

Mapping carbon emissions at a granular level in an Ophthalmology AMD pathway

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Background

The NHS contributes to around 4% of the country’s carbon emissions (Watts et al, 2019) and so it has an essential role in helping to meet the net zero targets set out under the Climate Change Act.

Ophthalmology is one of the largest outpatient-based specialities with 7.9 million attendances per year and 800,000 inpatient procedures. Age-related macular degeneration (AMD) is a one of the diseases which affects those aged over 50 years. With our aging population, numbers are expected to increase with time. Wet AMD is treated with a course of injections, which can last several years. Carbon emissions associated with a single intravitreal injection, is estimated at 13.68 kg CO₂e with patient travel accounting for 77% of emissions (Power et al, 2021).

Therefore with the huge throughput of patients, comes a sizeable carbon footprint. However, the size of this footprint has yet to be calculated. In order to reduce the carbon footprint to meet the net zero targets, we must first understand where the emissions are generated.

Aim

The aim of this project is to perform a granular analysis of the carbon footprint for a wet ‘age related macular degeneration’ (AMD) pathway by capturing patient’s travel preferences to an AMD clinic in Amersham, Buckinghamshire, United Kingdom.

This will help answer the following research questions:

- 1) What are the carbon emissions from travel for a patient receiving treatment for wet AMD?
- 2) What are the patient preferences?
- 3) How could we optimise the pathway to reduce the carbon?

Methodology

1. Conduct a materiality assessment- of all consumables, medicines, estates, energy consumption and travel using the Sustainable Healthcare Coalition’s/ Sustainable Development Unit methodology.
2. Apply a carbon factor applied to them from pre-determined databases (Ecoinvent, Inventory of Carbon and Energy Database and DEFRA) to come up with accurate carbon emissions data for the AMD pathway.
3. Staff travel data will be obtained through the National dataset or via the Trust staff survey (if available)
4. Patient travel data will be collected prospectively at the time of their appointments. This data will be extrapolated to compare against the National NHS dataset (SUS).
5. Retrospective Trust data on patient attendances throughout a 3 year period will be categorised to give an overall carbon factor for each patient on the wet AMD treatment pathway.

Results



Mean age: 86.3 years
Men: 33.3%
White British: 100%



Mean distance to clinic = 13.52 miles
(2.20-32.14)

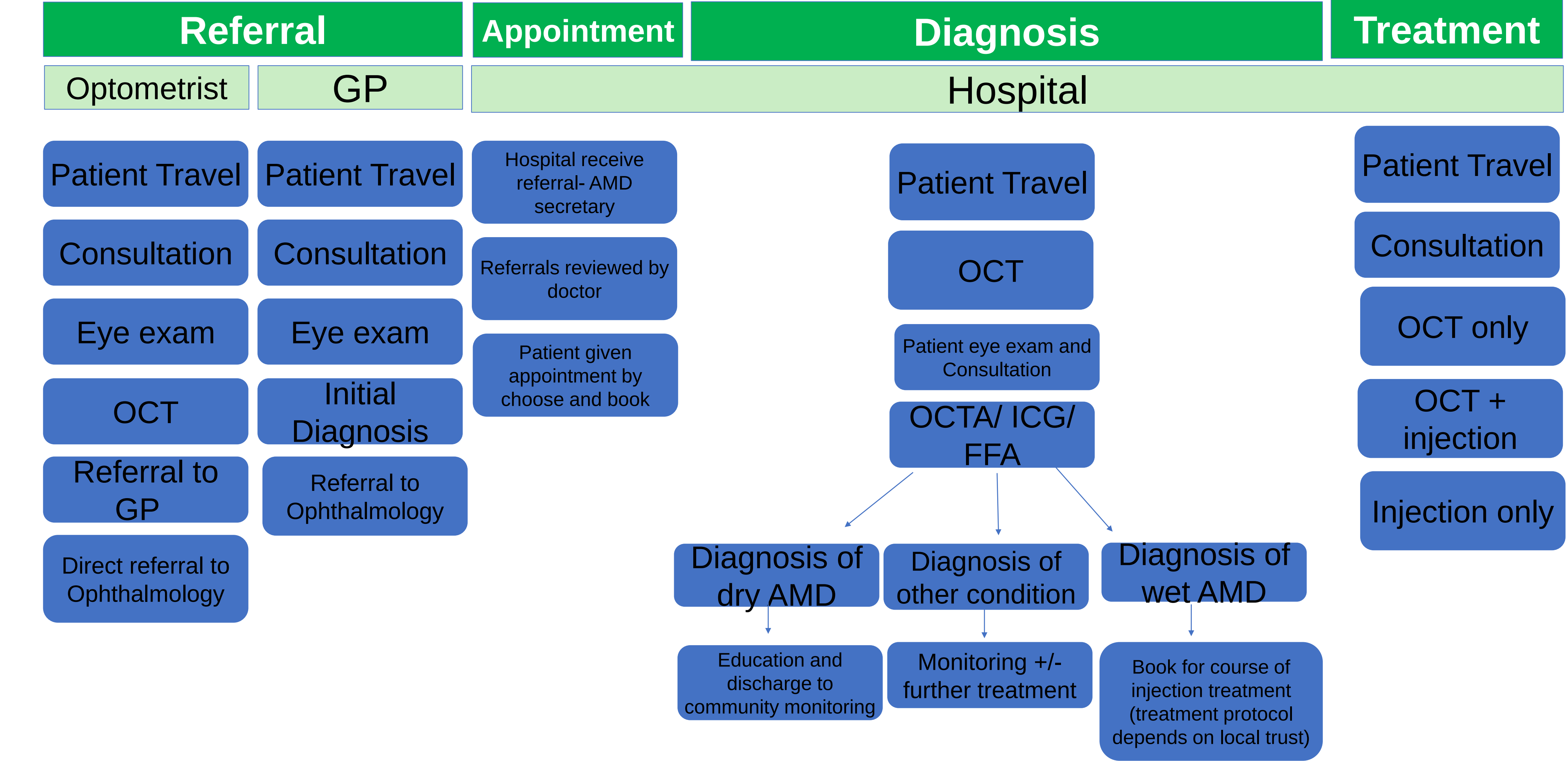


89.4% travelled by car of which
4- hybrid, 1 electric, 30 petrol/diesel.



Only 8.6% self drove
Additional 58.55 miles driven by carers.

Current AMD referral pathway



*AMD= age related macular degeneration; OCT= Optical coherence tomography; FFA- Fluorescein angiography, ICG- Indocyanine Green angiography, OCTA- OCT angiography

Discussion

1. Most ophthalmology units dilate a patient during clinic so they cannot drive immediately after to get home.
2. The average patient is older with 44% of patients having a disability that affects their mobility. Patients who are older are less likely/ confident to drive independently.
3. Most clinics are set in more rural locations where public transport is less accessible and there is a lack of alternative transport.
4. Patients with AMD have poor central vision and they often do not meet the DVLA driving criteria.
5. Carer travel to the patient needs to be included in the overall carbon emissions for patient travel. - - Appointment times and delays mean that public transport is often not reliable or is more inconvenient than travelling by car.
6. 54% of patients said ‘Nothing would persuade me to use public transport’ suggesting a possible socio-cultural role to attitudes to public transport.

Challenges and opportunities

- 1 **Variations in practise** – Different hospital trusts have different injection treatment protocols. With newer biosimilar agents, treat and extend is becoming popular.
- 2 **Ophthalmology patients travel data is different** – Patients cannot drive after eye dilation and this may affect choice of travel modes compared to national data.
- 3 **Single use consumables** – Trusts may choose to use different consumables/ reusables e.g. Invitria™ . In order to extrapolate to national data, this variation needs to be accounted for.
- 4 **Duplication of work** – Some referral systems have reduced duplication of imaging through transfer of OCT images
- 5 **Virtual hubs/ diagnostic centres**- This could reduce carbon emissions but require comprehensive referrals, OCT imaging services and a robust digital infrastructure.
- 6 **Different Eyecare Pathway**- This model could be used to identify different eyecare pathways to carbon footprint and support pathway redesign work
- 7 **Non modifiable hotspots** – Some hotspots may not be modifiable at a national or system level e.g. medicines/ drug procurement which play a large part in treatment.
- 8 **Implementation Support**- If carbon hotspots are identified, national support will be needed to ensure implementation of changes across different regions to capture carbon benefits