar status for its processes to reduce VTE risk, showing an audited improvement in risk assessment documentation and significant increase in the prescription of both mechanical and pharmacological prophylaxis (Vaughan, Shaw and Cannon, 2011). Manual audits for the year 2010-11 have shown steady improvement on correct prophylaxis with an average of 88% receiving appropriate chemoprophylaxis and 85% appropriate mechanical prophylaxis over the final quarter. (Southampton NHS trust quality account, 2010). The fifth Annual Audit of Acute NHS Trusts VTE policies commissioned by the All Party Parliamentary Thrombosis Group reported that 79-84% of trusts surveyed are following the Southampton model (House of Commons, 2011).

Impact case study (REF3b)

This research has had far reaching impact in clinical practice. Internationally, practitioners Robinson, 2009 (New Zealand); Sareeso & Utriyaprasit, 2011 (Thailand); and Ongen et al., 2011 (Turkey) claim that a systematic and objective risk assessment of patients has had (or could have) the desirable outcome of increasing uptake of thromboprophylaxis, ranging from 50-70% and reducing incidence of VTE in equal measure.

Although initially validated in orthopaedic, medical and surgical areas, the scale is being used in other areas of clinical practice. For example, following a recommendation by the Agency for Healthcare Research and Quality (ARHQ) to the US Department of Health and Human Services, the scale is being applied as a quality indicator for the management and prevention of VTE in the intensive care unit (Maynard & Stein (Medical Directors) 2008). ARHQ (2008) claimed that without such a systematic approach over one year, a 300-bed hospital would expect roughly 150 cases of hospital-acquired VTE. Approximately 50-75 of those would be potentially preventable, and approximately five of those patients would die. Each DVT would represent an incremental inpatient cost of \$10,000, while each pulmonary embolism would be approximately \$20,000 in additional cost (Maynard, 2008; Maynard, 2009). In Texas, USA, the San Antonio Association of Operating Room Nurses (2009) used the Autar DVT scale in its original form as a toolkit in the prevention of VTE in gerontology.

In Vienna, Austria, where there was no formal way of addressing the VTE problem, the Autar DVT scale was independently evaluated; its high specificity and sensitivity led to the Autar DVT scale being translated into German (Muller, 2008) and the scale has been implemented at the Kaiserin-Elisabeth Hospital, Huggasse. In Singapore, the scale was used by the Ministry of Health to develop their venous thromboembolism guidelines in 2008. In Bangkok and Songkhla (Thailand) the scale was shown to have good outcomes in terms of early detection, improving uptake of prophylaxis and reducing the risk and incidence of VTE (Sareeso & Utriyaprasit, 2011; Songwathana & Promlek, 2011). At Ain Shams University, Egypt, the scale was rigorously validated by a team of research fellows, leading to the implementation of the scale at the Ain Shams University Specialised Hospital in Cairo (Desouky et al., 2010). The Autar DVT risk assessment has also been translated into Japanese and Chinese to enable wider application.

The scale remains enduringly influential, (Ongen et al., 2011). Its reproducibility and ease of practical application make it an attractive tool to clinicians (Muller, 2008; Desouky et al., 2010) - a hard copy dossier of ca. 100 electronic enquires from hospital practitioners worldwide, is available for scrutiny to further corroborate the claims of impact if required.

5. Sources to corroborate the impact (indicative maximum of 10 references)

Evidence for Autar's contribution to the development of guidelines:

- NICE Guidelines 2010 name Autar as contributing to the 2007 guidelines: NICE clinical guideline 92 (which replaced guideline NICE clinical guideline 46 from 2007) see Appendix A: The Guideline Development Group and NICE Project Team, page 46
- AHRQ Tool D.4b can be accessed here:
www.ahrq.gov/professionals/systems/hospital/qitoolkit/d4b-dvt-bestpractices.pdf (accessed 31/07/13 - latest version from 2013).

The Chief Medical Officer's announcement and mandatory VTE risk assessment (which cites NICE guideline 92) can be accessed via this link:

http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationspolicyAndGuidance/DH_088215 (accessed 31/07/13)

Southampton University Hospitals NHS Trust:

- Southampton University Hospitals NHS Trust (2011) Anti-Embolism Stockings guideline for prevention of thromboembolism. Guideline GU-O52. Southampton University Hospitals NHS Trust.
- Vaughan-Shaw, PG and Cannon, C (2011) Venous thromboprophylaxis prevention in medical patients: a framework for improving practice. Department of General Surgery, Southampton General Hospital. *Phlebology*, 26: 62-68

Impact case study (REF3b)

- Southampton University Hospitals NHS Trust Quality Account 2010 – see page 11 for VTE data; PDF available on request
- The fifth Annual Audit of Acute NHS Trusts VTE policies commissioned by the All Party Parliamentary Thrombosis Group is available at www.apptg.org.uk/docs/reports_5_2011.pdf (accessed 31/07/13)

Evidence for international impact on clinical practice:

- Chin PKL, Beckert LEL., Gunningham S, Edwards AL and Robinson BA (2009) Audit of anticoagulant thromboprophylaxis in hospitalized oncology patients. *International Medicine Journal*. 39: 819–825.
- Sareeso, P and Utriyaprasit, K (2011) Application of Evidence-Based Practice for Deep Vein Thrombosis prevention in Medical-Surgical patients. *Journal of Nursing Science*. 29: 27-36.
- Ongen, C, Yilmaz, C, Cirak, AK et al. (2011) Venous thromboembolism risk and thromboprophylaxis among hospitalised patients: data from the Turkish arm of the ENDORSE study. *Clinical and Applied Thrombosis/Haemostasis*. 17: 539-545.

Evidence for use in other areas of clinical practice:

- Maynard G and Stein J (2008) Preventing hospital-acquired venous thromboembolism: a guide for effective quality improvement. Agency for Healthcare Research and Quality. AHRQ publication No. 08-0075, Rockville, Medical Directors. Available at www.ahrq.gov/qual/vtguide/ (accessed 31/07/13)
- “Preventing Venous Thromboembolisms in the Hospital”, Greg Maynard, 2009, AHRQ annual conference, see: <http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/pips/maynard.html> (accessed 31/07/13)
- San Antonio Association of Operating Room Nurses (2009) Autar DVT risk assessment scale-A Geriatric Examination Toolkit available at <http://web.missouri.edu/~proste/tool/cv/DVT/> (accessed 31/07/13)

International use and validation (in addition to citations above):

- Muller, G, Fritz, E, and Them, C (2008) Translation of the Autar Deep Vein Thrombosis Scale to assess the risk of thrombosis. *Pflegezeitschrift*. 61: 91-99. [in German].
- Singapore Ministry of Health Venous Thromboembolism Guideline (2008) Nursing Management for the prevention of deep vein thrombosis/Venous Thromboembolism (VTE) in hospitalised patients. Singapore Ministry of Health 2008.
- Songwathana, P, and Promlek, K (2011) Evaluation of a clinical nursing practice guideline for preventing deep vein thrombosis in critically ill trauma patients. *Australasian Emergency Nursing Journal*, volume 14: 232-239.
- Desouky, S, Elshamas ET and El awady M (2010) Validity and Reliability Assessment of the Autar DVT Scale. *Ain Shams University (Egypt). International Journal of Academic Research*. 2: 48-55.

Additional evidence

- a hard copy dossier of ca. 100 electronic enquires from hospital practitioners worldwide, is available for scrutiny to further corroborate the claims of impact if required