

# Sensitivity, Specificity and the ROC Curve

Australian Society for Psycho-Social Obstetrics and Gynaecology

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***Internal Mail***

Dr

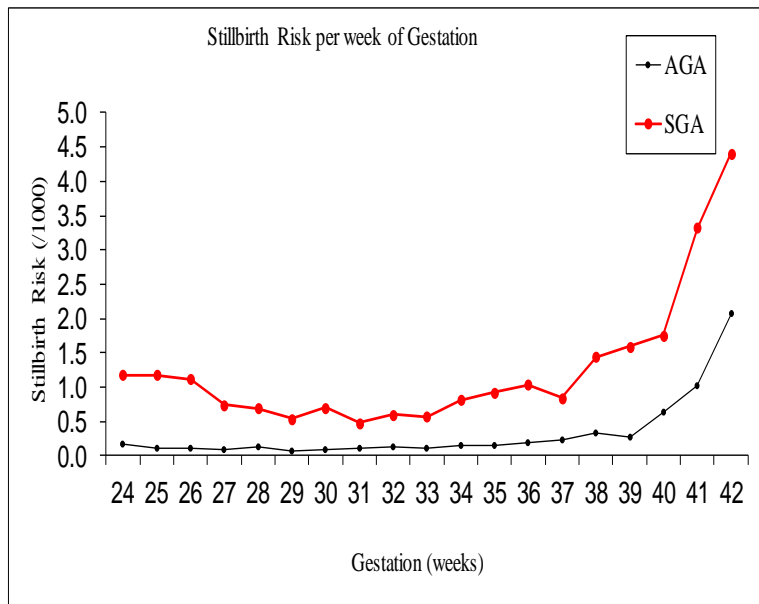
[REDACTED]  
Green Maternal Faecal  
Medicine Clinic  
The Women's Hospital

# Reducing Preventable Stillbirth



## Improved Detection of Fetal Growth Restriction

Increased risk of antenatal and intrapartum stillbirth....



Vashevnik et al, 2007

Antenatal detection which reduces perinatal mortality



Gardosi, BMJ 2013

*Of the 2.8 million stillbirths every year, half are growth restricted*

# Detection FGR



Fundal height measurement

Fetal biometry

Biomarkers



Sensitivity: 17-20%

Sensitivity: 57%

Sensitivity: 68%

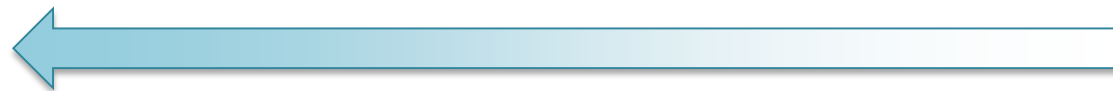
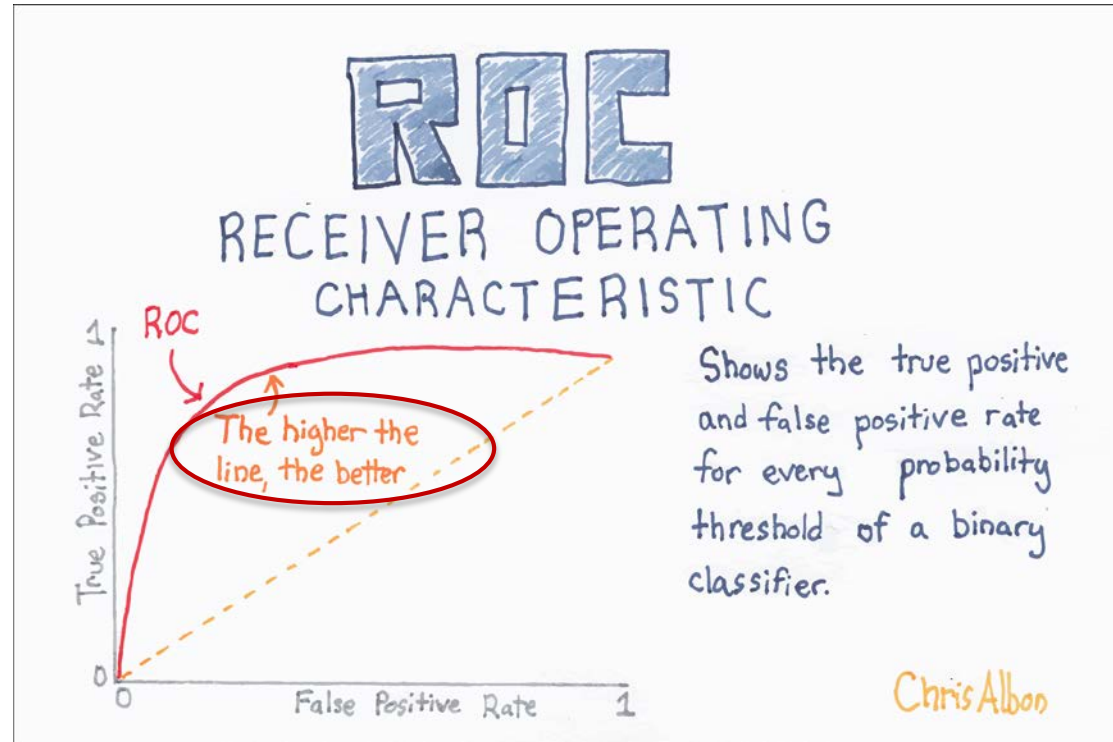
Sparks, Cheng et al. 2011; Sovio et al. 2015

Sovio et al. 2015

MacDonald et al, 2019

# The Receiver Operator Characteristic Curve

**Sensitivity**  
Probability of detection



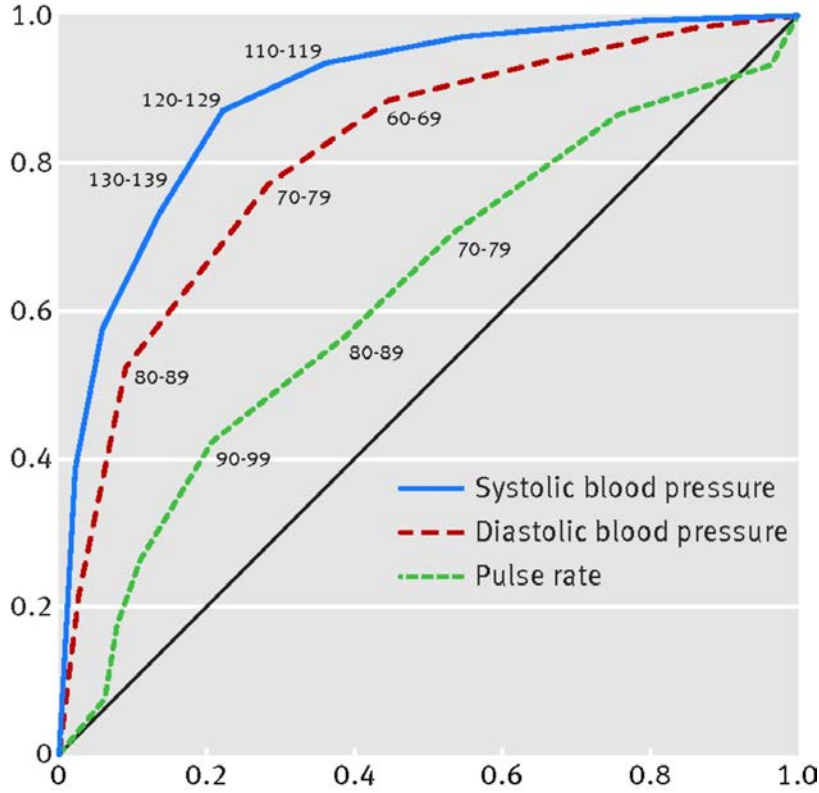
**False Positive Rate**  
Probability of 'false alarm'; (1- specificity)

Can vital signs in ER predict the presence of intracranial lesions?

# The Charm of the ROC.....



**Sensitivity**  
Probability of detection



**Area Under the Curve**  
Enables comparison of the performance of different screening tests



**Sliding the Inflection point**  
**Maximise detection rate** to reduce missing important diagnosis, or  
**Minimise false positive rate** where price of intervention is too high

**False Positive Rate**  
Probability of 'false alarm'; (1- specificity)

# Diagnosis and Staging



# Treatment



Surgery...

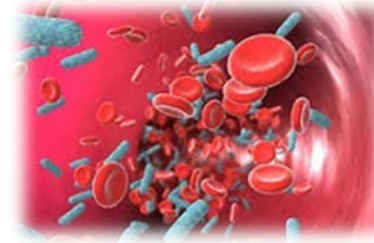


Hormone treatment...

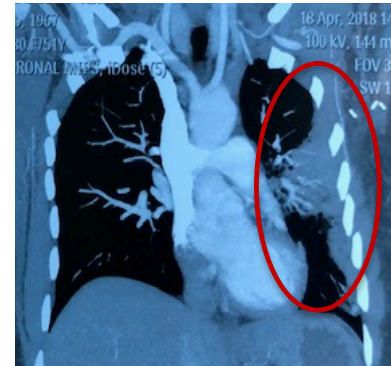


Radiotherapy...

# Complications of Treatment



Sepsis from burn breakdown



Radiation induced lung injury

# Side Effects of Treatment of Complications



Plus ...



'You have breast cancer...'





## The warrior myth...

*Rare disease with  
uncertain course*

*I don't like this version of  
myself*

*Unpredictable outcome*

*What's good for one  
thing is bad for another*

*Agitated, sleep  
deprived*



*I resent the self absorption*

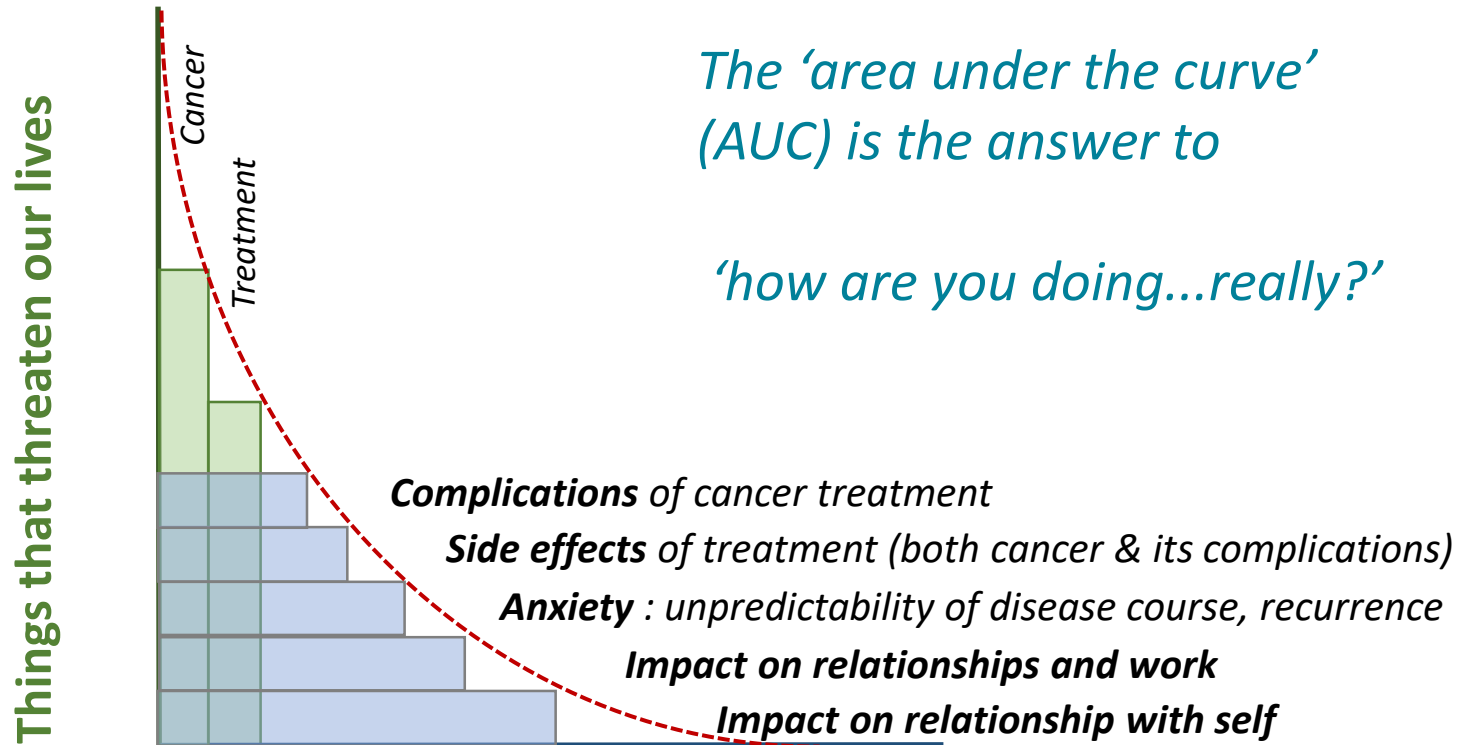
*Concern about  
'compassion fatigue'*

*Loss of confidence: letting  
patients and colleagues  
down*

I am not a warrior...



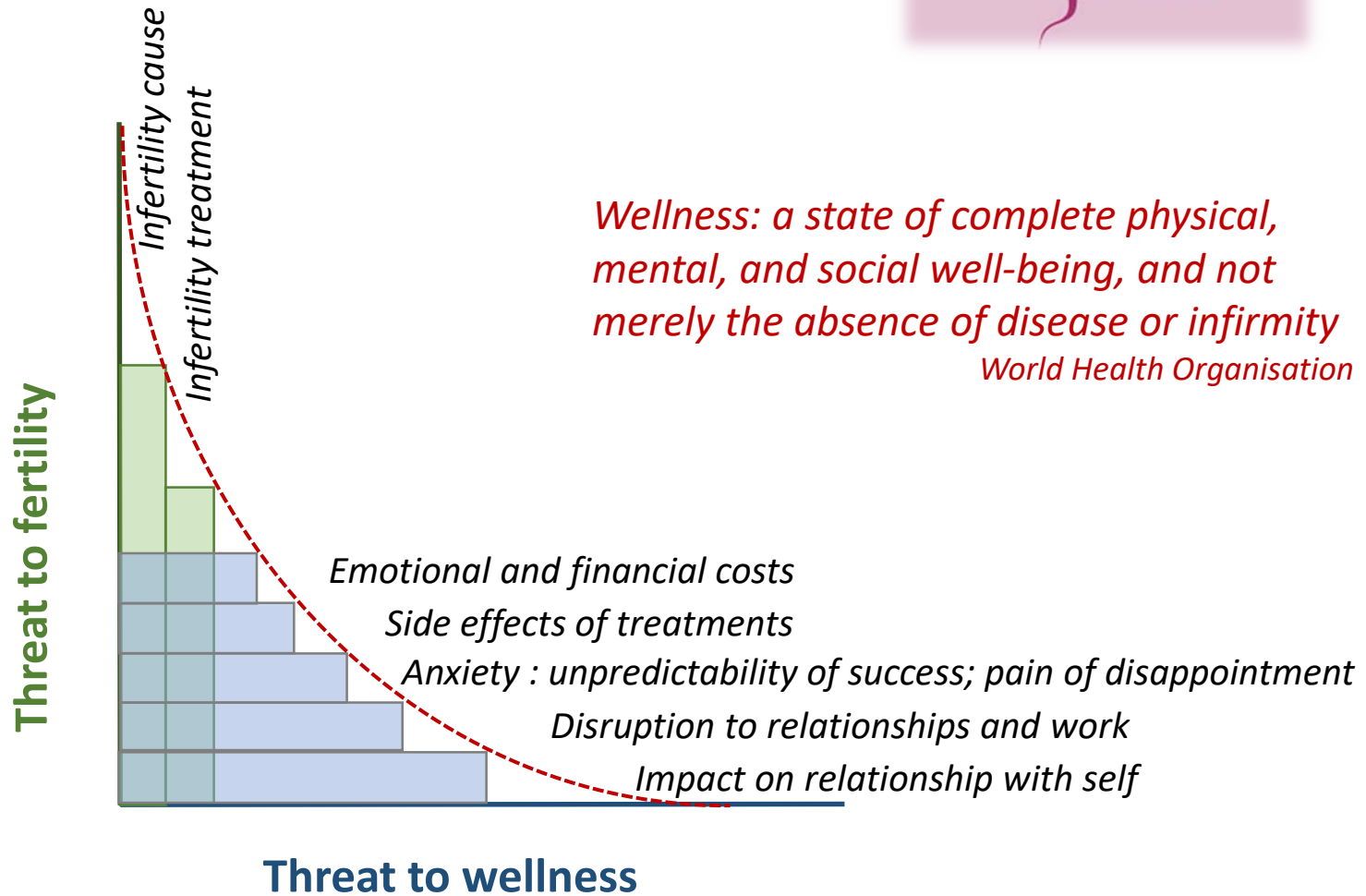
# 1. Can I describe, measure, assess, control?



Things that threaten our days

...the Reality of Cancer (ROC) Curve

# Infertility



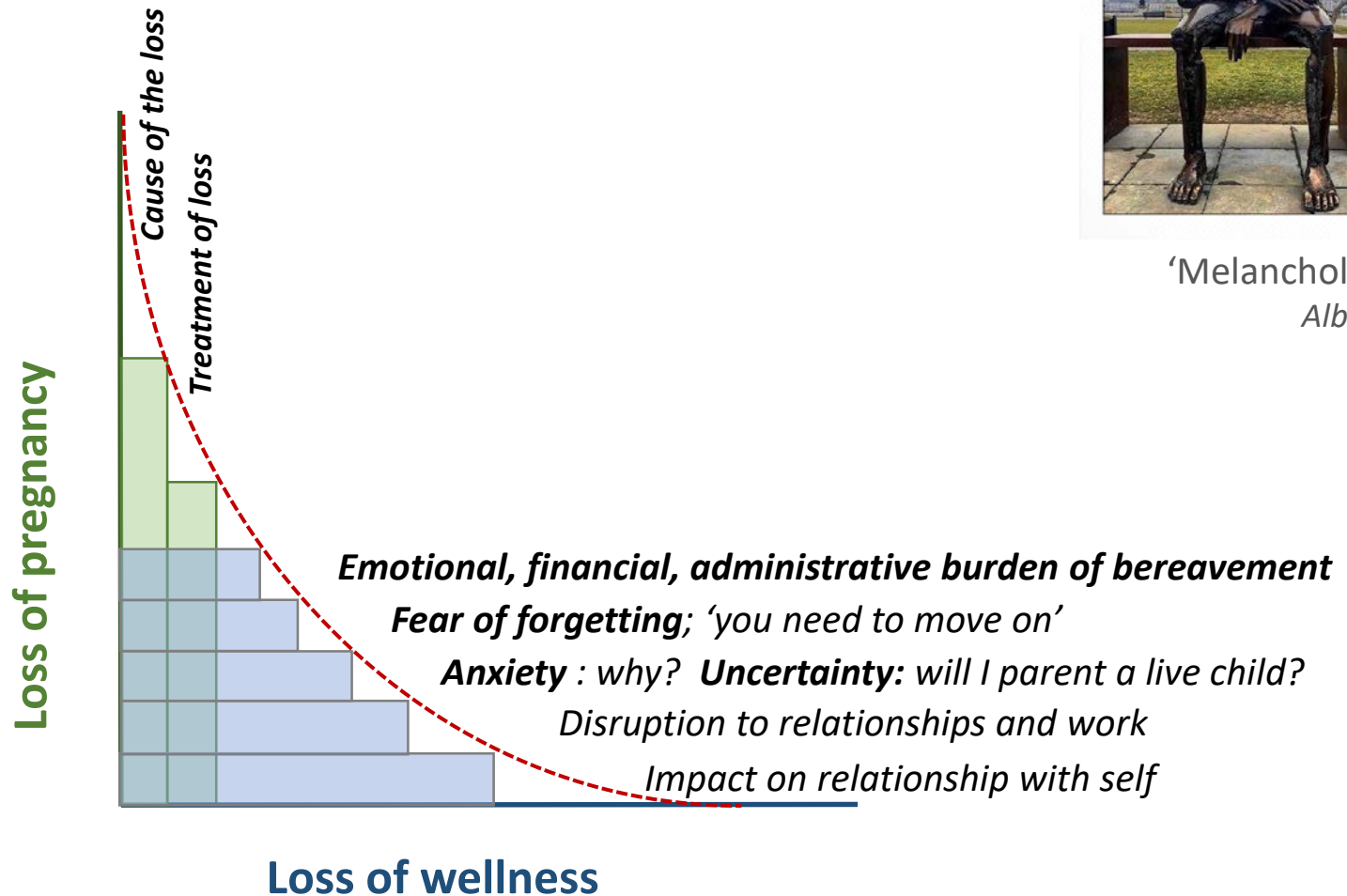
*Wellness: a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity*  
*World Health Organisation*

...the Reality of any Condition (ROC) Curve

# Miscarriage and Stillbirth



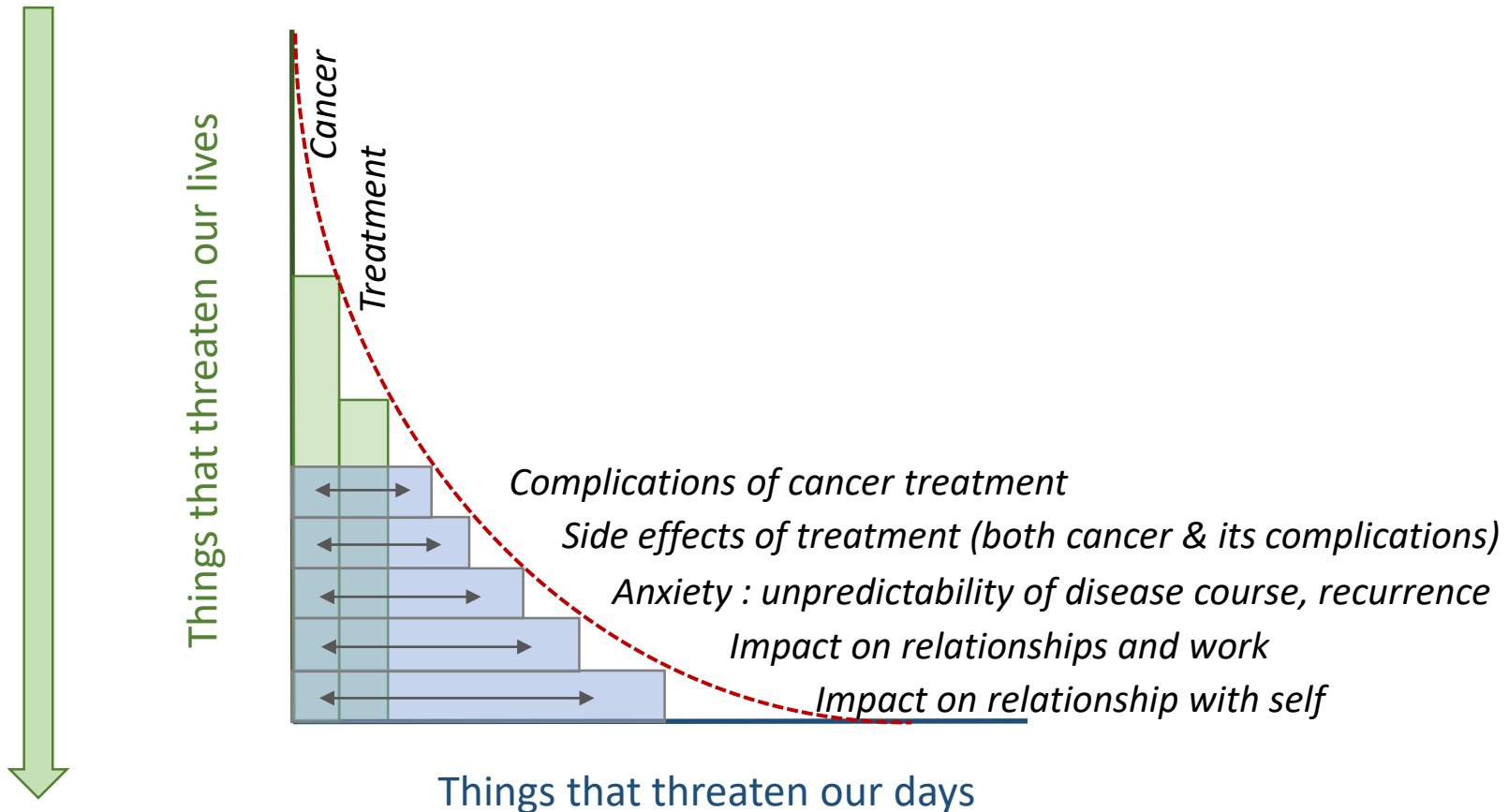
'Melancholy'  
Albert Gyorgy



...the Reality of any Condition (ROC) Curve

## 2. Can I minimise the Area Under the Curve?

*Driving the curve down....*



*Push the curve to the left....*

# 1. Exercise

Position statement summary

## Clinical Oncology Society of Australia position statement on exercise in cancer care



### **Regular exercise before, during and after cancer treatment**

- Decreases severity of adverse side effects
- Reduces risk of developing new cancers
- Reduces risk of comorbidities (cardiovascular disease, diabetes, osteoporosis)

### **All people with cancer should work toward**

- 150 minutes of moderate intensity, or 75 minutes of vigorous activity each week
- 2-3 resistance exercise sessions/ week targeting major muscle groups

### **All health practitioners in cancer care should**

- Discuss the role (and targets) for exercise in cancer recovery
- Consider referral to expert physiotherapist, exercise physiologist

## 2. Psychological intervention including meditation, mindfulness

### Mindfulness-based interventions for coping with cancer

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

*Cancer diagnosis challenges the commonly held world view that life is predictable and controllable*

#### Challenges

- Realisation of mortality can evoke existential angst
- Substantial changes in functional performance, appearance and lifestyle
- Potential for ongoing pain/ dysfunction
- Life plans change; future is less certain
- Lingering fear of recurrence or disease progression

#### Mindfulness based interventions can assist with

- Feelings of loss of control, uncertainty, fears of recurrence
- Depression, anxiety, insomnia, fatigue
- Improved cortisol slopes, blood pressure, telomere length





### 3. Kindness in Health Care

#### **Role of Kindness in ~~Cancer Care~~ management of fetal abnormalities**

**Unhurried Deep Listening:** ‘how is this affecting you?’ ‘what’s the most important thing we can do for you today?’

**Generous Acts:** ‘my doctor called me over the weekend...’; ‘..the nurse showed me the best way to get out of bed’

**Timely Care:** *being in limbo is unbearable*, heightens feelings of powerlessness; once a treatment plan is underway, a routine develops, which lessens stress and anxiety

**Gentle Honesty:** cancer is a high potency word. It is informative and kind to ask ‘how much do you want to know about your illness?’

**Support for Care Givers:** prepare, empower, assist family in a role they are often ill prepared to perform

## 4. Empathy

**Empathy, sympathy and compassion in healthcare:  
Is there a problem? Is there a difference? Does it matter?**

**Affective Empathy:** ability to subjectively experience and share in another's feelings

**Cognitive Empathy:** ability to understand another's perspective with objectivity

**Behavioural Empathy:** ability to communicate this understanding with the patient

**Moral Empathy:** an internal motivation and desire to relieve others of suffering

*'Empathy starts with curiosity and imagination. I imagine being the patient undergoing the patient's experience rather than imagining myself going through the patient's experience. This requires mental flexibility, an ability to regulate one's own emotions and to suppress one's own perspective in the patient's interests'*



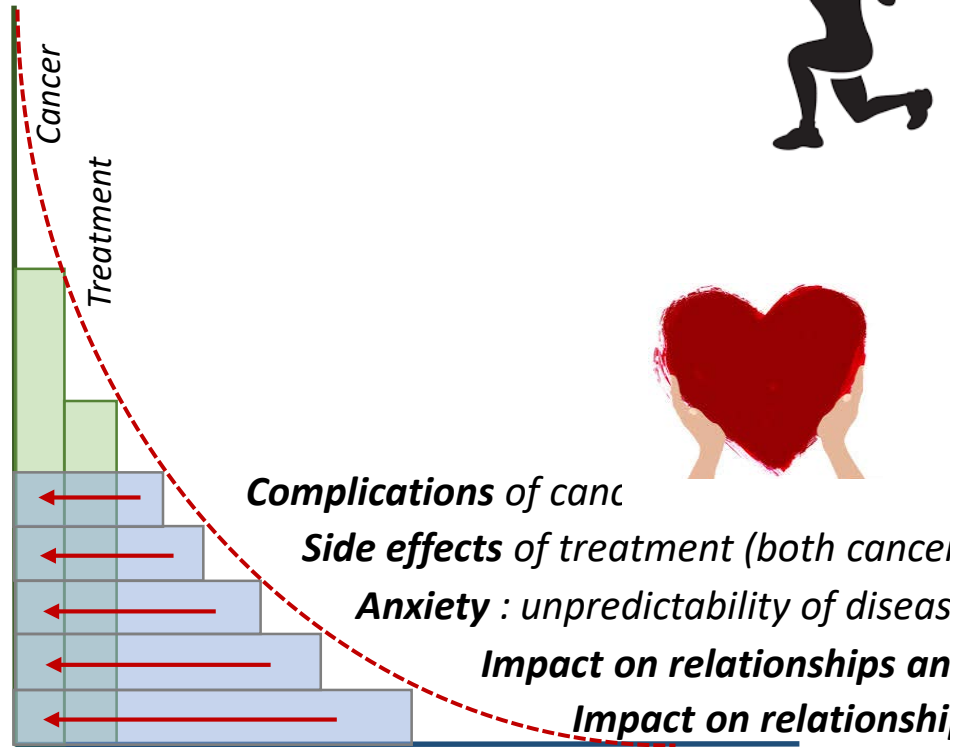


# Minimising the Area Under the Curve

*Driving the curve down....*



Things that threaten our lives



Things that threaten our days



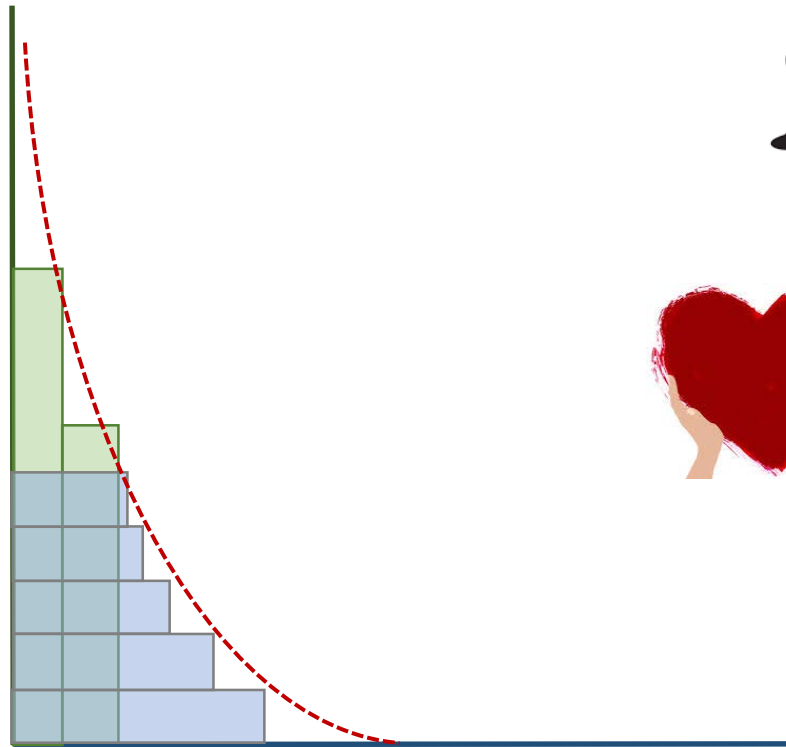
*Pushing the curve to the left....*

# Reducing the Area Under the Curve

*Driving the curve down....*



Things that threaten our lives



Things that threaten our days



*Driving the curve to the left....*

# Final Thoughts

**For patients:** the ROC may help give some structure to experiences which represent physical, emotional, social and existential challenges

**For health care workers:** By sensitively and specifically mapping these out, we improve our understanding of the patient's lived experience

**Together:** it is worth exploring the many and varied 'effect minimisers' to reduce the area under the curve, such as

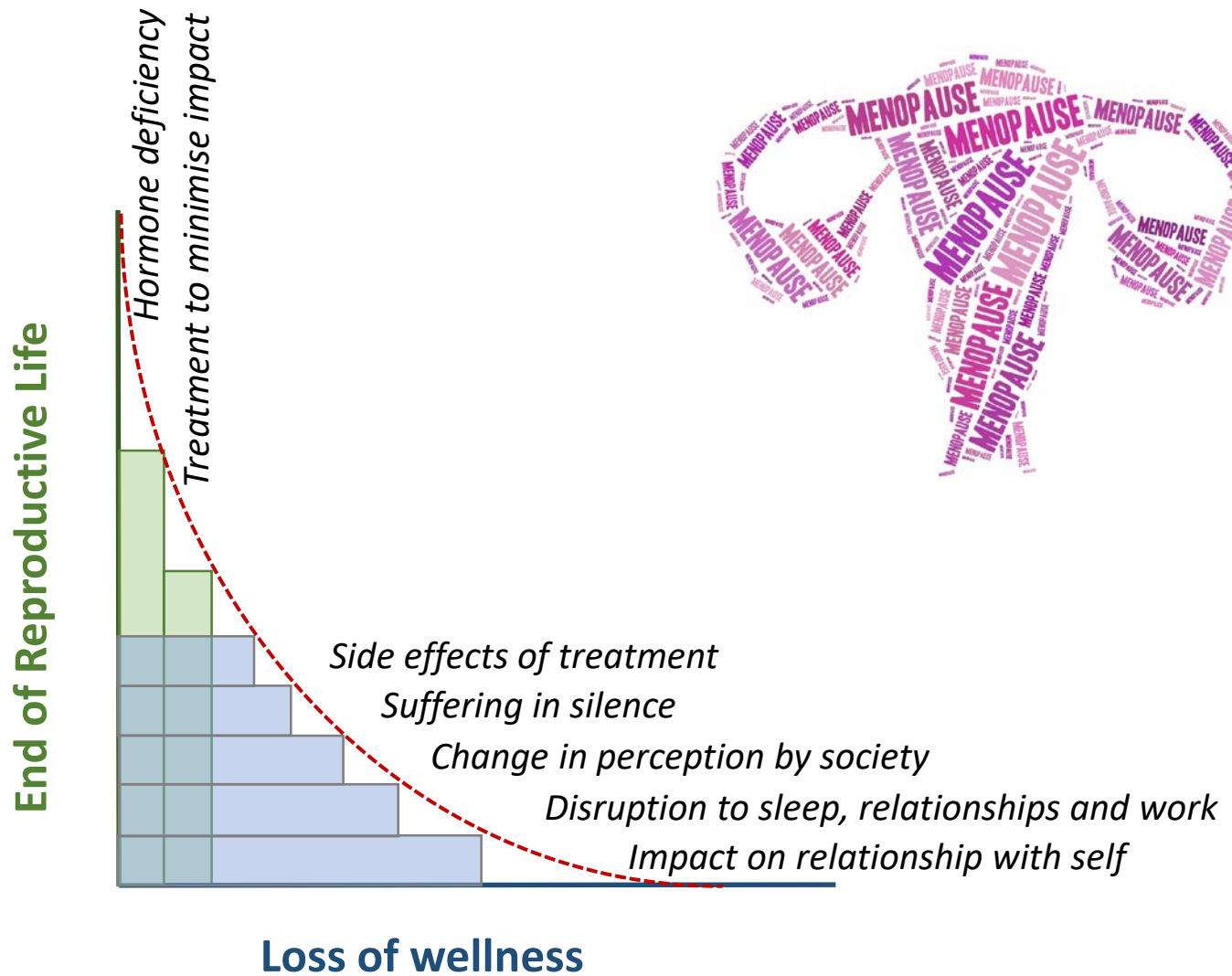
- Exercise
- Psychological support
- Kindness and wisdom
- Empathy

**We are not super heroes.** It's important to respect the curve. Your patients, colleagues, friends, family- and you- need you whole

in a world  
where you can  
be anything.  
BE KIND.

Thank you

# Menopause



...the Reality of any Condition (ROC) Curve

# Fostering a Culture of Kindness in Health Care

## Reforming the culture of healthcare: the case for intelligent kindness

*A sense of kinship: seeing the person in the patient and delivering the sort of care you would want for your family and friends*

