# Health and Social Care – Year 13 Summer Work

## Unit 4 – Enquiries into Current Research in Health and Social Care

Read and annotate the article (on pages below) you have been given. Complete research into this topic. You should have at least 6 additional sources of information. Make notes pages using these sources (maximum of four A4 sides).

Plan and answer the exam questions, use your notes/sources to support your answers.

## Unit 19 – Nutritional Health

Unit 19 is another coursework unit that you will complete at the start of next year. In preparation for this…

- Find an 'Eatwell plate' diagram (print off for your notes)
- How does an 'Eatwell plate' help people to improve their diet? Who in particular would this help?

- Research: protein, fat, carbohydrate, vitamins, minerals, fibre
- For each of the above you need to: give examples of foods that contain them, explain why they are important in the diet, explain what would happen if you did not include enough in your diet.

Article 1: Health Research
Blood test could provide an early arthritis warning
Monday March 23 2015

Arthritis causes pain and stiffness of the joints.
"Arthritis breakthrough as new test diagnoses condition up to a decade earlier," the Mail Online reports. The test measures proteins linked with arthritis.

The study aimed to see whether a blood test could be developed that could distinguish between different types of early stage arthritis.
The study included groups of people with established diagnoses, including those diagnosed with early-stage osteoarthritis (so-called "wear and tear arthritis") and rheumatoid arthritis (caused by the immune system).

It then measured and compared levels of different proteins in their blood. Overall, it found that looking at a combination of the levels of three proteins in the blood could distinguish between the different types of early-stage arthritis. This suggested such a test could have promise.
This is still early-stage research. Further study needs to look at whether this test is reliable for identifying and distinguishing between the different forms of early-stage arthritis in practice.

Most importantly, it needs to be seen whether use of the test leads to earlier treatment, and whether this leads to an improvement in patient outcomes.

Can arthritis be prevented?
The cause of rheumatoid arthritis, where the immune system starts attacking the tissue surrounding the joints is unknown. Therefore, it is unclear how the condition could be prevented. However, there is some evidence that people **who don't smoke have a lower risk of getting the condition.**

There is no guaranteed way of preventing osteoarthritis. However, taking regular exercise, keeping your muscles strong, and achieving or maintaining a healthy weight will help to reduce the risk.

Where did the story come from?
The study was carried out by researchers from the University of Warwick and other institutions in the UK. No sources of funding were reported. Some of the authors have a patent based on this work.

The study was published in the peer-reviewed scientific journal Scientific Reports.

**The Mail's headline is premature, as we do** not know how accurate this test will prove to be on further study or whether it would be introduced. The subheadings saying "There is currently no test, meaning some patients are only diagnosed when disease is so progressed that surgery is the only option" is also a little overdramatic and inaccurate. This reporting makes it sound like osteoarthritis currently has no diagnosis and management pathways in place, which is not the case.

Osteoarthritis is usually diagnosed **based on a person's symptoms,** examination findings and X-ray findings.

What kind of research was this?
This was laboratory research, which aimed to develop a blood test to allow the detection and differentiation between different types of early-stage arthritis.

Blood tests are already used to help diagnose or exclude certain types of arthritis, such as rheumatoid arthritis, which is linked to having particular proteins and inflammatory markers in the blood. However, osteoarthritis (OA) has no diagnostic blood test. OA is a degenerative joint condition, where the cartilage covering the ends of the bones becomes worn and thin, causing symptoms including pain, stiffness, swelling and crunching feelings in the joints.

**It is currently diagnosed based on a combination of a person'**s symptoms and findings from a clinical examination. X-rays can also detect characteristic changes to the joints, though these are often not present in early stages of the disease.

This study aimed to look at if there were any biochemical markers that could be detected in the blood that would help diagnose early-stage OA and distinguish it from other types of arthritis. Ideally, a diagnosis could be made before any of the more advanced joint changes set in, which could be detected by X-ray.

What did the research involve?
This study included groups of people (181 people in all) with different established diagnoses:

- advanced OA
- early OA
- advanced rheumatoid arthritis (RA)
- early RA
- early non-RA inflammatory arthritis -- people with early symptoms of an inflammatory arthritis, but not having the diagnostic features of RA
- a healthy control group with no joint problems.

The researchers took blood samples from these people and samples of the fluid in the joints (synovial fluid) from those with early-stage arthritis. They used advanced laboratory techniques to measure the amount of different proteins in these fluids. They particularly looked at the amount of:
- anti--cyclic citrullinated peptide (CCP) antibodies -- a marker for RA
- citrullinated protein -- a marker for inflammation
- hydroxyproline -- a building block that is part of the protein collagen -- a structural protein found in cartilage and bone.

They compared the levels of these markers in people from the different groups. They also assessed whether looking for a particular combination of levels of these markers would allow them to tell the different groups apart.

What were the basic results?
The researchers found that compared to healthy controls, blood levels of citrullinated proteins were increased in people with early OA and early RA.

Generally, people with early arthritis tended to have higher levels of these proteins in the blood, while in advanced disease, levels were lower in the blood and higher in the joint fluid.

Levels of citrullinated proteins were not increased in people with other non-RA early-stage inflammatory arthritis.

Anti--CCP antibodies were found mainly in the blood of people with early RA.

Compared to health controls, increased levels of hydroxyproline were found in people with early OA and early non-RA, but not in people with early RA. The researchers found that looking at the levels of all three proteins enabled them to discriminate between people with early OA, early RA, other non- RA early inflammatory arthritis, and healthy joints. This combination test correctly identified:

- 73% of people with early OA
- 57% of people with early RA
- 25% of people with non-RA early inflammatory arthritis
- 41% of people with healthy joints.

The test also correctly identified:
- 87% of people who did not have early OA
- 91% of people who did not have early RA
- 76% of people who did not have non-RA early inflammatory arthritis
- 75% of people who did not have healthy joints.

How did the researchers interpret the results?
The researchers say their study provides a novel biochemical blood test that could be used for the diagnosis and discrimination of early-stage arthritis.

They say that this could help to support improved treatment and patient outcomes.

Conclusion
This laboratory study suggests that for people presenting with early joint symptoms, examining blood levels of a combination of proteins could help to distinguish people who have early-stage OA from those who have early stage RA or other inflammatory arthritis.

However, this study is in the early stages and so far has only looked at relatively small samples of people with confirmed diagnoses of these different conditions. A lot of further work needs to be done to examine the accuracy of such a blood test, and to see whether it could reliably identify and distinguish between people with these conditions presenting to doctors in real world practice. These studies should assess whether it offers an improvement on the current approach to diagnosis based on symptoms, clinical examination, imaging findings and other blood tests currently used -- such as measurement of inflammatory markers, rheumatoid factor, or anti-CCP antibodies.

Even if such studies find that the test performs well, it is likely that it would not replace all other diagnostic tests, instead being used in combination with other methods, especially as it performed better at detecting some forms of arthritis than others.

Most importantly, it also needs to be seen whether using this blood test as a diagnostic method would actually lead to improved disease outcomes for people with arthritis, as suggested in the news reports.

While several of the risk factors associated with OA are unavoidable (e.g. increasing age, female gender, previous joint damage or abnormalities), maintaining a healthy weight and staying active could help prevent onset of the disease. RA is an autoimmune disease (where the body's own immune cells attack the joints) with no established cause. However, smoking is associated with the development of the condition.