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ARC West Midlands News Blog





Health Disparities – Utility vs Justice?

Richard Lilford, ARC WM Director

It is clearly a good aim and moral principle to try to reduce disparities in society. Likewise, public services should aim to reduce disparities both in access and, where possible, in outcomes. However, from the way people sometimes speak, write and comment on grant applications, I get the impression that no intervention should go ahead unless it is likely to reduce disparities in outcome. I can quote examples of the above, but elect not to do so since I wish to approach this issue philosophically. So, I am going to start from the premise that there exists a sizeable proportion of influential people who really think that it would be wrong to embark on an intervention whose immediate effects are to widen rather than narrow disparities (the importance of ‘immediate effects’ will become apparent in due course).

Before tackling this issue head on, let us first describe different types of potential outcome (say, on a balance of probabilities):

- 1 All benefit, but the ‘disadvantaged’ benefit most – existing disparities are reduced. 😊
- 2 Every group benefits equally – disparities unaffected. 😊
- 3 Everyone benefits but the less vulnerable benefit more than the vulnerable. 😐
- 4 The less vulnerable benefit but the vulnerable receive no benefit. 😞
- 5 The less vulnerable benefit at the expense of the vulnerable. 😞

Clearly, there is an order of preference here. I do not think there are principled objections to Scenarios (1) and (2). What is not to like?

When we come to Scenario number (3), however, the situation becomes more problematic. The vulnerable benefit, but disparities are widened.

I am going to argue that such a scenario does not, other things being equal of course, always preclude the intervention. Philosophically, I would argue this on utilitarian grounds – we maximise expected utility within the paradigm intervene vs no intervention. I thank Peter Craig of Glasgow for the following example from his files. At a certain point in time, an intervention was proposed to reduce sudden infant death syndrome – more colloquially ‘cot death’. The intervention was a public education campaign. The previous evidence showed that this was a type (3) scenario. Would anyone really not want to save parents – even if disparities widen – when both groups are protected from the unconscionable loss of their baby? The size of the discrepancy is relevant. Say, the mortality in rich people would reduce by 10% (relative risk reduction) vs 2.5% in poor people. All gain utility. But as the difference widens, so to the gap widens and a point may be reached where the disparity itself may occasion greater loss than the gain among the poor. The moral obligation to produce maximum welfare collides with the moral obligation to reduce painful and

debilitating disparities. There is a technical answer to this question, which is to specify how much overall QALY gain we should give up for a unit reduction in the QALY gain difference across advantaged vs disadvantaged groups – a branch of ‘welfare economics’. Scenario (4) is then an extreme case of Scenario (3). Again, there is a trade-off, but the more vulnerable gain nothing. They lose nothing directly, but they may suffer from the fact that others are benefiting. Let’s look at Scenario (5), in search of a solution to this uncomfortable Scenario (4).

In Scenario (5) overall utility increases but poor people actually lose out. Such is not an ideal situation, but it is very real – think of expropriating households to build a new railway, for example. There is a way out of such a conundrum, and that is to compensate the vulnerable group to the extent that they would trade the compensation for the loss they suffer and thus actually gain utility – a so-called [Pareto-optimal solution](#). How well this works in practice is another matter – I guess it depends on the generosity of the compensation payment. In-so-far as it is applicable, it pertains to Scenarios (4) and (5).

Maybe these are the sorts of arguments you would expect a (self-appointed) economist to make. Still, I thought that they were worth making; even if not original (they are not), they are topical.

Generative, Artificial Intelligence and Diagnostic Accuracy: Expect More of These

Richard Lilford, ARC WM Director

Many newspapers and journals have carried articles on artificial intelligence (AI) over the last few months. *The Economist*, for example, has featured some very interesting analyses on how machine learning works and what potential uses it has [1]; while an opinion piece in the *Financial Times* looks at how AI has the potential to transform productivity in healthcare.[2] Indeed, we have discussed AI in previous editions of your ARC WM News Blog.[2-5]

Now a very interesting and provocative article has been published in JAMA where a Generative Pre-trained Transformer 4 (GPT-4) AI was set to work on 70 consecutive cases from the New England Journal of Medicine clinical pathological conference series.[6] These are fiendishly difficult diagnostic conundrums that the ARC WM Director enjoys. A patient experiences recurrent fainting due to a drop in blood pressure. You should examine the patient's gums. "The gums?" do I hear you say? Yes, they may contain the tell-tale signs of pigmentation

typical of Addison's disease – adrenal gland failure. There is no pigmentation and tests for adrenal function come back normal. In that case, think mastocytosis. Very rare, but good to recognise it when it exists.

The authors developed a standard chat prompt that explained the general conference structure and instructed the model to provide a list of possible diagnoses in order of probability.

The AI system correctly identified the correct diagnosis in 39% of cases, while in 64%, the correct diagnosis was included in the differential list.

The ARC WM Director is underwhelmed by these results. The reason for this, is that the information going into the AI model is organised through a medical reasoning process. Therefore, the information is given in a certain order, and is arranged according to medical logic. This is a far cry from the original medical notes, where large amounts of data wrangling are required to extract meaning.

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The Rapid Rise in Cancer in Young Adults

– Reverse Engineering the Cause

Richard Lilford, ARC WM Director

The rise in cancer incidence in young adults (aged 25-40 years) is now widely accepted as genuine.[1, 2] It has the following features:

1. It is not accompanied by a rise in older people – if anything the reverse is true.[1]
2. It affects both sexes.
3. It applies to multiple cancers.
4. It does not apply equally across cancer types – the rise is greatest for nasopharynx, prostate and kidney, with a study showing that 12 of 14 cancer studies were becoming more common in young adults.[2]

It is unlikely that the observation is an artefact of higher detection rates, since it is specific to younger people. Cancer incidence is rising among domestic animals, but this almost certainly is, at least partly, the result of increasing awareness and detection. Behaviour, such as delaying pregnancy, could not explain the ubiquitous nature of the increase. There are, however, some ubiquitous environmental factors, such as oestrogen and micro-plastics, that could be responsible, but, again, why only the young? Diet cola is carcinogenic [I hear](#) – is that consumed mostly by the young?

So, the ARC WM Director's candidate is a (viral) infection. That could certainly have a predilection for a particular age group, would affect males and females equally, and could cause a range of cancer types. I guess people have thought of this and are archiving cancer tissue from people young and old, and in the current and previous epochs to test such a hypothesis. Alternatively, or in addition, a virus, rather than cause cancer directly by inserting itself into the host genome, could reduce the body's immune response to cancer. Certain individuals may be more susceptible than others. Could they show up in gene-wide association studies, comparing cancer and non-cancer cases across age groups and epochs? Just a thought. In the meantime, the tragic increase in cancer at the prime of life remains an enigma.

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Increasing Health and Well-Being Through City of Culture

Dr Andrew Anzel, Research Fellow

Coventry was awarded the opportunity to host the UK City of Culture festival in 2021. *The City of Culture Programme (COC2021)* involved a multi-year build-up of activity that culminated in a yearlong major cultural festival. The primary aim of **COC2021** was to design and implement a programme of cultural activities that focused on the diversity and the youthfulness of Coventry that was co-created with local communities. As part of the measurement and evaluation of **COC2021**, ARC WM researchers examined how the design and delivery of **COC2021** created health and well-being impacts on the local population.

Our work is grounded in other studies that have identified positive links between health and well-being and cultural participation.[1, 2] For example, we know that cultural participation can increase health literacy, reduce isolation, create a sense of community and identity, and positively shape child development.[3] **COC2021** developed their programme of activity to be specifically aligned with this current trend to use cultural activity to increase health.[4] To do this, **COC2021** had a 'Caring City' team that oversaw the creation of new cultural experiences that addressed mental health problems, improved well-being, and tackled loneliness/isolation. Additionally, **COC2021** partnered with health-based organizations within Coventry to support their work. For example, **COC2021** worked with *Grapevine*, an organisation working with individuals experiencing isolation or loneliness and those with lived experience of mental health issues.

Examples of combined arts and health initiatives developed for the **COC2021** Festival include:

- 'Theatre of Wandering', focussed on working with participants with dementia and their carers
- 'Reform the Norm' was a series of projects that amplified the voices of those with neurodiversity and worked to improve participant's overall well-being
- A 'Nudgeathon' that explored social prescribing
- Online dance classes and physical and mental wellbeing activities
- A 'Try It' programme, which encouraged participants to try new activities to generate expected well-being outcomes such as improved social cohesion, increase in confidence, and reduced anxiety.
- Various other projects, such as: *We Come Far*, *CVX Young Producers*, *Haus of Kraft*, and *GENERATE Festival*.

We used a series of qualitative and quantitative measures to evaluate whether **COC2021** activity improved health and well-being. A full breakdown of our methodology and findings will be published in September 2023 at: <https://coventry21evaluation.info/>. Two key findings from our study warrant a summary here.

First, we were interested to see whether having a major cultural festival with a health focus would improve the well-being at the population level. Indeed, previous research has cited how City of Culture festivals have led to similar

population-level impacts such as community rejuvenation, pride of place, and increased life chances.[5] To do this, we partnered with the Coventry City Council to include culture and well-being related questions in their Household Survey – a survey that goes out to a representative sample of the local population every few years. To be specific, we included the Short Warwick-Edinburgh Mental Well-Being Scale (SWEMWBS) into the survey. In 2018, we found that the that the average SWEMWBS score for a resident in the city was 26.41. In 2022 (after **COC2021**), we found that the average SWEMWBS score for a resident in the city had declined to 21.99 (which we largely attribute to COVID-19 and the cost of living crisis). However, for those who self-reported engagement with **COC2021** activity, the wellbeing scores were slightly higher than the general population - 22.54. It should be noted that we do not have enough data to determine whether higher well-being scores and **COC2021** engagement had a causal or correlated relationship at a population level; however, we do have evidence that this occurred at the personal level, which we will now discuss.

Second, we were interested to know whether **COC2021** activity that used participants to help create certain shows were having their health and well-being improved. To do this, we surveyed 132 participants of the Caring City Team programme using the ONS Subjective Wellbeing scale (as required by a **COC2021** funder). At the beginning of the programme in 2020, the baseline averages for all participants were:

- Life Satisfaction – 6.7
- Worthwhile – 7.0
- Happiness – 7.0
- Anxiety – 4.4

After the programme ended in 2021, participants reported higher levels of life satisfaction, feelings that their life is worthwhile, happiness and lower levels of anxiety. The endpoint averages for all

participants were:

- Life Satisfaction – 7.6
- Worthwhile – 7.8
- Happiness – 7.5
- Anxiety – 4.11

These are just a few indicative examples of how we measured the impact of the City of Culture on health and well-being. For more information, please check out other published evaluations, including:

- City of Culture: [Final Evaluation \(upcoming\)](#)
- City of Culture: [Social Value Assessment](#)
- City of Culture: [Volunteering Wellbeing and Civic Pride Focus Study](#)
- City of Culture: [Measuring the Impact of Arts and Culture on Wellbeing](#)
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Increasing COVID Booster Uptake Through Reminders or Money

Peter Chilton, Research Fellow

At ARC WM we have previously published on the use of reminder letters for increasing uptake of flu vaccine among healthcare workers, which found the letters had no significant effect.[1] In a similar vein, a recent RCT by Chang, et al.[2] assigned nearly 58,000 patients in California who had already received the first two COVID-19 vaccines to one of three arms – to receive a message reminding them they were due a booster; to receive a message plus incentive of a payment of \$25 if booked within two weeks; and to receive no reminder.

Analyses showed that personal reminders increased vaccination rates within two weeks in both arms (3.51%) compared to the control arm (2.65%), a difference of 0.86 percentage points, corresponding to a 32.5% difference ($p=0.000$). However, there was no significant difference in uptake between those who were sent only the reminder and those who were also offered the financial incentive (3.51% without, 3.48% with [$p=0.845$]).

Sub-group analyses showed that reminders produced a greater increase in booster vaccination for patients over 65 years old, for those whose first language was Spanish (compared to English or other), and for those who received the message via SMS (compared to via email).

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ARC WM Quiz

How might cats cause schizophrenia in humans?
(with thanks to Prof Peter Jones for the question.)

email your answer to: ARCWM@warwick.ac.uk



Answer to previous quiz: It was long thought that the only animal, apart from humans, that can get leprosy is armadillos, due to their low body temperature compared to other mammals, allowing the *M. leprae* bacterium to survive.

However, leprosy has also recently been identified in chimpanzees in Guinea-Bissau and the Ivory Coast, while British Red Squirrels have also been shown to be infected.

Congratulations to Alan B Cohen who was first to answer correctly.



Identifying Dementia Risk Through Protein Markers

Peter Chilton, Research Fellow

Current treatment for dementia disorders, such as Alzheimer's disease, work by temporarily reducing symptoms, and are more effective when administered early on. However, diagnosis relies on symptoms already being present. A recent study in *Science Translational Medicine* aimed to identify whether it was possible to identify biological changes before the onset of symptoms.[1]

The authors conducted proteomic analyses of almost 5,000 plasma proteins in a population of ~11,000 middle-aged adults (45-60 years old) and found that, after adjustments, 32 were associated with developing dementia within 25 years. These proteins were involved in various pathways, including the regulation of proteins (proteostasis), the immune response, the function of synapses (where signals are passed between nerve cells), and the organisation of the extracellular matrix (a network that provides structural and biochemical support to cells). Although the majority of these proteins had similar associations with dementia onset in men and women, several showed stronger associations with one sex or the other.

As a follow-up the authors were able to replicate the association with neurocognitive outcomes in 15 of these proteins in one of two sets of external cohorts. Furthermore, studies of post-mortem brain tissue from patients with Alzheimer's disease showed abnormal expression of eight of the identified proteins, though this did not include all of the proteins most strongly associated with dementia risk.

Network analyses of the data revealed a specific protein signature for dementia risk in middle-aged adults ~20 years away from onset of dementia, characterised by impaired immune and proteostasis pathways. Further, abnormal coagulation and complement signalling were characteristic indicators ~10 years before onset of dementia.

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Historical Profiles: Wilfred Bion

Phillip Simmons, ARC WM Project Administrator

This month, I would like to look at the remarkable life of Wilfred Bion, the influential psychoanalyst who is also the father of our esteemed colleague Professor Julian Bion (*University of Birmingham*).

Born in India on the 8th of September 1897, Wilfred was sent to England where he attended Bishop's Stortford College boarding school.

At the age of 19, he entered the battlegrounds of World War I, being deployed in France as a tank commander, before eventually rising to the rank of Captain when he was demobilised in September 1921. During the war, he received a *Croix De Guerre* and was recommended for the *Victoria Cross*, but this was downgraded to a *Distinguished Service Order* (DSO). The citation for the DSO read as follows:

"For conspicuous gallantry and devotion to duty. When in command of his tank in an attack he engaged a large number of enemy machine guns in strong positions, thus assisting the infantry to advance. When his tank was put out of action by a direct hit, he occupied a section of trench with his men and machine guns and opened fire on the enemy. He moved about in the open, giving directions to other tanks when they arrived, and at one period fired a Lewis gun with great effect from the top of his tank. He also got a captured machine gun into action against the enemy, and when reinforcements arrived, he took command of a company of infantry whose commander was killed. He showed magnificent courage and initiative in a most difficult situation."

Wilfred went on to gain a BA in History at Queen's College Oxford, before training in medicine at University College London, graduating with a "*Conjoint Diploma*." He then undertook seven years of training at the Tavistock Clinic in Psychotherapy. In 1938 he started his [training analysis](#) (training to become a psychoanalyst), however, this was interrupted by World War II.

He was recommissioned as a lieutenant in the Royal Army Medical Corps in April 1940 where he treated people for 'shell shock' (post-traumatic stress disorder) at Northfield Hospital in Birmingham. Here, he initiated the first [Northfield Experiment](#), an experiment to utilise "*group dynamics*" for soldiers to self-heal. Whilst this was closed after only six weeks due to not having approval from the army, it did lead to the second successful Northfield Experiment and the evolution of "*therapeutic communities*".

The lessons from his time in the 1940s were compiled into a book released in 1961 entitled: "*Experiences in Groups and other papers*". This book quickly became influential within the Psychoanalytical community, and has subsequently influenced the implementation of group therapy within many different fields of work.

After the war, Wilfred returned to the Tavistock Centre, where he was the chair of the planning committee that reorganised the Tavistock Centre into two centres: the Tavistock Clinic, part of the NHS, and the Tavistock Institute of Human Relations. In 1948 he resigned from the Tavistock Centre, no longer wanting to work for the state.

Over the course of six years (1946 - 1952) he continued his training analysis, completing his training in 1952. It was also during this time (continuing into the late 1960s) that he stopped working with groups and refocussed on patients with psychosis, utilising and adding to Melanie Klein's body of work on "[infantile phantasy](#)" with ideas such as "[Container-Contained](#)."

Some of the important works that he created during this period were:

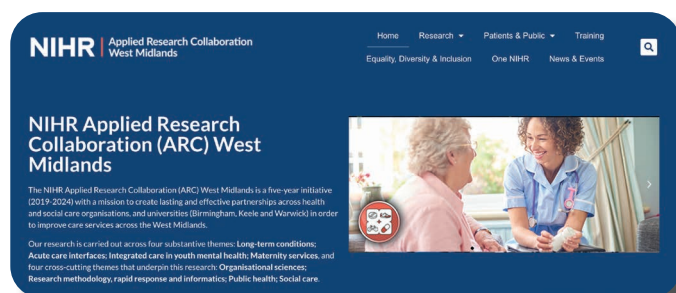
- Learning from Experience (1962).
- Elements of Psychoanalysis (1963).
- Transformations (1965).

In his twilight years, Wilfred had another fruitful creative period, developing a theory that people must have a capacity for engagement with self and the world, be able to self-reflect and they should be able to withstand frustration to be able to think.

Towards the very end of his life, Wilfred revisited his work on "therapeutic communities", producing several works based on his experiences during World War II.

Wilfred passed away peacefully in Oxford in 1977.

Latest News and Events



ARC WM Website Re-design

We have recently carried out a re-design of our ARC West Midlands website at <https://www.arc-wm.nihr.ac.uk/>.

We invite you to take a look and welcome any feedback at: ARCWM@warwick.ac.uk.

Latest National NIHR ARC Newsletter

The latest July issue of the national NIHR ARC newsletter is now available online at: <http://eepurl.com/itYOFC>.

This issue includes recent news on NIHR funding for a new '*Race Equity and Diversity in Careers Incubator*', led by Oxford and Birmingham Universities in partnership with ARC Oxford and Thames Valley; research that long COVID fatigue can impact daily life of patients more than some cancers; and co-designing friendly online and physical 'community spaces'.

To subscribe to future issues, please visit: <https://tinyurl.com/ARCnewsletter>.



Congratulations - Collaborative Working Award

Congratulations to Dr Magdalena Skrybant (PPIE Lead at ARC WM) who recently won the Collaborative Working Award at the Birmingham Professional Awards 2023, which recognise colleagues who undertake brilliant work contributing to the success of the University.

<https://www.birmingham.ac.uk/news/2023/workplace-excellence-celebrated-at-the-birmingham-professional-awards-2023>



Congratulations - Innovation in Inclusion Award

At the recent Health Services Research UK annual Conference, the “*Stuck in Hospital*” project was awarded an “*Innovation in Inclusion*” prize for the involvement of people with learning disabilities and autistic people in long-stay hospitals. More information on the project is available at: birmingham.ac.uk/schools/social-policy/departments/social-work-social-care/research/why-are-we-stuck-in-hospital.aspx.

This project was led by Prof Robin Miller (Social Care theme lead) and Prof Jon Glasby, who were delighted that all the work of the research team and the support received was recognised, and that they were able to demonstrate that people within such settings can participate in

research. The HSRUK conference also provided an opportunity to further share the research insights from this project and to allow debate on the opportunities to improve practice and policy.



The 1st round of *NIHR Team Science* has recently launched, aiming to bring together individuals to form teams to address a research challenge from different disciplinary perspectives. The theme for this round is *Multiple Long-Term Conditions*.

The first stage of the programme is the Team Science Camp, running 26-28 September 2023. Here coaching in the principles of Team Science will be provided, with support to develop multi-

NIHR Team Science Launched

disciplinary teams, who will then be eligible to apply for an award to provide funding and support for the team to develop further.

The deadline for expressions of interest is **25 August 2023**. For more information, please visit: nihr.ac.uk/documents/nihr-team-science-camp-expressions-of-interest-guidance-notes-round-1-2023/33816.

If you have any questions, please contact: academy-awards@nihr.ac.uk.

Transforming Lives Through Research Video

The NIHR have produced a short video for people new to the NIHR and/or the kind of research carried out, which aims to bring to life the nature of our research and highlight the continuing

need for research. The contents also touch on each of the NIHR work streams and the areas of strategic focus. You can view it online at: <https://youtu.be/an5LmTgkkUY>.

Implementation Training Resource

The Knowledge Mobilisation Support team at ARC East Midlands have developed a series of four modules to help research teams get their work implementation ready – or to work on a journey towards this.

Evidence-based, they provide guidance and learning, with links to other useful resources.

1. Implementation: Principles and Perspectives.
2. Engagement, Involvement & Co-production.
3. Planning for Impact.
4. Measuring & Evidencing Impact.

They are available to download at: <http://tinyurl.com/ARCimpsci>.

NIHR Academy Members' Conference 2023

Registration is now open for the NIHR Academy Members' Conference 2023 which is taking place in a hybrid format at The Queens Hotel in Leeds and online on **10 - 11 October 2023**.

This year the conference is titled "*Team science: promoting and recognising interdisciplinary collaboration*" and is a fantastic opportunity for early career researchers to hear from inspiring speakers, network with peers and understand

more about the NIHR. There will also be networking sessions and a poster competition.

Further information, the agenda and details of how to register can be found at: <https://web.cvent.com/event/e4df107f-9ed2-4286-ac02-4e50cbd26eb1/summary>.

Please note, registration closes on **7 August 2023**.

Recent Publications

Aiyegbusi OL, McMullan C, Hughes SE, Turner GM, Subramanian A, Hotham R, Davies EH, Frost C, Alder Y, Agyen L, Buckland L, Camaradou J, Chong A, Jeyes F, Kumar S, Matthews KL, Moore P, Ormerod J, Price G, Saint-Cricq M, Stanton D, Walker A, Haroon S, Denniston AK, Calvert MJ; TLC Study Group. [Considerations for patient and public involvement and engagement in health research](#). *Nat Med*. 2023.

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