

Institution: Swansea University		
Unit of Assessment: 2		
Title of case study: Enabling cost savings and improved prevention and management of chronic oedema through the assessment of the health and economic benefits of lymphoedema care		
Period when the underpinning research was undertaken: 2014-2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g., job title):	Period(s) employed by submitting HEI:
Ioan Humphreys	Research Officer/Senior Research Officer	2006-present
Tessa Watts	Lecturer	1996-2018
Ruth Davies	Lecturer	2004-2016
Deborah Fitzsimmons	Professor	2004-present
Period when the claimed impact occurred: 2017-2020		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact		
<p>Lymphoedema affects over 200,000 people in the UK, and approximately 2 in 10 breast cancer sufferers and 5 in 10 people with vulval cancer worldwide. Our research has provided the Welsh Government (WG) and clinicians with accurate estimates based on original evidence of the economic burden of lymphoedema and the cost savings derived from more efficient approaches to assessing and managing lymphoedema in patients in primary and secondary care. The Lymphoedema Network Wales (LNW) used our data to lobby for GBP1,400,000 from the WG to deploy a new service to be rolled out across Wales that included extending the On the Ground Education Programme (OGEP) and the 'Wet Leg' Pathway (WLP). Our findings have since shown estimated cost savings of up to GBP24,460,000 per year from the new service. Our research has played a critical role in 1) evidence-based policy changes, 2) improving the management of chronic lymphoedema for patients and practitioners by supporting the implementation of cost-effective programmes, and 3) increasing the economic impact of improved clinical care.</p>		
2. Underpinning research		
<p>In 2014, LNW asked the Swansea Centre for Health Economics (SCHE) to conduct an economic analysis of the All-Wales Lymphoedema Service. This came from previous work on economic burden of wound management that Humphreys had conducted [R1]. Patients with lymphoedema have significantly increased risk of wound formation. This can occur due to infection, moisture build-up and fungal infection in skin folds, as well as trauma. Therefore, good skin, wound care and compliance with compression are all important factors to reducing risk of developing further complications. This work showed that wounds generate a considerable economic burden for the NHS [R1] and that chronic wounds related to lymphoedema are a major contributor to the problem. A rapid evidence assessment review conducted by Humphreys et al [R2] showed that lifestyle factors, co-morbidities, demographics, deprivation, and current service provision affected lymphoedema service providers and patients. These affected factors related to Health-Related Quality of Life (HRQoL) and NHS resource utilisation. Using economic evaluation methodologies, Humphreys and Fitzsimmons analysed resource utilisation from 6 months before to 6 months after entry into the LNW's new lymphoedema service and showed significant economic savings for the NHS (GBP2,424 per patient per year) compared to the costs of wound management in a hypothetical 'world without' scenario [R3]. The LNW continued to work with</p>		

Humphreys on an economic analysis of other aspects of the lymphoedema service, including the new OGEP. LNW developed the OGEP (2015 – 2016) as a community-based education model involving the use of video prescription applications and an educator training programme to support community health professionals and patients in the management and care of chronic oedema. The WLP was developed as part of the OGEP. Before the OGEP, each Welsh Health Board (WHB) had its own system for managing lymphoedema, and these systems were not value- or evidence-based or cost effective. Therefore, a single-arm study (with no comparator) based on an observational 'before-after' design was conducted with 100 patients in the OGEP [R4]. In a review of the direct costs associated with the OGEP, the largest difference between baseline and the three-month follow-up review was a reduction in the frequency of district nurse (DN) home visits (53%), which resulted in more cost-effective service delivery [R4]. Furthermore, there was a large difference in the costs of dressings, which decreased from GBP52,419 at baseline to GBP19,667 (63%) when the OGEP was utilised [R4]. There was also a statistically significant improvement in the patients' EQ-5D-5L utility scores and visual analogue scale scores, which indicated an increase in the patient's perceived quality of life (QoL). Our research showing the economic benefits of the OGEP and the WLP across the Cardiff and Vale University Health Board (CVUHB). Our work was cited as the only economic analysis source in the updated clinical guidelines for the WLP created by the LNW [R4].

Davies and Watts also qualitatively examined the effect of the OGEP on clinicians by conducting focus groups and found that the OGEP enhanced community nurses' awareness, knowledge and understanding of chronic oedema management [R5]. The sustainability of the training programme and the safety and quality of care for lymphoedema patients were key outcomes that were identified in the focus groups [R5].

Humphreys also worked with Thomas et al to provide the first in-depth examination of the potential economic benefits of OGEP lymphoedema education in residential and nursing home settings. The economic burden of lymphoedema care was estimated to be GBP198,660 over a period of 6 months (January – June 2019). The potential costs saved due to the avoidance of GP home visits was estimated to be GBP29,213 over the same period [R6].

In addition to conducting the abovementioned research, Humphreys also evaluated data collected by LNW on lympho-venous anastomosis (LVA) (2015–2019) [R7]. This analysis showed interesting changes in resource use, costs and patient health outcomes between baseline (pre-treatment) and 3-, 12- and 24-month follow-ups (post-LVA treatment). The analysis showed that over time, these changes result in significant long-term cost savings for the NHS and affect HRQoL for this cohort of patients. It showed statistically significant differences in important and meaningful cost drivers in the management of chronic oedema, such as reductions in episodes of cellulitis and hospital stays due to cellulitis [R7].

3. References to the research

This research has made important contributions to the discipline internationally and contributes important knowledge to the field likely to have a lasting influence. Whilst all papers have been peer reviewed.

R1. Phillips, CJ; Humphreys, I; Fletcher, J; Harding, K; Chamberlain, G; Macey, S (2016) Estimating the costs associated with the management of patients with chronic wounds using linked routine data. *International Wound Journal*, Vol 13, 1193-1197
<https://doi.org/10.1111/iwj.12443> (116 Citations).

R2. Humphreys, I; Morgan, K; Thomas, M (2017) Managing chronic oedema in community settings. *Wounds UK*, Vol 13, 22-35 ([Publisher Website](#) (2 Citations)).

Impact case study (REF3)

R3. Humphreys, I; Thomas, MJ (2017) Evaluation of the economic impact of a national lymphoedema service in Wales. British Journal of Nursing, 26, 1093-1100
<https://doi.org/10.12968/bjon.2017.26.20.1093> (3 Citations).

R4. Humphreys, I; Thomas, MJ; Morgan, KM (2017) Pilot evaluation of the management of chronic oedema in community settings project. British Journal of Community Nursing, 22, 578-585
<https://doi.org/10.12968/bjcn.2017.22.12.578> (9 Citations).

R5. Watts, T; Davies, R; (2017) Chronic oedema 'on-the-ground' education programme. British Journal of Community Nursing, 22, 526-534
<https://doi.org/10.12968/bjcn.2017.22.11.526> (3 Citations).

R6. Thomas, MJ; Morgan, KM; **Humphreys, I;** Hocking K; Jehu D (2020) The benefits of raising awareness of lymphoedema for care staff in nursing and residential homes British Journal of Nursing, 29(4),190-198
<https://doi.org/10.12968/bjon.2020.29.4.190> (0 Citations).

R7. Thomas, MJ; Morgan, KM; **Humphreys, I** (2020) Evaluation of the data collected for lympho-venous anastomosis (LVA) (2015 – 2019) (currently being prepared for publication).

Research Grants		
Evaluation of the economic impact of a national lymphoedema service in Wales		
Principal Investigator: Deborah Fitzsimmons 0000-0003-7286-8410		
Other research team members: Ioan Humphreys 0000-0001-7993-0179		
Ruth Davies N/A		
Welsh Government	DATES: 2015 - 2016	GBP20,000
Pilot evaluation of the management of chronic oedema in community settings project		
Principal Investigator: Deborah Fitzsimmons 0000-0003-7286-8410		
Other research team members: Ioan Humphreys 0000-0001-7993-0179		
Tessa Watts 0000-0002-1201-5192		
Ruth Davies N/A		
Welsh Government	DATES 2016 - 2017	GBP20,000
Evaluation of the data collected for lympho-venous anastomosis (LVA)		
Principal Investigator: Ioan Humphreys 0000-0001-7993-0179		
Welsh Government	DATES 2017 - 2019	GBP9,900
The benefits of raising awareness of lymphoedema for care staff in nursing and residential homes		
Principal Investigator: Ioan Humphreys 0000-0001-7993-0179		
Welsh Government	DATES 2019 - 2020	GBP2,000

4. Details of the impact

Contributing to evidence-based policy change

The LNW has been developing innovative methods to support the management of chronic oedema within the community setting.

Our research showing the economic benefits of the OGEP and the WLP across the Cardiff and Vale University Health Board (CVUHB) [R4] underpinned a significant policy and economic decision by the WG. Based on the economic analysis outlined in [R3] and [R4], Humphreys was able to confirm for the LNW that the OGEP and WLP reduced health care resource use and costs and that HRQoL scores increased among the patients with whom the OGEP was trialled. The LNW employed the evidence from the research to successfully lobby

the Welsh Health and Social Care department to fund the rollout of the WLP throughout Wales [C1, C2]. As a result, GBP1,4,000.00 has been permanently ring-fenced by the WG for rollout the OGEP programme across all seven HBs for the benefit of all community nurses and DNs. [C5, C6, C7] The 'Wet Leg' pathway is now taught as an Agored Cymru accredited unit to Health Care Support Worker (HCSW) and Qualified Nurses and allied health care professionals and have been taught to approximately 283 people from all over the UK. To date 21 healthcare professionals (ranging from allied healthcare professionals to national lymphoedema specialists) have been employed to teach and manage the OGEP pathway throughout Wales. Furthermore, as a direct result of working with Swansea University's researcher Ioan Humphreys on the economic evaluations of the OGEP, the LNW moved part of their headquarters to the Health and Wellbeing Academy at Swansea University [C1]. This move has already increased the visibility of LNW's research and has led to further collaboration between Humphreys and researchers within the Medical School. This pooling of resources now includes access to the Secure Anonymised Information Linkage (SAIL) databank.

Improving the management of chronic lymphoedema for patients and practitioners

Again, based on the economic analysis outlined in [R3] and [R4], it was evidenced that OGEP and WLP reduced health care resource use and costs and that HRQoL scores increased among the patients with whom the OGEP was trialled. The OGEP promotes the use of 'wet leg' treatment that is more clinically effective than previous treatments among DNs. The education on the WLP includes training on the appropriate use of compression bandaging, etc., and the resulting changes in practices have led to a significant reduction in the number of required DN visits [R4] [C4]. Chronic oedema can have a profound and long-term impact on patients and impact a range of health metrics, including HRQoL. A survey (currently being analysed and prepared for publication) of lymphoedema practitioners was conducted between January and March 2020 on the use of the WLP.

Below are two example quotes from participants in the survey:

"[The WLP] hugely reduced the need for dressings and Multi-Layer Lymphoedema Bandaging (MLLB), more normal body image, patients able to socialise without stigma, reduction in washing and care needs for carers" (clinical nurse specialist, Wales).

"[The WLP] reduces wet legs, improves healing, patients can return to work earlier, wounds heal quicker, improves mobility" (lymphoedema clinical lead, Wales).

The analysis and report produced by Humphreys on OGEP was also endorsed and supported by the Chief Nursing Officer of Wales (CNO). She noted, *"The report makes sobering reading on the debilitating and distressing effects of this condition and I believe it is therefore essential that community nurses take a leading role in delivering effective person-centred care (OGEP), which minimises the complications of the condition and eliminates hospital admissions as far as possible"* [C3, C4]. In addition, the OGEP was supported by all Directors of Nurses in Wales, as the programme is being rolled out nationally across all seven WHBs [C5, C6, C7]. Our work was cited as the only economic analysis source in the updated clinical guidelines for the WLP created by the LNW [C3, C4].

Increasing the economic impact of improved clinical care

Our review of the direct costs associated with the OGEP showed that the largest differences between the outcomes at the baseline and the three-month follow-up review were in reduced frequency of DN home visits (53%). Furthermore, there was a large difference in dressings costs, with baseline of GBP52,419 being reduced to GBP9,667 (63%) once the OGEP was utilised [R4]. This evidence was then used by the Chief Nursing Officer to establish a discussion and funding relationship between LNW and NHS Wales [C4]. Based on the potential cost savings seen in the CVUHB alone, the total costs saved over all the WHBs implementing the WLP/OGEP are estimated to be approximately GBP24,460,000 (an avg. GBP1,223 per patient savings) [R4]. A DN at Hywel Dda University Health Board (HDUHB)

noted the effectiveness and cost-efficiency of the WLP in a comment on Twitter (24/01/2019) replying to a LNW staff member): *“Introducing the ‘Wet Leg’ Pathway was one of the most clinically effective, cost-saving and labour-saving innovations I have ever seen in District Nursing!!”*

The LNW recently secured more annual rolling funding of approximately GBP120,000 to deliver their LVA treatment for the management of lymphoedema in the Swansea Bay University Health Board. [C8] The LNW secured this funding by citing the results of the report delivered by Humphreys [R7].

5. Sources to corroborate the impact

C1. LNW Testimonial from National Clinical Lead/ Associate Director for Lymphoedema in Wales, Lymphoedema Network Wales (LNW)) 03/11/2020. This source corroborates the research relationship established by LNW and Swansea University.

C2. Communication from Minister for Health and Social Services) 26/08/2016. This source corroborates the relationship established by LNW and WG.

C3. Wet Leg Pathway - The Chronic Oedema ‘Wet Leg’ (Lymphorrhoea) Pathway v3.0 FINAL 12.08.2019 and testimonial quote from the Chief Nursing Officer for Wales (CNO) (page 2) 12/08/2019. This source corroborates the research relationship established by LNW and CNO.

C4. Email communication between Chief Nursing Officer for Wales (CNO) Assistant Director, Finance Delivery Unit, NHS Wales) 20/11/2018. This source corroborates the funding relationship established by LNW, NHS Wales and CNO

C5. Communication from Director General for Health and Social Services and the NHS Wales Chief Executive) 05/04/2019. This source corroborates the research funding relationship established by LNW, WG and Swansea University.

C6. Email communication from Chief Executive, Aneurin Bevan University Health Board) 29/05/2019. This source corroborates the research funding relationship established by LNW, WG, HBs and Swansea University.

C7. Email communication from Director of Finance, Finance Directorate, Health and Social Services Group, Welsh Government) 23/05/2019. This source corroborates the research funding relationship established by LNW, WG and Swansea University.

C8. Director of Planning, Welsh Health Specialised Services Committee (WHSSC)) 06/11/2020. This source corroborates the research funding relationship established by LNW, WHSSC and Swansea University.