

# An Innovative Early Intervention Model of Care for Breast Cancer Survivors

## ALERT EDUCATION

Three-hour workshop



Dear Certified Lymphedema Therapists,

Thank you for attending 'An Innovative Early-Intervention Model of Care for Breast Cancer Survivors' as part of the Klose Lymphedema Conference (2-4 May 2019, Denver, Colorado).

### Overview

In this interactive theoretical and practical three-hour workshop, presented by Ms Louise Koelmeyer (Occupational Therapist and ALERT Program Manager), you will learn the key components of a prospective surveillance and early-intervention model of care in breast cancer rehabilitation. Evidence will be presented that challenges some of the myths in risk-minimisation education. You will learn about the importance of risk stratification and how bioimpedance spectroscopy (BIS) and compression therapy can be used to improve patient outcomes in an early-intervention cancer-rehabilitation program.

### Workshop Objectives

- Recognise the practical application of a prospective surveillance and early-intervention model of care shown to reduce the risk of lymphedema and the severity of lymphedema during breast cancer rehabilitation.
- Identify how bioimpedance spectroscopy applies to a prospective surveillance model of care for lymphedema and cancer survivorship.

You are most welcome to participate in any ALERT education programs or visit us in Sydney if ever travelling down-under in the future. For any enquiries please contact us at [alerteducation@mq.edu.au](mailto:alerteducation@mq.edu.au).

Kind regards,  
Louise Koelmeyer

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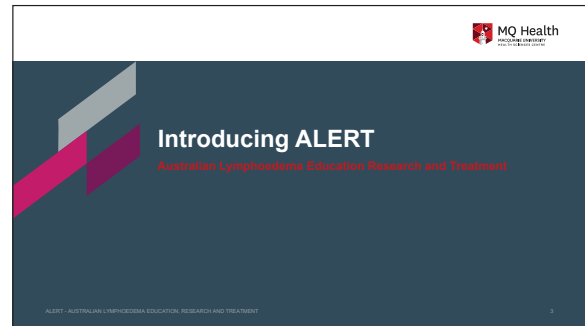
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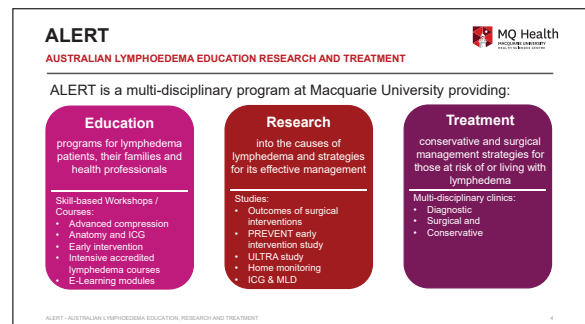
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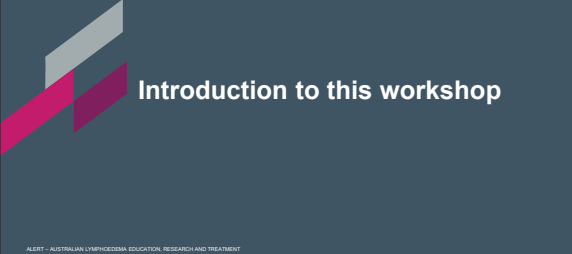
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**ALERT Multidisciplinary Team - MDT meeting** 



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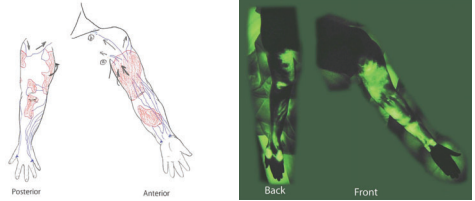


**Introduction to this workshop**

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**Personalised manual lymphatic drainage (MLD)** 



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**ALERT presenter for this workshop** 

**MS LOUISE KOELMEYER** 

- Ms Louise Koelmeyer is an occupational therapist with over 29 years of clinical experience in both public and private settings specializing in breast cancer rehabilitation and lymphedema management in all areas of assessment, education, early detection and treatment.
- As Lymphedema Program Manager & Senior Lecturer in ALERT at Macquarie University, Louise is involved in strategically managing the education, research and treatment arms of the multidisciplinary program. Louise's research interests are in achieving better outcomes in innovative early and advanced lymphedema management through conservative and surgical treatment. Louise is one of the Australian Principal Investigators on the 5-year "PREVENT" Vanderbilt University Randomised Control Trial investigating the early detection and management of breast cancer-related lymphedema. Macquarie University has contributed the highest number of study participants (450) to the total cohort of 1,200 women on this study.
- Louise presents education workshops and lymphedema training courses locally, nationally and internationally on the early prospective surveillance model of care in early detection and management of lymphedema.
- Louise is enrolled at Macquarie University in PhD studies exploring Home Monitoring for lymphedema.

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**Learning objectives** 

At the conclusion of this three hour workshop lymphedema practitioners will be able to understand the following in the context of breast cancer care:

- Recognize the theoretical & practical application of a prospective surveillance and early-intervention model of care shown to reduce the risk of and the severity of lymphedema
- Identify how bioimpedance spectroscopy applies to a prospective surveillance model of care for lymphedema and cancer survivorship

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**Prospective surveillance and early intervention model of care in breast cancer rehabilitation**

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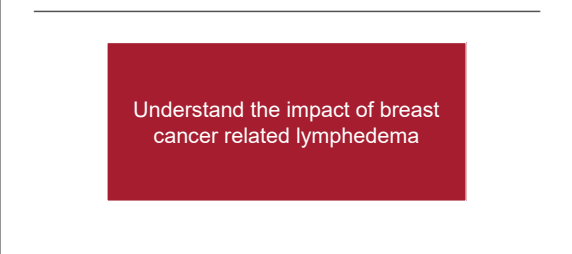
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**Group introductions** 

- What is your background? OT / PT / RN?
- What is your workplace setting? Public hospital / Private hospital / Community / Private practice?
- Do you currently work within a "Prospective surveillance & early intervention model of care service"?
  - If YES - How does this work?
  - If NO - Is there scope or support to develop this model of care within your workplace?
- What objective assessment tools do you use to diagnose lymphedema?
- What are you hoping to achieve from participating in today's workshop?

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**Understand the impact of breast cancer related lymphedema**

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### Setting the scene.....

IMPACT OF LIVING WITH LYMPHEDEMA

"I was possibly more devastated by the diagnosis of lymphedema than the original breast cancer. It is a constant, lifelong, physical reminder of my breast cancer. It seems unfair – I was in a low risk category, and did everything I was told would minimise the risk. It is uncomfortable, disfiguring and can potentially result in life threatening infection unless I am ultra careful with my arm and hand. Goodbye activities I enjoyed – gardening, knitting, etc. I can't wear my pretty bracelets or rings on that side, and sleeveless tops and dresses are out most of the time. Compression garments, bandages (looking like 'Michelin Woman') therapy sessions can be very expensive. Treatment is time consuming and must be attended to daily. In short, a real drag".

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### Key risk factors for BCRL

BREAST CANCER RELATED LYMPHEDEMA

- Research has shown that the type of cancer-based intervention has an effect on the risk of developing lymphedema
- Apart from **treatment factors (namely surgery, chemotherapy, radiation and other pharmacological management strategies)** there are **individual risk factors** that can further increase risk (such as high blood pressure, comorbid disease, history of infection in the limb, obesity, and low activity and exercise levels.)


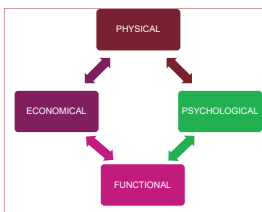
References:  
 da Costa Vieira, R., et al (2016) Risk Factors for Arm Lymphedema in a Cohort of Breast Cancer Patients Followed up for 10 Years. Breast Care. 11:45-50  
 Nguyen, T.T., et al (2017) Breast Cancer-Related Lymphedema Risk is Related to Multidisciplinary Treatment and Not Surgery Alone: Results from a Large Cohort Study. Ann Surg Oncol 24(10):2072  
 Saneesh, H.E., et al (2017) Diagnostic Methods, Risk Factors, Prevention, and Management of Breast Cancer-Related Lymphedema: Past, Present, and Future Directions. Curr Breast Cancer Rep 9(2):111-121

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### Lymphedema and survivorship

- Lymphedema is a survivorship issue following breast cancer
- It is often the daily reminder of having survived breast cancer

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### Key risk factors for BCRL

SUMMARY

Key risk factors:-

- Extent of surgery and whether lymph node dissection is performed (ALND = 20%; SNB = <5%)
- Radiation therapy to axilla (30%)
- Trauma
- Infection
- Body mass index
- Immobility and low exercise levels
- Effects of Taxanes – 6 x risk of increased transient swelling
- High blood pressure



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### Key risk factors for BCRL

SCORING SYSTEMS FOR PREDICTION OF LYMPHEDEMA

- Nomograms and scoring systems are being developed to assist with risk stratification for lymphedema
- Wang and colleagues, for example, in 2016 developed a scoring system to predict individual probability of LE after ALND in breast cancer.

They found the following to be key risk factors:-

- history of hypertension
- axillary lymph node status
- surgery on dominant arm
- surgical infection/early oedema/seroma
- level of ALND
- number of lymph nodes dissected
- and radiotherapy

Statistical variable	Points
Hypertension	
Yes	4
No	0
Region on dominant arm	
Yes	4
No	0
Level of ALND	
II	4
III	2
IV	0
Radiotherapy	
To irradiation field of lymph node basin	4
None	0
Seroma infection/seroma volume	
Yes	4
No	0
ALND = axillary lymph node dissection	


References:  
 Bevilacqua, J.L., et al (2012) Nomograms for predicting the risk of arm lymphedema after axillary dissection in breast cancer. Ann Surg Oncol. 19(8):2580-2589  
 Li X., et al (2017) Validation of a breast cancer nomogram to predict lymphedema in a Chinese population. J Surg Res. 210:132-138  
 Wang, L., et al (2016) A Scoring System to Predict Arm Lymphedema Risk for Individual Chinese Breast Cancer Patients. Breast Care. 11:52-56

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### Early warning signs

- May be vague and intermittent and include:
  - Feelings of heaviness
  - Aching, pain or tension
  - Tightness or fullness
  - Clothing, shoes or jewellery feeling tighter
  - Transient swelling
- Early detection and effective management can reduce symptom severity and improve quality of life! It is the key to SUCCESS in gaining long term CONTROL!



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### Risk stratification

Cancer intervention and level of lymphedema

- Lower number of lymph nodes removed and less invasive surgery
  - For example - SLND & breast conservative surgery
- More lymph nodes removed and more invasive surgery
  - For example - ALND & breast conservative surgery
- More lymph nodes and much more invasive surgery
  - For example - SNB +/- ALND & mastectomy
- Extensive lymph node removal, chemotherapy and radiation
  - For example - Neo-adjuvant chemo & mastectomy +/- reconstruction with radiation therapy

Other risk factors including: high blood pressure, comorbid disease, history of infection in the limb, obesity, and low activity and exercise levels increase risk

Lower risk of lymphedema → Higher risk of lymphedema


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### Risk minimisation education

HOW DO I LOOK AFTER MY ARM?

- Use affected arm NORMALLY for daily activities at home, work and during leisure time.
- Become in tune and aware of own body signs / symptoms
- Maintain a healthy weight with regular exercise
- Use moisturising cream to keep the skin moist and reduce risk of infection (upwards)
- Meticulous skin and nail hygiene (minimise risk of infection / cellulitis)
- Regular exercise of the affected arm including resistive training exercises will help circulation and pumping of lymph fluid (swimming / aqua aerobics / gym program / weights).
- Discuss options for wearing a compression sleeve with your medical specialist or lymphedema therapist.



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### Myth debunking

BREAST CANCER TREATMENT RELATED RISK FACTORS

#### Exercise

Graduated and individualised exercise prescription does not cause BCRL or make BCRL related lymphedema worse

Exercise has in fact been shown to have a protective effect

#### Carrying heavy bags

Resistance exercise training (weight lifting) has been shown to be safe if graduated

Persons should not be advised to be fearful of lifting objects with their arm as this sends a conflicting message. A common sense approach should be applied to daily tasks such as lifting shopping bags.

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### Stages of lymphedema

INTERNATIONAL SOCIETY OF LYMPHOLOGY (ISL)

Stage	Description	Characteristics
0	Sub-clinical/Latent	Some damage to lymphatics however there is no visible oedema
1	Spontaneously reduces, acute phase	Pitting oedema that reduces with elevation of the arm. Usually, upon waking in the morning (except for head and neck lymphoedema), the limb(s) or affected area is normal or almost normal size.
2	Spontaneously irreversible, chronic phase	Spongy consistency and can be "pitting" or "non-pitting." Fibrosis and fatty changes are starting to occur/have occurred.
3	Elephantiasis; irreversible, end-stage	Irreversible tissue changes and usually the limb(s) is/are very large. The tissue is hard (fibrotic) and fatty changes are present.

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### Myth debunking

BREAST CANCER TREATMENT RELATED RISK FACTORS

#### Air travel

Literature is lacking however the latest 2018 systematic review stated: "Air travel is generally safe in persons post breast cancer surgery." (Co et al)

One study offered caution towards compression therapy: "... flights up to 4.5 hours are low risk and should a compression garment be worn, that it is checked carefully for the correct fit near to the time of the flight." (Graham et al)

Persons with breast cancer should therefore not be told that flying will cause BCRL.

Hydration on the plane, doing simple upper limb exercises, regular walks on the plane and avoiding non graduated strenuous exercise (such as pulling heavy bags) may be appropriate.

#### Injections into the arm and blood pressure readings

Not an evidence based risk factor for the development of BCRL

"... ipsilateral blood draws, injections, blood pressure readings ... may not be associated with arm volume increases." (Ferguson et al)

"... there is limited evidence to support the recommendation that venipuncture should be avoided in patients with a history of lymph node surgery" (Germal et al)

Even in a cohort of persons who underwent bilateral breast surgery "Blood pressure readings, blood draws, injections ... were not significantly associated with increases in arm volume in this cohort." (Adourian et al)

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### Assessments for lymphedema

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### Assessment of lymphedema

- Lymphedema therapists are highly skilled and trained to assess and manage lymphedema
- Need to use subjective and objective skills and tools and understand what you are measuring and assessing and why?
- Look, feel, touch, listen to client, understand symptoms described, medical history, lifestyle, function, what else is going on???
- Any tool is only as good as the operator and understanding what it is measuring

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### Current practice not ideal

Increase in volume due to muscle gain	ECF	Muscle and Tissues	Fat
Increase in volume due to weight gain	ECF	Muscle and Tissues	Fat increase
Increase in volume due to lymphedema	ECF increase	Muscle and Tissues	Fat

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### Perometry

NORMATIVE DATA

- Dyke et al in 2012 measured 204 healthy women, over the age of 40 years, with no history of treatment for breast cancer or lymphedema with a perometer.
- This research provided **normative data** based on limb volume to allow practitioners to understand the difference between arm dominance (from muscle mass) vs oedema.
- Cut-offs for diagnosis of swelling for the dominant and non-dominant arm were determined. Starting at the ulnar styloid and moving proximally 10 cm the cut-offs were:
- Dominant arm: 1.3 cm, 2.4 cm, 2.5 cm, 2.7 cm, and 3.1 cm
- Non-dominant arm they were 1.2 cm, 1.9 cm, 1.9 cm, 2.7 cm, and 2.7 cm.

Reference:  
Dyke, E., et al (2012) Normative Volume Difference Between the Dominant and Nondominant Upper Limbs in Healthy Older Women. Lymphatic Research and Biology 10(4):162-168

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### Bioimpedance spectroscopy (BIS)

- A non-invasive method of determining the composition of body tissues to evaluate the presence of body fluids such as lymph.
- BIS measures parameters over a frequency range of 3 - 1000 kHz with 256 data points. Comparison of the data collected within that frequency range enables calculation of extracellular, intracellular and total body water.
- Measured in L-Dex units. Normal range = -10 to +10. Change of 6.5 triggers early intervention
- Recent validation study comparing positions (lying, sitting and standing) show excellent comparison between U400 and SOZO devices (results to be published)

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## Understanding the L-Dex scale

- The normal range for L-Dex was established from bioimpedance data gathered from a cross population study of healthy men and women<sup>1-3</sup>. The mean (average) L-Dex value of healthy men and women without lymphedema, regardless of limb dominance, is defined as 0.0 within this normal range.
- L-Dex values of +10 and -10 represent three standard deviations (3 SD) from the mean in a population of men and women without lymphedema.
- Individual patient results should be interpreted by a clinician based upon the trending of the change in a patient's values inside or outside of the normal range.
- Extracellular fluid volume differences between the limbs are presented on the scale as an aid to the clinical assessment of unilateral LE.

1. Cornish, B.H., et al. Early diagnosis of lymphedema using multiple frequency bioimpedance. *Lymphology*, 2001, 34(1) p. 2-5.  
2. Stout, L., et al. Quantification of the volume expansion used to assess the clinical severity of breast cancer-related lymphedema by bioimpedance spectrometry. *Lymphatic Research and Biology*, 2011, 3(1) p. 41-51.  
3. Stout, L., et al. Interlimb model for assessment of unilateral lymphedema in dogs by bioimpedance spectrometry. *Lymphatic Research and Biology*, 2011, 3(1) p. 3-9.

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## Using L-Dex® to help in early assessment

Reference: Cornish, B.H., et al (2001) Early diagnosis of lymphedema using multiple frequency bioimpedance. *Lymphology*, 34(1)2-11

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## L-Dex (lymphedema index)

- Normal L-Dex range = -10 → +10
- Sub-clinical change 5 – 6.5 L-Dex points
- Clinical change of 7 L-Dex points

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## SOZO vision

SOZO WILL USE BIS ACROSS SURVIVORSHIP PLATFORM

- Bilateral capability
- Segmental body composition
- Tissue analysis
- Bone mineral content
- Monitoring risk for cardiac heart failure (CHF)
- Drug dosing
- Nutrition management
- Hydration monitoring
- Home monitoring

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## SOZO Pro assessment

TISSUE ANALYSIS IN SURVIVORSHIP

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## What are the key components of a prospective surveillance and early intervention model of care in breast cancer rehabilitation

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## Bioimpedance spectroscopy (BIS)

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## Defining the model of care

PROSPECTIVE SURVEILLANCE & EARLY INTERVENTION MODEL OF CARE

- A prospective surveillance and early intervention model of care, can be defined as a **proactive** means of providing patient care whereby the practitioner aims to detect lymphedema before clinical signs of swelling appear and to manage other sequelae related to cancer treatment.
- This model allows for lymphedema early intervention strategies to be implemented whilst clinical symptoms are minimal.
- Working as part of a multidisciplinary team is most beneficial
- Stout and colleagues in 2012 proposed a prospective surveillance model that focused heavily on **physical rehabilitation and exercise** as a comprehensive approach to cancer survivorship health care.
- The goals of this model of care were to:
  - promote surveillance for common physical impairments and functional limitations associated with breast cancer treatment (including lymphedema)
  - provide education to facilitate early identification of impairments
  - introduce rehabilitation and exercise intervention when physical impairments are identified
  - promote and support physical activity and exercise behaviours

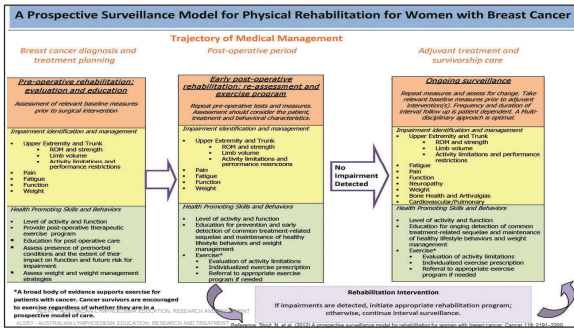
Reference: Stout, N., et al. (2012) A prospective surveillance model for rehabilitation for women with breast cancer. *Cancer*, 118: 2191–2200.

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## Breast cancer rehabilitation

- PROSPECTIVE SURVEILLANCE & EARLY INTERVENTION MODEL OF CARE
- Prospective surveillance aims to detect stage 0 lymphedema (subclinical or latent)
  - Not visible and with no associated volume change
  - Monitoring using bioluminescence spectroscopy (BIS)
  - Is more easily managed than later stage lymphedema and potentially reversible
  - All women at risk of lymphedema should have access to early intervention



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## Key aspects of the model of care

PROSPECTIVE SURVEILLANCE & EARLY INTERVENTION MODEL OF CARE

- Screening – pre-operatively or pre-treatment with risk stratification (based on individual risk factors)**
- Screening – post-operatively and at regular intervals with risk stratification**
- Assessment - technology that can detect lymphedema before clinical signs are apparent (bio-impedance spectroscopy) and other assessments specific to cancer care**
- Implementation of appropriate early intervention therapy for lymphedema- education, exercise, compression therapy (garments) and scar management**
- Implementation of appropriate therapy for general cancer rehabilitation- education, exercise, musculoskeletal, psychological**
- Ongoing health promotion including encouraging exercise**

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## Monitoring protocol

PROSPECTIVE SURVEILLANCE & EARLY INTERVENTION MODEL OF CARE

- All persons diagnosed with breast cancer should have pre-treatment measurements recorded and should have similar measurements repeated at 3 to 6 monthly intervals for the first 2 years post treatment.
- Risk stratification needs to be considered
- PREVENT Study – Key trigger points for Early Intervention
  - ≥ 5 <10% above pre-surgical baseline
  - Change of 6.5 L-Dex points above baseline

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What is "Early Intervention" for a prospective surveillance and early intervention model of care program?

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### Lymphedema tool kit

MANAGEMENT STRATEGIES

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## Early intervention

PROSPECTIVE SURVEILLANCE & EARLY INTERVENTION MODEL OF CARE

- Compression Therapy – Class 2 compression sleeve and gauntlet (must fit appropriately – RTW or Custom made)
  - To be worn ~10-12 hours / day when most active for 4-6 weeks
- Modified CDT to be reviewed by lymphedema therapist at 4 weeks
- Ongoing education on risk minimisation education & skin care
- Exercise - Clinical Oncology Society of Australia (COSA) position statement on exercise in cancer care states that exercise to be embedded as part of standard practice in cancer care.
- Avoid inactivity and progress towards at least 150 minutes of moderate intensity aerobic exercise and two to three moderate intensity resistance exercise sessions each week.
- SO2O to track Body Composition (% Skeletal Muscle Mass, Fat mass, Hydration levels)

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## Governance evidence supporting early intervention model of care

- Increasing international clinical and governance literature supporting a prospective surveillance model of care for the early detection and management of breast cancer-related lymphedema
- Key position statements on early detection of lymphedema – recommend routine monitoring from time of breast cancer diagnosis and ongoing education and rehabilitation according to risk
  - Australasian Lymphology Association (ALA), Aus
  - Agency for Clinical Innovation (ACI), Aus
  - National Lymphedema Network (NLN), USA
  - National Comprehensive Cancer Network (NCCN), USA
  - National Accreditation Program for Breast Centers (NAPBC), USA

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### Clinical evidence supporting early intervention model of care

Author	Study Design	Year	Number	BCRL diagnostic technique / intervention	BCRL (early vs late intervention)
Box	Randomised	2002	65	Circumference, BIS / early Physio	11% vs 30%
Torres Lacomba	Randomised	2010	120	Circumference / early Physio	7% vs 25%
Stout	Prospective	2011	196	Perometry / compression garment	25% subclinical and 6% Stage I-II
Soran	Prospective	2014	186	BIS, Physio, compression garment	33% subclinical, early intervention, 4% vs 36%
Koelmeyer	Retrospective	2019	188-early surveillance (ES); 256-traditional referral (TR)	Education, BIS, compression garment	4% ES vs 24% TR, Stage II-III
Ridner	Randomised	2018	280	BIS & 7 / compression sleeve	L-Dex & 7 units change = clinical LE

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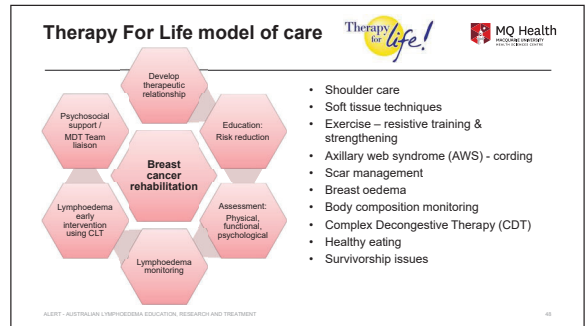
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### Clinical evidence supporting early intervention model of care

Author	Study Design	Year	Number	BCRL diagnostic technique/intervention	BCRL (early vs late intervention)
Yang	Prospective	2016	707 - 390 Surveillance group, 317 historical control group.	Lymphedema symptom experience index & BIA Garment, education, MLD	5 year data - 6.4 % surveillance group vs 15.1 % control group.
Kilgore	Retrospective	2018	146	BIS (2SD) Garment, education, MLD	34% had elevated BIS. After EI 6% chronic BCRL
Whitworth	Prospective	2018	93	BIS RTW Garment, education, MLD	3% developed chronic BCRL

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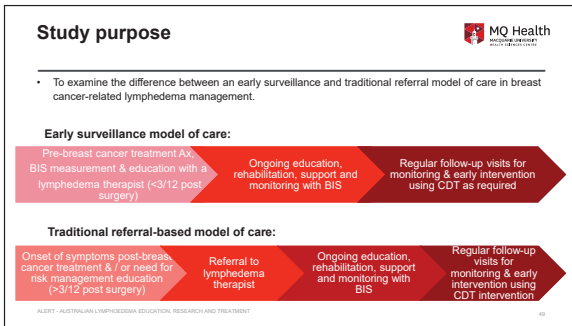
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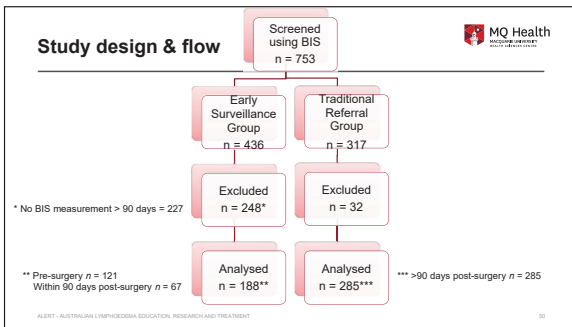
### Results

#### BASELINE CHARACTERISTICS OF PARTICIPANTS

Characteristic	All	Groups		p-value
		Early surveillance n = 188	Traditional referral n = 285	
Age (yr), mean (SD)	55 (11)	54 (12)	56 (11)	<0.05
Arm at risk, right n (%)	216 (46)	84 (45)	132 (46)	0.727
Axillary nodes dissected, yes n (%)	301 (64)	121 (64)	180 (63)	0.790
Medical Intervention, n (%)		n = 186	n = 94	
Nil adjuvant	31 (11)	19 (10)	12 (13)	<0.001
RT only	47 (17)	34 (18)	13 (14)	
CT only (without taxane)	16 (6)	11 (6)	5 (5)	
CT only (with taxane)	25 (9)	22 (12)	3 (3)	
RT + CT (without taxane)	161 (58)	100 (53)	61 (65)	
RT + CT (with taxane)	95 (34)	73 (39)	21 (22)	

ALERT - AUSTRALIAN LYMPHEDEMA EDUCATION, RESEARCH AND TREATMENT Koelmeyer, L., Borotkanics, R., Alcorso, J., Prah, P., Winch, C., Nakhel, K., Boyages, J. (2019). Prospective surveillance model of care for breast cancer-related lymphedema results in earlier treatment and decreased disease severity. Cancer, 125, 6, 654-662.

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### Results

#### EARLY SURVEILLANCE & TRADITIONAL REFERRAL GROUPS AND DIFFERENCE BETWEEN GROUPS FOR EACH OUTCOME

Outcome	Groups		p-value*
	Early surveillance	Traditional referral	
Time to first BIS measure (yr), med (IQR)	n = 188 0.34 (0.28 to 0.51)	n = 285 2.15 (0.97 to 5.41)	<0.001
Health system utilization (# visits/year), med (IQR) †	n = 108 4.1 (2.9 to 6.0)	n = 108 3.9 (2.5 to 5.9)	0.238

\* Indicates women who attended clinic for six months or longer

ALERT - AUSTRALIAN LYMPHEDEMA EDUCATION, RESEARCH AND TREATMENT Koelmeyer, L., Borotkanics, R., Alcorso, J., Prah, P., Winch, C., Nakhel, K., Boyages, J. (2019). Prospective surveillance model of care for breast cancer-related lymphedema results in earlier treatment and decreased disease severity. Cancer, 125, 6, 654-662.

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### Results

INCIDENCE & SEVERITY OF LYMPHOEDEMA (IF DIAGNOSED) FOR EARLY AND TRADITIONAL REFERRAL GROUPS

Outcome	Groups		p-value*
	Early Surveillance n = 188	Traditional Referral n = 285	
Stage of lymphedema, n (%)			
Non-lymphedema	138 (76)	173 (61)	p<0.001
Stage 0	19 (10)	3 (1)	
Stage 1	19 (10)	43 (15)	
Stage 2	8 (4)	53 (19)	
Stage 3	0 (0)	13 (5)	

\*Non-parametric wilcoxon rank-sum test

Kashmeyer, L., Bostrom, R., Alamo, J., Park, P., Wood, C., Nohad, K., Boyage, J. (2019). Prospective surveillance model of care for breast cancer-related lymphoedema results in earlier treatment and decreased disease severity. Cancer, 125, 6, 854-862.

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### Acknowledgment of funding support

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- ### Conclusions
- Results support the use of bioimpedance spectroscopy (BIS) as part of an early prospective surveillance model of care that may result in earlier detection and earlier diagnosis of lymphedema as well as lower BIS values over time.
  - International clinical guidelines have urged that lymphedema surveillance and early intervention model of care (exercise, skin care, compression therapy, lymphatic drainage massage as required) be implemented routinely after breast cancer treatment.
  - Earlier detection of lymphedema may lead to lower health-care costs if it results in the effective management of symptoms and prevents progression to severe lymphedema.
- ALERT - AUSTRALIAN LYMPHOEDEMA EDUCATION, RESEARCH AND TREATMENT

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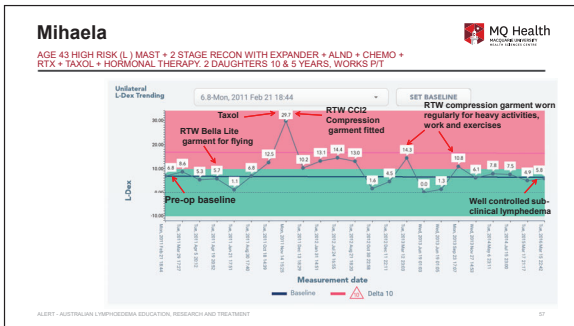
### Integrating a prospective surveillance and early intervention model of care program using case studies

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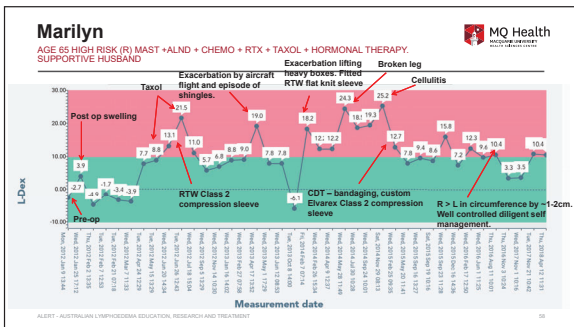


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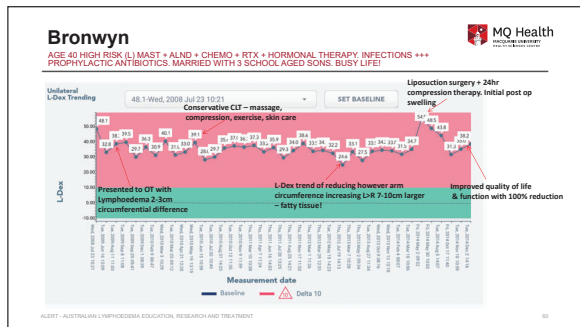
### Which L-Dex = 26?

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## Sharne's story: Changing people's lives

**Pre-op +12,567ml**  
**Unable to climb 8 steps**  
**+108kg**  
**L-Dex = 184.1**

**Sydney Harbour Bridge**  
**3 months and 1,390 steps**

**Completes 5 half marathons**

**ALA 2018**  
**3 years later,**  
**in boots! +950mls**  
**65kg**  
**L-Dex = 53.1**

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## Building a prospective surveillance and early intervention model of care

Monitoring primary outcome pathway to inform care, when and where to intervene

Collaborative multidisciplinary team

Prospective surveillance & early intervention model of care

Identify and engage education for staff, patients and patients

Program resources (staffing, funding, staff and treatment)

Ongoing quality improvement & evaluation

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## Sharne's story

DECEMBER 2017

**TOTAL BODY COMPOSITION**

Fat Free Mass (FFM) 48.5 kg  
 Fat Mass (FM) 19.7 kg  
 % of Weight

**METABOLIC REPORT**

Active Tissue Mass (ATM) 24.3 kg  
 Extracellular Mass (ECM) 23.8 kg  
 Bone Mineral Mass (BMM) 1370.8 mL/day

**DECEMBER 2017**

FFM 48.5 kg (77.8% of weight)  
 FM 19.7 kg (22.2% of weight)  
 Total Body Water (TBW) 36.9 L (50% of weight)  
 Bone & Minerals 13.3 kg  
 Fat Mass 18.6 kg

**MAY 2018**

FFM 62.3 kg (77.8% of weight)  
 FM 17.7 kg (22.2% of weight)  
 Total Body Water (TBW) 36.9 L (50% of weight)  
 Bone & Minerals 13.3 kg  
 Fat Mass 18.6 kg

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## Building a prospective surveillance and early intervention model of care

- What strategies will you take in your own clinical setting to establish a prospective surveillance and early intervention program?
- What are the challenges you may face? Organisational, financial, geographical, social, resource limited
- What are the possible opportunities?
- Who are your key stakeholders?
- Seek support and networks from others in similar setting
- How will you evaluate your program?
- How will you promote your program?

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## Building a prospective surveillance and early intervention model of care

- Use supportive Best Practice Documents & Evidence
  - National Lymphedema Network (NLN), USA
  - National Comprehensive Cancer Network, NCCN, USA
  - National Accreditation Program for Breast Centers (NAPBC), USA
- Organise appointment for meetings with key stakeholders
  - Surgeons
  - Breast care nurses
  - Multi-disciplinary teams
- Develop proposal & partnership
- Build on education & knowledge

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## Case study 1: Barbara

### PRE-TREATMENT ASSESSMENT

- What are Barbara's individual risk factors for the development of secondary arm and breast lymphedema?
- What assessments will you conduct as part of her pre-treatment appointment for ongoing monitoring program?
- If Barbara was overweight, how does this impact her risk of lymphedema?
- Is Barbara anticipated to gain weight during chemotherapy or lose weight?
- If Barbara has a higher level of fat free mass when compared to her muscle mass, how may this affect her during treatment?
- When will you review Barbara again?

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## Case study 1: Barbara

### PRE-TREATMENT ASSESSMENT

**General:**

- 52-year-old female. Diagnosis of self-detected left breast cancer 2 weeks ago. Lymph node biopsy indicated node positive cancer.

**Social history:**

- Primary school teacher - working full time
- Married, 2 children aged 14 and 18

**Physical history:**

- Left hand dominant
- No comorbidities. No joint pain reported. Full shoulder ROM
- Body weight - Not known. Appears to be slightly overweight and is wearing a size 14-16 clothing.
- Reports her blood pressure is normal.
- NI other medical history. No family history of breast cancer.

**Breast cancer treatment plan:**

- Likely to have an ALND with breast conserving surgery and R breast reduction. To then have chemotherapy and radiation.

**To note:**

- Barbara is emotional and is very concerned about her cancer diagnosis. She is worried about the effect her diagnosis will have on her family.
- Barbara is concerned about losing her hair and about gaining more weight.
- Barbara reports being very concerned about lymphedema as a teacher at her work has advanced lymphedema after breast cancer.

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## Case study 2: Jenny

### LYMPHEDEMA RISK STRATIFICATION AND RISK MINIMISATION EDUCATION

**Medical history:**

- Breast cancer, in the left breast, was diagnosed 5 months ago. Treatment included SLNB followed by ALND. The drain was instilled for 4 weeks. The client had breast conserving surgery (WLE).
- Post-operative seroma in the breast area.
- Chemotherapy (non-Taxane based). Radiation therapy is due to commence in 2/52.

**Lymphedema history:**

- Jenny presents at your clinic reporting shoulder tightness and heaviness in arm. She has experienced these feelings since surgery.
- Pre-op L-Dex was -3.0
- 3-month L-Dex was 0.1.
- Circumferential arm measures are 80mL larger on the left side than the right. She is left side dominant.
- Normal sensation test.

**Patient concerns / reasons for visiting your clinic:**

- Jenny is concerned about her breast feeling sore and swollen and reports a change in the appearance of her breast following surgery. (There are no signs of breast infection.)
- She would like to fly to London to see her son after her radiation treatment has finished. She asks you about flying sleeves as she has heard a little about lymphedema from Google and is concerned about getting a "big arm."

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**Case study 2: Jenny**  
 LYMPHEDEMA RISK STRATIFICATION AND RISK MINIMISATION EDUCATION

- What are Jenny's individual risk factors for the development of secondary arm and breast lymphedema?
- What assessments will you conduct as part of her 6-monthly review for ongoing monitoring program?
- How would this differ to a pre-treatment and 3-month follow up appointment?
- What would your intervention involve?
- What advice would you give her about air travel?
- What compression garment options and advice would you consider and why for aircraft travel?
- When will you review Jenny again?

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**Case study 3: Margie**  
 HIGH RISK MONITORING AND LYMPHEDEMA EARLY INTERVENTION

- What are Margie's individual risk factors for the development of secondary arm and breast lymphedema?
- What assessments will you conduct as part of her 12-monthly review for ongoing monitoring program?
- What would your lymphedema risk reduction advice include?
- How could her breast fibrosis relate to lymphedema?
- What would your early intervention involve?
- What compression garment options would you consider and why?
- When will you review Margie again?

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**Case study 3: Margie**  
 HIGH RISK MONITORING AND LYMPHEDEMA EARLY INTERVENTION

**Medical history:**

- Breast cancer, in the left breast, was diagnosed 12 months ago. Treatment included SLNB + ALND with mastectomy, chemotherapy (including Taxane) and radiotherapy.
- Post-operative seroma in the breast area and an episode of breast cellulitis 1 month ago.

**Lymphedema history:**

- Margie reports tingling and heaviness in her left arm. She has experienced these feelings since commencing taxane-based chemotherapy. Symptoms slightly worsened after an episode of cellulitis in her breast tissue.
- Margie is concerned about her breast feeling sore and swollen. The skin feels warm.
- Circumferential arm measures are at the upper end of normative data. Margie is R arm dominant.
- Normal sensation test.
- ROM deficit by 35 degrees into external rotation and abduction on the left side when compared to the right. Margie has difficulty brushing her hair. Compensation movement occurs by neck forward flexion. The axillary and breast scar tissue was firm and hard, and contracture of the tissues is evident from local scar tissue as well as from radiation induced fibrosis.

Time point	L-Dex measures
Pre-op	-2.2
3 months	+2.2
6 months	-4.2
9 months	FTA
12 months	12

**To note:**

- "My breast feels swollen and sore. It has also changed colour and is tight around the scar tissue. I get dressed quickly and avoid touching or looking at it" said Margie at follow up assessment.
- Margie also reports feeling distressed.

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**Case study 4: Building a prospective surveillance and early intervention model of care**

- What strategies will you take in your own clinical setting to establish a prospective surveillance and early intervention program?
- What are the challenges you may face? (i.e. organisational, financial, geographical, social, resource limited)
- What are the possible opportunities?
- Who are your key stakeholders?
- Seek support and networks from others in similar setting
- How will you evaluate your program?
- How will you promote your program?

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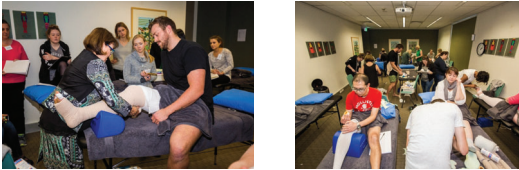
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**Thank you, feedback and questions**

- For more information contact ALERT Education at [alerteducation@mq.edu.au](mailto:alerteducation@mq.edu.au) or go to our website at <https://www.mqhealth.org.au/alerteducation>
- Follow our [LinkedIn](https://www.linkedin.com/company/alertatmacquarieuniversity) via: [www.linkedin.com/company/alertatmacquarieuniversity](https://www.linkedin.com/company/alertatmacquarieuniversity)



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**Case Study 1: Pre-Treatment Assessment**

Case study: "Barbara"

**General:**  
 52-year-old female. Diagnosis of self-detected left breast cancer 2 weeks ago. Lymph node biopsy indicated node positive cancer.

**Social history:**  
 Primary school teacher –working full time  
 Married. 2 children aged 14 and 18

**Physical history:**  
 Left hand dominant  
 No comorbidities. No joint pain reported. Full shoulder ROM.  
 Body weight – Not known. Appears to be slightly overweight and is wearing a size 14 -16 clothing.  
 Reports her blood pressure is normal.  
 Nil other medical history. No family history of breast cancer.

**Breast cancer treatment plan:**  
 Likely to have an ALND with breast conserving surgery and R breast reduction. To then have chemotherapy and radiation.

**To note:**  
 Barbara is emotional and is very concerned about her cancer diagnosis. She is worried about the effect her diagnosis will have on her family.  
 Barbara is concerned about losing her hair and about gaining more weight.  
 Barbara reports being very concerned about lymphedema as a teacher at her work has advanced lymphedema after breast cancer.

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**Questions:**

What are Barbara's individual risk factors for the development of secondary arm and breast lymphedema?

Risk factor	Reason

What assessments will you conduct as part of her pre-treatment appointment for ongoing monitoring program?

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If Barbara was overweight, how does this impact her risk of lymphedema?

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Is Barbara anticipated to gain weight during chemotherapy or lose weight?

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If Barbara has a higher level of fat free mass when compared to her muscle mass, how may this affect her during treatment?

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When will you review Barbara again?

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**Case Study 2: Lymphedema Risk Stratification and Risk Minimisation Education**

Case study: "Jenny"

**Medical history:**

Breast cancer, in the left breast, was diagnosed 5 months ago. Treatment included SLNB followed by ALND. The drain was insitu for 4 weeks. The client had breast conserving surgery (WLE).

Post-operative seroma in the breast area.

Chemotherapy (non-Taxane based). Radiation therapy is due to commence in 2/52.

**Lymphedema history:**

Jenny presents at your clinic reporting shoulder tightness and heaviness in arm. She has experienced these feelings since surgery.

Pre-op L-Dex was -3.0

3-month L-Dex was 0.1.

Circumferential arm measures are 80mL larger on the left side than the right. She is left side dominant.

Normal sensation test.

**Patient concerns / reasons for visiting your clinic:**

Jenny is concerned about her breast feeling sore and swollen and reports a change in the appearance of her breast following surgery. (There are no signs of breast infection.)

She would like to fly to London to see her son after her radiation treatment has finished. She asks you about flying sleeves as she has heard a little about lymphedema from Google and is concerned about getting a "big arm."

What are Jenny's individual risk factors for the development of secondary arm and breast lymphedema?

Risk factor	Reason

What assessments will you conduct as part of her 6-monthly review for ongoing monitoring program?

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How would this differ to a pre-treatment and 3-month follow up appointment?

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What would your intervention involve?

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What advice would you give her about air travel?

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What compression garment options and advice would you consider and why for aircraft travel?

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When will you review Jenny again?

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### Case Study 3: Lymphedema Risk Stratification and Risk Minimisation Education

Case study: "Margie"

**Medical history:**

Breast cancer, in the left breast, was diagnosed 12 months ago. Treatment included SLNB + ALND with mastectomy, chemotherapy (including Taxane) and radiotherapy.

Post-operative seroma in the breast area and an episode of breast cellulitis 1 month ago.

**Lymphedema history:**

Margie reports tingling and heaviness in her left arm. She has experienced these feelings since commencing taxane-based chemotherapy. Symptoms slightly worsened after an episode of cellulitis in her breast tissue.

Margie is concerned about her breast feeling sore and swollen. The skin feels warm.

Time point	L-Dex measures
Pre-op	-2.2
3 months	+2.2
6 months	4.2
9 months	FTA.
12 months	12

Circumferential arm measures are at the upper end of normative data. Margie is R arm dominant.

Normal sensation test.

ROM deficit by 35 degrees into external rotation and abduction on the left side when compared to the right. Margie has difficulty brushing her hair. Compensation movement occurs by neck forward flexion. The axillary and breast scar tissue was firm and hard, and contracture of the tissues is evident from local scar tissue as well as from radiation induced fibrosis.

**To note:**

"My breast feels swollen and sore. It has also changed colour and is tight around the scar tissue. I get dressed quickly and avoid touching or looking at it" said Margie at her follow up assessment.

Margie also reports feeling distressed.

What are Margie's individual risk factors for the development of secondary arm and breast lymphedema?

Risk factor	Reason

What assessments will you conduct as part of her 12-monthly review for ongoing monitoring program?

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What would your lymphedema risk reduction advice include?

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How could her breast fibrosis relate to lymphedema?

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What would your early intervention involve?

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What compression garment options would you consider and why?

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When will you review Margie again?

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**Risk factors**

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Cemal, Y., et al (2011) Preventative measures for lymphedema: Separating fact from fiction. *Journal of the American College of Surgeons*. 213(4):543-551

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**Feedback form for 'An Innovative Early-Intervention Model of Care' workshop at the Klose Lymphoedema Conference 2019.**

Name (optional) \_\_\_\_\_ (Denver, CO) 2 May 2019

Thank you for your attendance at ALERT Education's 'An Innovative Early-Intervention Model of Care' workshop as part of the Klose Lymphoedema Conference 2019. We value your feedback and continually strive to improve our education program.

If you would like to join our database to keep up to date with ALERT's research and educational workshops please provide your name (above) and email. Email address: \_\_\_\_\_

1/ Please provide an overall rating for the learning experience of this workshop (0 = poor learning experience, 10 = excellent learning experience).



2/ Please rate your level of understanding of 'An early-intervention model of care in breast cancer' currently from 0-10 (0= poor, 10 = excellent)



3/ Do you feel that this workshop met the anticipated learning outcomes? (0 = not at all, 10 = absolutely) The learning objectives are below:

- Recognize the practical application of a prospective surveillance and early-intervention model of care shown to reduce the risk of lymphedema and the severity of lymphedema during breast cancer rehabilitation.
- Identify how bioimpedance spectroscopy applies to a prospective surveillance model of care for lymphedema and cancer survivorship.



4a/ Prior to this workshop what percentage of patients did you feel were appropriate for RTW vs custom made garments in an early intervention setting?

% ----- RTW  
% ----- Custom Made

4b/ Having completed this workshop what percentage of patients do you feel are appropriate for RTW vs custom made garments in an early intervention setting?

% ----- RTW  
% ----- Custom Made

5a/ Prior to this workshop how likely were you to utilise bioimpedance spectroscopy in an early intervention setting? (0= see no value in utilisation, 10= 100% value in utilisation)



5b/ Having completed this workshop how likely are you to utilise bioimpedance spectroscopy in an early intervention setting? (0= see no value in utilisation, 10= 100% value in utilisation)



6/ How could the workshop be improved/any other feedback? \_\_\_\_\_

7/ We would appreciate feedback that could be used for marketing purposes on the Macquarie University webpage. If you consent for us to publish your name and profession, please write some feedback below that could be presented as a testimonial