

Summary of Professor Anna Whittaker's presentation at Laughter Yoga Open Day – 28 October 2017

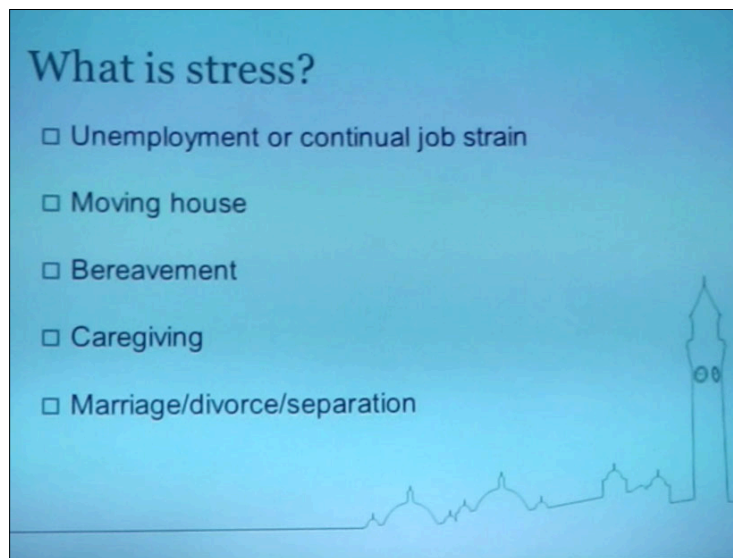
Professor Anna Whittaker

Subject of talk:

- The effect of stress on the body; eg. Immune system and stress hormones
- How stress and social connections relate to our physical health, particularly through the immune system and the effects of stress hormones, and how this differs across the life span

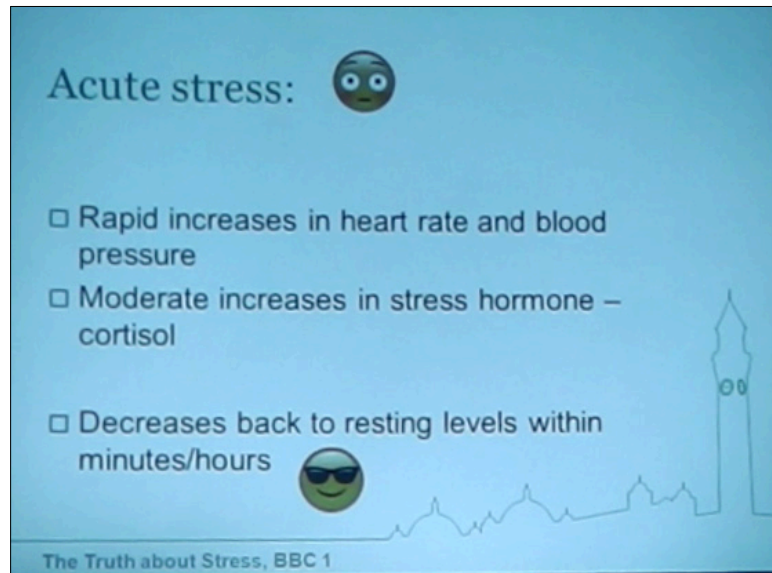


- What do we mean by stress?

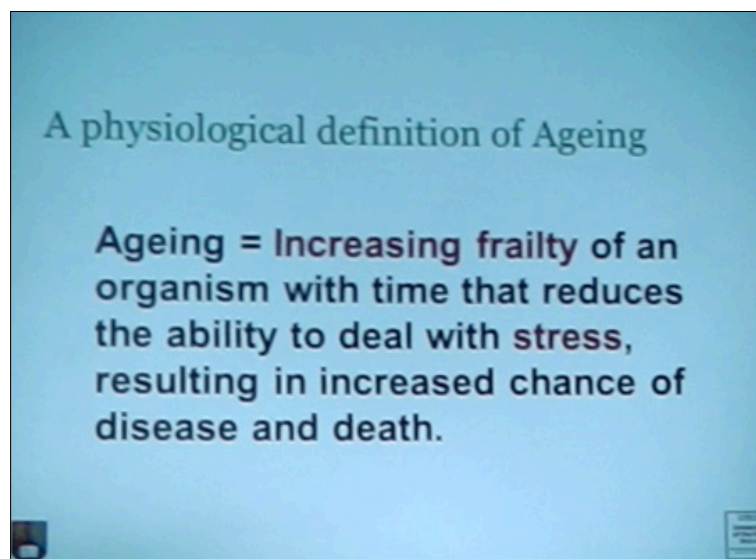


- Does stress have the capacity to make you ill? Or is it just an 'Old Wives Tale'? If it does, how does it get inside the body and have an impact on us?
- Effects of ageing on top of stress
- What can be done to reduce the effects of stress? Interventions such as LY
- What is stress?
 - Unemployment and continual job strain
 - Moving house
 - Bereavement
 - Caregiving
 - Marriage / divorce / separation
- Chronic life events – try to control them by having them at intervals rather than all at once! Stress not controllable when and how it happens

- Stress associated with change – sometimes for good events, not always for bad.
- Some stresses bad for us as they also impact on our social circles and support.
- Is all stress bad and negative?
- Need to respond to some stressful situations in everyday life and then move on. Mobilise energy through stress response.
- Some people she studied do not show a stress response, which is not healthy.
- Acute stress – daily hassles like trying to find a parking space. Also 'short term' such as student's tests or exams.



- Chronic stress has a different effect – more severe and long-term, such as caregiving.




- These different levels of stress have different effects on the body – acute stress mobilises us to react and then recover and helps deal with that event. Chronic stress leads to wear and tear making the person more prone to diseases.
- Programme – ‘The Truth about Stress’ on BBC1 (<https://www.youtube.com/watch?v=e1xSMspO6WM>) – measured stress and the effects on the body. Had people on heart rate monitors, blood pressure, etc. BBC wanted the research to take place at Dudley Zoo. Took research participants to snakes or Tarantulas, whichever they were scared of. Rigged up to monitors to gauge their response. If Anna had been rigged up when the Tarantula came in, it would have gone off the scale! When the object of fear was taken away, responses would return to normal.
- Physiological responses to stress: SAM axis – Adrenaline; HPA axis – Cortisol. These stress hormones ‘talk’ to the other organs within the body through neuro-transmitters through their receptors.
- Continual stress will result in the way these organs react and make changes to how well they are working and how well the immune system is coping.
- It’s never as simple as looking at high and low cortisol levels depending on the type of stress. Neither situation is good.
- Research participation with students (2 hours) as part of their degree – they have a choice, which they choose.
- Different reaction responses and how many antibodies produced. Can look at vaccines, how fast wounds heal and how many immune cells there are – all snapshot of how well a person’s immune system is doing.
- Start research with questionnaires for each person participating. Different questionnaires for different groups of the population estimated number and how much social support they have.
- Take baseline blood sample and count number of antibodies if doing a vaccination study.
- After 4-5 weeks follow up participants after a flu jab when they would have the highest number of antibodies.
- Follow up some time later to see whether they are maintaining the same level of antibodies. Vaccinations to help fight off a real illness if person catches it.
- Student stress with undergraduates – questionnaire different. Responders to the vaccines and non-responders. Responders increase antibodies by up to 4 times their original levels. If person doesn’t achieve this they are non-responders. Those who didn’t respond are those with higher levels of stressful life events.
- Also higher levels of response from participants with higher levels of social support.
- What happens when combine stress and ageing?
- Antibody – Immunoglobulin A (also find in saliva, etc) If levels are low, more susceptible to colds and other infections. First line of defence is in the skin and then saliva.

Ageing, caregiving, and salivary Immunoglobulin A

1843 adults from the West of Scotland Twenty-07 study

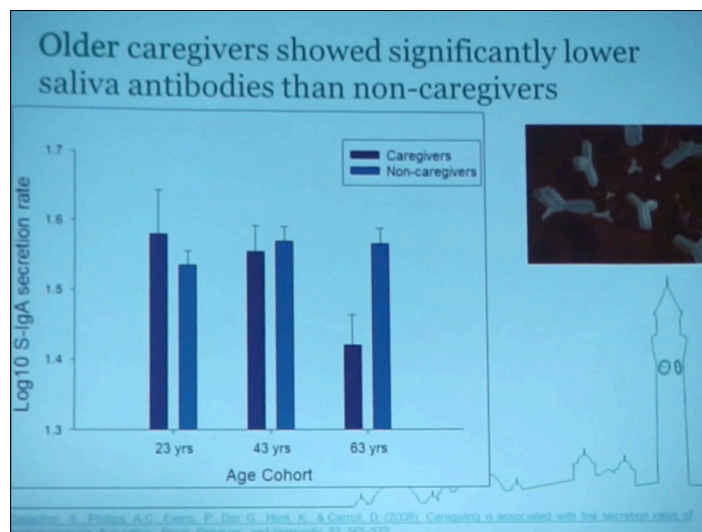
Measures

- 2-minute saliva samples collected in salivettes.
- Assayed for sIgA secretion rate

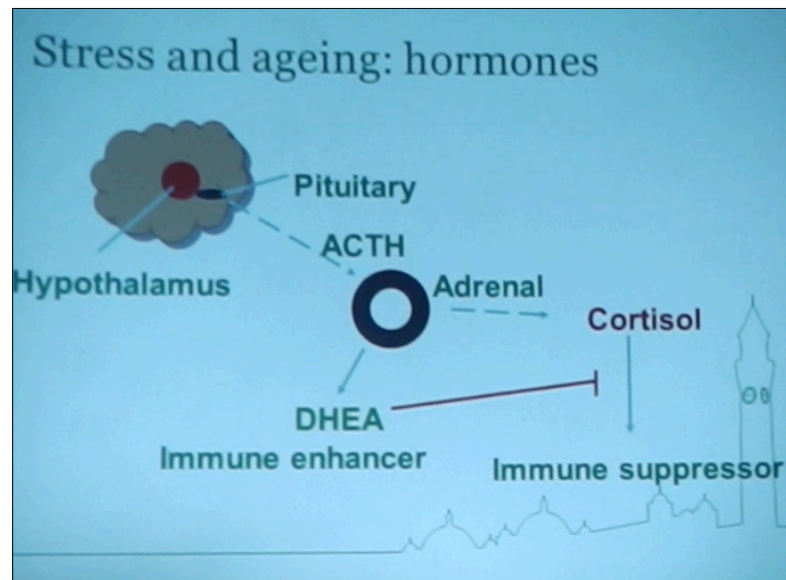


Caregiver Information: For up to 4 people...
Is there someone you provide regular care for?

- Glasgow study 2004 (started in 1980's) – Followed social determinants of health: what events affected their lives as they aged – called 2007 study and finished in 2009. Looked at studies between age groups. Took saliva samples to measure people's ability to produce immunoglobulin – like a dental swab. One question was about caregiving stress. Dramatic difference between caregivers and non-caregivers. Caregivers didn't produce as much of this antibody in their saliva so not as well protected. Even more pronounced in the group of older people.



- Cortisone is given to people to bring down an inflammatory infection but it can also suppress the immune system.
- DHEA opposite effect to cortisol and is immune enhancing. As people age their DHEA levels drop – start dropping around the age of 30.



- Research done on caregiving as it is a chronic stressor – poorer response to vaccination (in terms of antibodies)
- Question – does this stress for caregivers only become an issue when the caregiver is older? Found no difference between caregiver and control group not caregiving but may be manifest in certain types of caregivers. Study done with another group – parents with children with disabilities – high levels of distress. Looked to see whether stress levels of caregivers only takes place to caregivers later in life or can it also affect younger caregivers?

Caregiving and immunity in ageing

□ Most previous research in stressed older adults has focused on caregivers for a spouse with Alzheimer's, who show:

- Worse response to vaccination
- Slower wound healing
- Poorer immune cell function

A photograph showing two elderly individuals, a man and a woman, sitting side-by-side. The man is holding a book or a folder, and both appear to be looking at it. They are in a simple indoor setting.

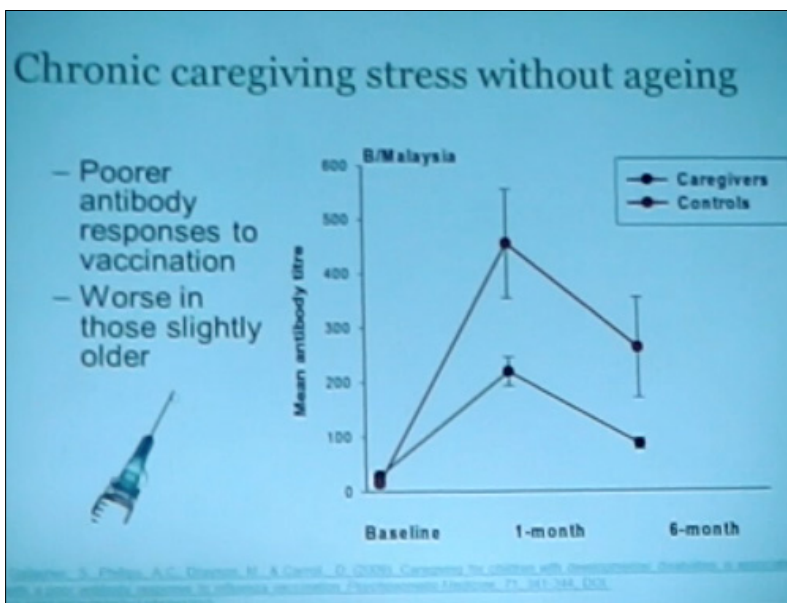
May depend on the nature of the stress, e.g. the characteristics of the care recipient.

Parents of intellectually disabled children report high psychological distress

This distress is largely driven by the child's challenging behaviours

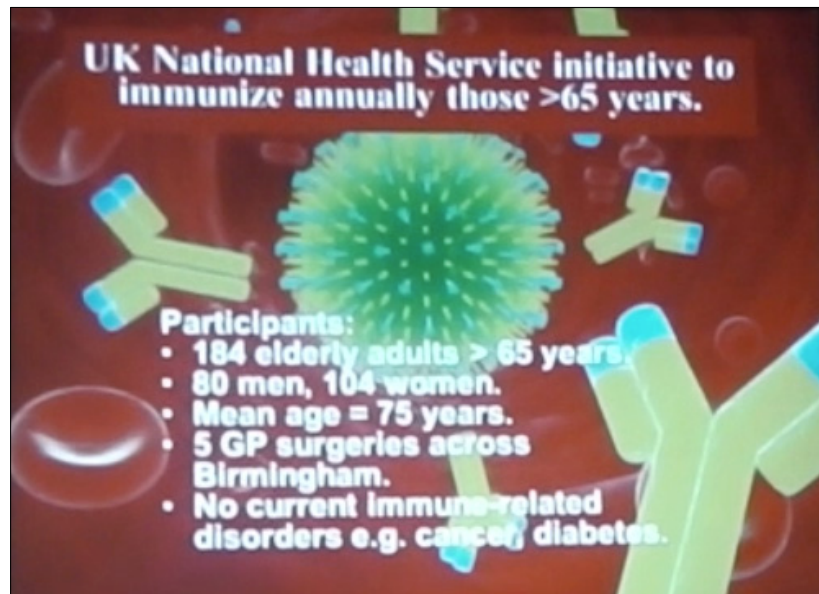


- Did another vaccination study between caregivers and non-caregivers. Result was that younger caregivers had poorer response to antibodies than the control group.

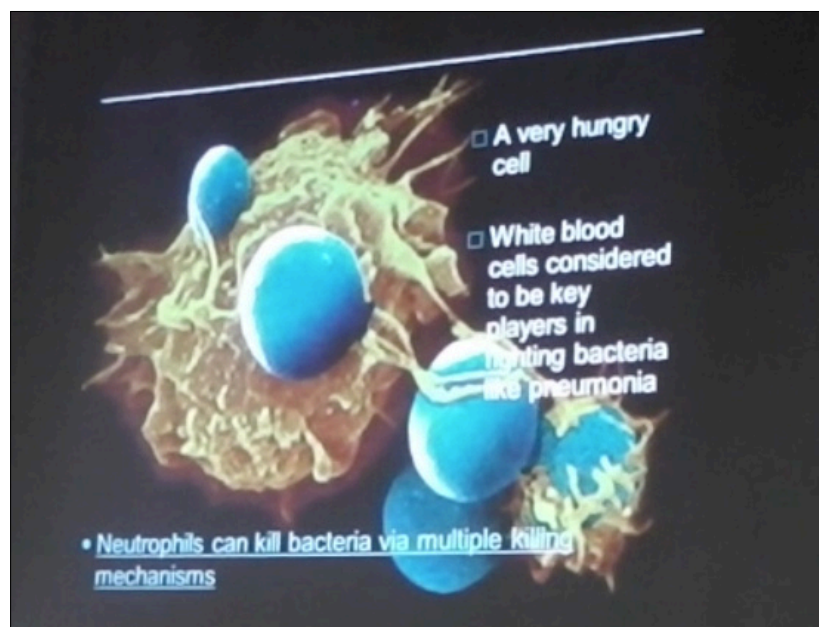


- In study vaccinated with flu in one arm and pneumonia in the other – caregiver's response was not as big as the control group. After 6 months, caregiver's antibodies levels were almost back to what they started with.
- Similar response for caregivers following the Pneumonia vaccine.
- What about 'every-day' stress? How can that affect the immunity and does that get worse as people age? Convinced 180 people to participate across 5 different surgeries in Birmingham to gain a mixture of data – education, profession, finance, etc. By 65 plus many people taking a variety of medication. Adjust from list of medication people are taking and also their

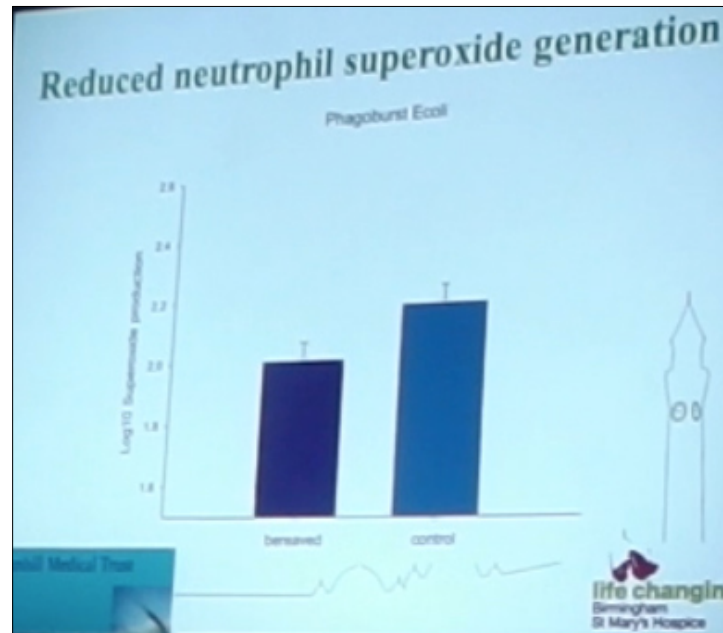
diseases such as High Blood Pressure, arthritis, etc and take into account. Excluded people with active cancer and HIV.



- Questionnaire of life events over the previous year and some more personal questions too. Asked about marital status and how good the marriage is. If you had your time again, would you marry this person? Looked at vaccination history. Ageing also has a reaction in stress.
- What goes into the flu jab depends on which strains of flu are the most virulent. Take tests before the vaccine is given and then again after the 4 – 5 week period. Some baseline tests in older people quite high but at the 4 – 5 week response the levels are lower. How can older people have more stressful situations than younger people facing exams, etc? Bereavement is one of the things that take place in people lives more frequently as people get older.
- Fighter cells Neutrophils fight cells like Pneumonia – Pneumonia cells replicate rapidly.



- An older person often contracts Pneumonia in hospital and quite often results in death because their Neutrophils are not functioning properly.
- Often find that one partner dies, the other often dies shortly afterwards – did a study to find out whether lack of Neutrophils was the reason. Research showed that bereaved group were affected.



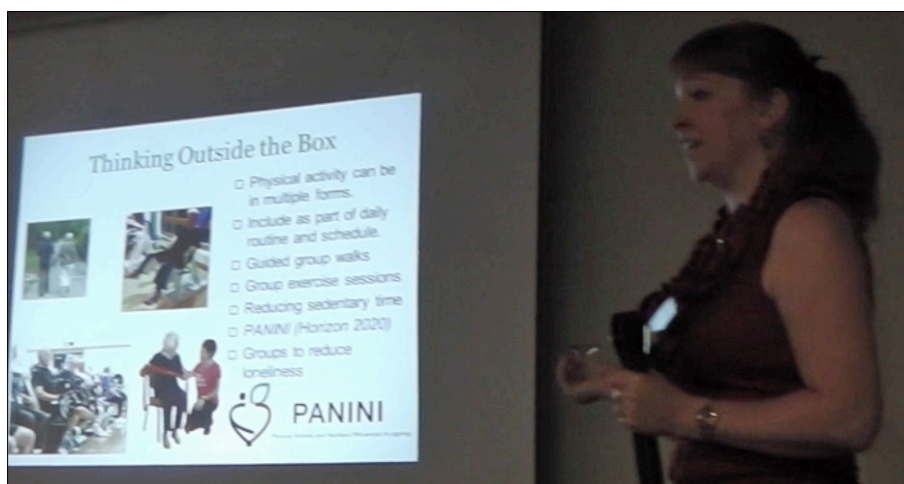
- Neutrophils engulf (eat) the bacteria and produce lots of chemicals. Could they include some superoxides - killing chemicals (like putting bleach down our toilets)? Found in both the bereavement and control groups the Neutrophils were there but in the bereavement group the Neutrophils were capturing the disease cells but not killing them. Because of this, the research looked at the ratios between cortisol and DHEA levels. Higher cortisol level in older people and particularly in bereaved older people.
- Interim conclusion that some of the stresses affect the immune system and therefore affect health and evidence that this is worse in older people.



- What can we do about it? (This is where interventions come in such as Laughter Yoga). Anna's university department covers sport, exercise and rehabilitation exercises – encourage people to be more active as exercise can have positive effects on immunity and also on psychological factors. Various studies covering these aspects.
- Don't necessarily solve these areas by going to the gym and one of challenges is persuading people to do this in a way that fits into their lives and isn't forcing everyone to go into a gym where they might feel uncomfortable.



- As well as doing exercise, try to reduce stress – challenging. Look at other factors like social support – what if try to reduce loneliness instead? Why not do that and link to activity?
- There is a big European study taking place at the moment called Panini. See: <https://www.birmingham.ac.uk/generic/panini/index.aspx>. This is about physical activity and nutrition influences in ageing. Lots of solutions.



End of presentation

Video Link: <https://www.youtube.com/watch?v=lqyB1B96Ajl&feature=youtu.be>

Questions:

1. DHEA influences cortisol – has anyone managed to increase the DHEA levels?

Answer – Looking at giving people DHEA. It is a hormone – rather like giving people Vitamin D. Would be particularly important to give to people where their immune system is not working well and have depression. Found people suffering after a hip fracture – could they be given DHEA. Very difficult in the UK. Still trying to get funding to do this research because in the UK although it is a nutritional supplement, it is seen as a drug. Before can start to give this, which would be a very cheap intervention, with minimal side effects (greasy skin) have to show can get the right dosages, no ill effects, etc. Been done massively in USA but have to convince people it would be worth doing. DHEA could be taken as a tablet and could be really effective but they have yet to prove this within particularly vulnerable populations. No noticeable benefits from everyone taking it but for people with low immunity or high stress. Can obtain these online but her colleague, Professor Janet Lord, has tested the tablets, which have no DHEA in them so don't waste money. We need to have it made so it is a way forward.

2. Can you get the DHEA from something you eat?

Answer – No. People produce it naturally so they've been able to synthesise it.

3. Is there anything we can do to naturally make it happen?

Answer – Other than reverse the ageing process!! Physical activity does increase the DHEA levels. Also sunshine for vitamin D. All the healthy things we all know – healthy diet, being active, laughing etc. Have to do tests in the long term. Have seen results in the short term and then levels return to where it was. When tests are doing with people who have been doing interventions for some time, then chronic changes are seen.

4. Chronic illness is also seen in the older population so their cortisol is higher anyway (and DHEA potentially lower), so isn't that a natural process?

Answer – It is a natural process but gets worse if person has a hip fracture or bereavement. We still have scope to improve quality of life in people for whom it's worse. Ageing is not necessarily related to disease, people can age healthily, so we'd like to target people who are particularly at risk.

5. Giving people vaccinations each year, isn't that just bombarding the immune system to produce even more immunity, which is causing other side effects in the body?

Answer – Anna doesn't do much work on vaccines and auto-immunity so doesn't want to step beyond what she knows. Even when people are older their bodies can respond to new pathogens and produce antibodies against

them. People can still produce good antibodies even with the annual vaccines. You don't run out of capacity to create antibodies

6. Experience of a loved one who was bereaved within weeks was diagnosed with a rare immunity deficiency and was diagnosed with Pneumonia

Answer – People often say someone dies of a broken heart but people can also die from a broken immune system. It manifests in different ways for different people.

Maggie Thompson
November 2017