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NIHR CLAHRC West Midlands News Blog

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Welcome to the latest issue of your NIHR CLAHRC West Midlands News Blog.

Welcome to the latest issue of our News Blog, where we argue for the rehabilitation of Malthus and his argument regarding the natural population limit. We also take a look at recent articles on the nurse-patient ratio; brain injury from American football; how university education should be presented; the savings that could be made from vaccination programmes in LMICs; and a warning to all researchers on the risk of predatory journals.

Further, we bring you the latest news; have our latest quiz question; profile Sarah Lawton; and detail some of our latest publications. We also have some featured replies to recent blogs.

We hope that you find these posts of interest, and we welcome any comments. You can find previous issues of our News Blog here.

Director's Blog

Stop Being Beastly to Malthus!

I never understand why people think that Malthus got it so badly wrong. His argument (the Malthusian trap) was that resources are finite and that, therefore, there must be some limit to the number of people that the world can feed.[1] While it certainly turned out that the world can feed many more people than he thought, this does not disprove the underlying theorem. At some point there must come a threshold, where food supply really fails to meet the demand. If we generalise from food to include water, then that point might not be as far away as complacent people think. Of course, we also have to take into account the environmental damage associated with feeding, transporting, and keeping a large number of people warm.

Malthus has become almost a figure of derision. While he may have been wrong about when, the jury is still out about whether. He was right about the generic point, that there is a limit to the carrying capacity of our planet. Food is central to this, because even if we do not run out of food, much environmental damage is caused in its production.

The world's population will stabilise in about 50 years, although African populations will continue to expand for a while longer.[2] So we should mitigate the environmental effects of food production. I like to eat beef from time to time. However the production of beef is very energy intensive and the methane released by cattle contributes about 20% of the total global warming.[3] So I favour a tax on all beef, similar to that on fuel. Such a tax is more justifiable even, then a tax on sugar and tobacco. This is because consumption of sugar and tobacco does not have the strong externalities associated with fossil fuels and production of beef. There is no proper libertarian argument against taxation in circumstances where strong externalities apply.[4] Pigovian taxes are taxes designed to compensate for externalities and to reduce behaviour that harms others; they would seem entirely justified in this case. I am less of a fan of Pigovian taxes to deal with internalities – that is to stop people from harming themselves. But as it turns out, red meat is bad for our health, as discussed in a recent news blog.[5]

So let us give Malthus his due. He might have got the detail wrong, but his principle still stands. I vote for the rehabilitation of Malthus.

-- Richard Lilford, CLAHRC WM Director

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CLAHRC WM Quiz

Everyone knows that the first virus to be eradicated through vaccination was smallpox, but which was the second?

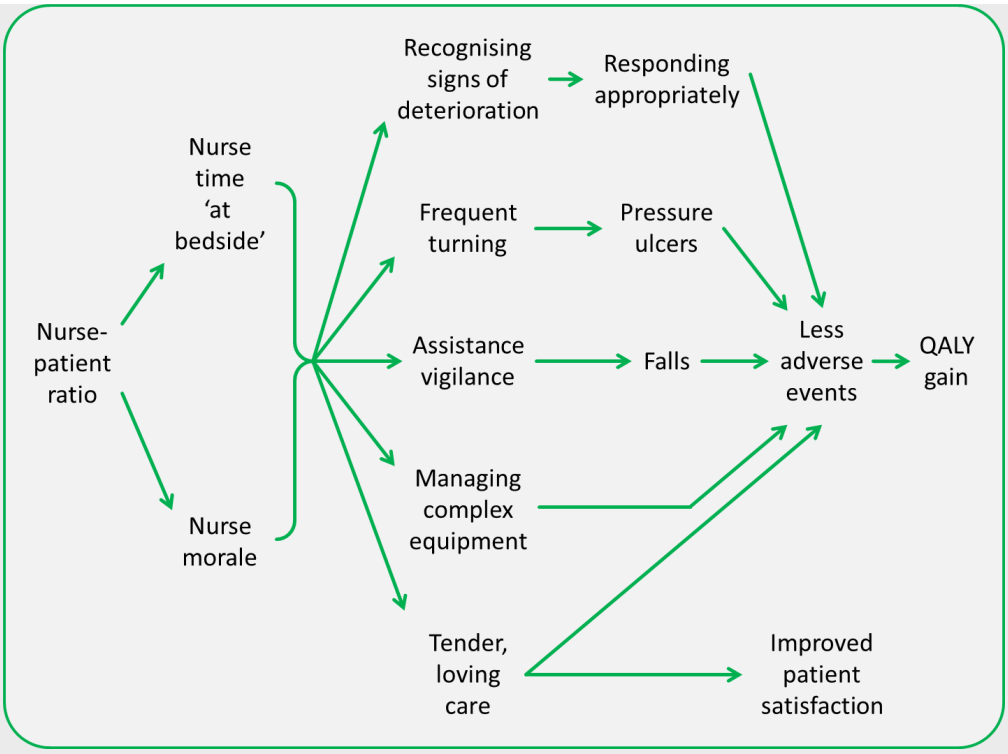
Email CLAHRC WM your answer.

Answer to our previous quiz: The old infections are those that were able to regulate our immune system and establish long-term infections, and thus were able to survive within small hunter-gatherer groups. These included ancestral forms of ***Mycobacterium tuberculosis*, *Helicobacter pylori*, gut helminths, and blood nematodes**. You can read this interesting paper in the Lancet for more information. Congratulations to Melita Harris who was first to answer correctly.

Director's Choice - From the Journals

Update on Ratios of Patients to Qualified Nurses

News Blog readers may know that there is a considerable literature on nursing skill mix and patient outcomes in hospital. One of the most important studies is Paul Shekelle's masterful systematic review from 2013.[1] Taken in the round, the literature shows a consistent association between the ratio of skilled nurses to patients and improved outcomes. A recent large cross-sectional study from a number of European countries reaches similar conclusions [2]; many outcomes of hospital care (including death rates) were improved in association with high levels of qualified nurses. Mortality reduction in hospitals with a favourable ratio of qualified nurses to patients were about 10% lower than in those with a less favourable ratio. An interesting question relates to what nurses do that could make such a large difference. An obvious mediating factor would be vigilance in recording vital signs and responding appropriately to signs of deteriorating physiology. Managing new technology, such as infusion equipment, may also be important. Getting the right medicine into the right patient at the right time is yet a further way good nursing could improve outcomes. Improved ratios are also strongly associated with patient satisfaction. Reassurance and tender care may mediate better physical outcomes given the close interplay between the nervous and immune systems.[3] These, and other, causal pathways are represented in the figure.



The above study did not look at process variables that might mediate a beneficial impact on nursing time. However, given plausible mechanisms by which nurses may improve outcomes and consistent, albeit non-experimental, evidence it is not unreasonable to conclude that improving the ratio of qualified nurses to patients will improve care. Saving money by skill substitution is therefore likely to be a false economy since health economic models are sensitive to quite modest reductions in adverse events.[4]

-- Richard Lilford, CLAHRC WM Director

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References

Two Hundred and Two Ex-(American) Footballers' Brains Analysed After Death – This You Must Read

Who would have thought that American football could be so damaging to the brain? Boxing yes. Here force is targeted at the container for the brain. However, it turns out that other contact sports may also damage the brain according to a recent study of 202 ex-footballers who donated their brains before death.[1] The clinical condition of the patients was recorded and correlated with histopathological finding. The mean age at death is rather young at 66. Hold on to your seat and read on to learn that fully 87% of football players' brains fulfilled the histopathological criteria for chronic traumatic encephalopathy (a progressive neurodegenerative disorder associated with repetitive head trauma). In fact it was present in 110 of the subsample of 111 footballers who were lucky (unlucky) enough to make the National Football League (NFL). Further, 86% of these NFL players had severe pathology. Yes, brains may be more willingly donated when cognitive deterioration is present than when it is not,

leading to inclusion bias. A prospective study is needed. But should we wait the 20-40 years needed for the results? Even if this study has overestimated the effect, the bias could not create so large an association if there were none. Would you encourage your grandchildren to play? If your heart packs up, your lungs fail or your pancreas turns cancerous, you die as yourself. But if your cerebral cortex is damaged you live as someone else.

-- Richard Lilford, CLAHRC WM Director

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Reference

Class Lectures in Medical School – Nearly Obsolete?

The University of Vermont's College of Medicine advertises "no lectures required." And empirical enquires show that context heavy, PowerPoint loaded, lectures are ineffective. But a thoughtful article in the New England Journal of Medicine [1] suggests that the class lecture should change rather than go. In fact, the classroom is well suited to active learning, with students who have already assimilated the core material at their own pace through private study. The lecturer interacts with the students who sit around tables and are provided with opportunities to discuss issues in small groups as the need arises. I learned that this is called the 'flipped-classroom' approach. Such an approach resulted in better outcomes when compared to traditional problem-based learning approaches in a randomised trial.[2] So a little bit of this and a little bit of that. And there is still a place for a little theatre. As to problem-based learning as a method to propel a new topic – forget it. It is sub-optimal, as discussed in a previous News Blog.[3]

-- Richard Lilford, CLAHRC WM Director

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Vaccination Savings

We know that vaccination is one of the most cost-effective interventions in terms of improving public health, but it can only be at its most effective if it is encouraged and supported by policy-makers and government officials. A recent paper in the Bulletin of the World Health Organization looked at the potential economic benefits of providing ten different vaccinations in 73 low- and middle-income countries.[1] These included vaccinations against hepatitis B, measles, rubella, and yellow fever. The authors found that if vaccinations were given routinely between 2001 and 2020, not only would 20 million children avoid death, but there would also be an estimated saving of $347 billion. This figure is predominantly made up of lifelong productivity gains from deaths avoided ($330 billion), but also from disabilities avoided ($9.4 billion), treatment costs ($4.5 billion), transport costs ($0.5 billion), and lost caregiver

wages ($0.9 billion). Further they estimate that $820 billion would be saved from the broader economic and social value of vaccinations. The biggest contributor to these estimates was vaccination against measles, followed by *H. influenza* type b, *S. pneumoniae*, and hepatitis B.

-- Peter Chilton, Research Fellow

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Reference

Researchers – Beware of Predators

A recent column in Nature draws attention to 'predatory journals' – journals that charge open access publication fees without editorial or publishing services (such as peer-review) that are usually seen with legitimate journals.[1] Anecdotally, researchers have found that, after submitting a manuscript, they are presented with a hitherto unmentioned charge for publishing, and then when refusing to pay find that the paper is still 'published', making it much more difficult for it to published in another, legitimate, journal. Further, they were then invoiced for a retraction fee to remove the paper. Others have found that they have been listed on a journal's editorial board without their explicit consent.

Although many researchers may feel that they would not fall for a predatory journal, it is still possible, especially for those who are early career researchers, those who have had a string of rejections and are feeling pressurised to publish, or those who are distracted by other concerns. Fortunately Shamseer and colleagues conducted a cross-sectional comparison study of nearly 300 journals to discern if there were any characteristics more strongly associated with predatory journals.[2] They identified 13 such characteristics that are more likely to be seen:

1. Including biomedical and non-biomedical subjects in their scope of interest, and in particular subjects with little overlap.
2. Having spelling and grammar errors.
3. Using unauthorised and/or low-resolution images.
4. Using language on the website that targets authors as opposed to readers. For example, focusing on inviting submissions, promoting metrics, etc. as opposed to highlighting recent publications.
5. Promoting the Index Copernicus Value as a metric.
6. Lacking description of the manuscript handling process.
7. Requesting that manuscripts are submitted through email, as opposed to through a submission system. This often ignores requirements such as conflicts of interest declarations, funding statements, etc.
8. Promising rapid publication.
9. Having no retraction policy.
10. Having no detail on digital preservation.

11. Having low publishing fee (e.g. <$150, as opposed to >$2000 in legitimate journals).
12. If the journal claims to be open access, either retains copyright, or fails to mention it.
13. Having a non-professional or non-journal affiliated email address as a point of contact.

Of course, having one or some of these characteristics does not mean the journal is predatory, but should indicate that you take a closer look.

-- Peter Chilton, Research Fellow

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News

NIHR Trauma Management MedTech Cooperative

University Hospitals Birmingham has successfully been awarded funding to establish the NIHR Trauma Management MedTech Cooperative. This will build expertise and capacity in the NHS to develop new medical technologies and provide evidence on commercially-supplied in vitro diagnostic tests, with a specific focus on medical devices and technology in the trauma management field. CLAHRC WM Director Richard Lilford is a theme lead, and CLAHRC WM also has a shared post. For more information, please click here.

World Alzheimer's Month

September is World Alzheimer's Month and, each week, the NIHR are focusing on a different theme around research. For more information, please click here.

Cross-CLAHRC Care Homes Research Event

CLAHRC East of England are holding a cross-CLAHRC event in London on **23 November 2017**, 10:00-16:30. The event will provide an overview of CLAHRC-supported care home research and how it has made a difference; what works and does not; and on building a national collaboration. Booking will open shortly, but you can be added to the invitation list by contacting Jessica Edwards at: Jessica.Edwards@unversitiesuk.ac.uk.

Public Health Research and Practice in the West Midlands

Public Health England and the NIHR Clinical Research Network West Midlands are hosting a free-to-attend workshop focussing on research and practice in the region on Tuesday **14 November 2017** in Birmingham. The event, '*Working Together to Improve Health*', aims to identify and recognise regional research needs and priorities, and consider how research findings can better support public health policy and practice within the West Midlands.

There will be talks from key groups within the West Midlands, a PHE honorary contract surgery, and a session to pitch ideas for local research projects (with the winner receiving £5,000 to 'pump-prime' their project).

For more information, and to book your place, please visit the event website. The deadline for applications for the 'Dragon's Den' session is 5pm **Monday 2 October 2017**.

The Social Value of Translational Research

An article by Prof Graeme Currie, a CLAHRC WM Co-Director and lead of our Implementation and Organisational Studies theme (5), has recently been published in Biz Ed (published by AACSB, an association for educational institutions with business programs). 'The Social Value of Translational Research' discusses the collaboration between Warwick Business School and Warwick Medical School, and how it focuses its research on innovations for the healthcare field. It can be viewed online here.

NIHR Trainee Meeting

Registration is now open for the 11th Annual NIHR Trainee Meeting in Leeds. The event will be held on **14-15 November 2017** for all NIHR funded trainees and infrastructure trainees and will feature poster presentations, networking, workshops and presentations from senior NIHR Health Researchers. Registration will close at 17:00 on **Friday 22 September 2017**. For more information and to register, please click here.

Funding Opportunities

The NIHR have released details of the latest funding available through the Health Technology Assessment Programme. You can view the full list of funding opportunities online.

The MRC are accepting applications for the Confidence in Concept scheme (to support the earliest stages of multiple translational research projects and accelerate transition from discovery to development); and the Proximity to Discovery Industry Engagement Fund (to provide funding for innovative ways to enable the initial development of academic-industry collaborations). The deadline for proposals is 17:00 on **Tuesday 7 November 2017**.

Survey for NHS Decision-Makers

Researchers from CLAHRC North Thames are looking at evidence use in decision-making in the NHS and the preferences of decision-makers for different types of evidence. They have created a short 10 minute survey for NHS decision-makers and those involved in the process and are inviting UK healthcare professional to complete it. The study is called DECIDE (DEcision in health Care to Introduce or Diffuse innovations using Evidence) and is funded by the Health Foundation and led by Dr Simon Turner. The survey is available here. If you have any queries, please contact Nicholas Swart at n.swart@ucl.ac.uk.

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Profile

Sarah Lawton

Mrs Sarah Lawton is a Senior Trials Manager, at Keele Clinical Trials Unit (CTU), Keele University. Following an undergraduate degree in Business Studies at Kingston University in Surrey, Sarah relocated to Staffordshire and developed a career in project management within healthcare settings. She commenced her experience within secondary care clinical governance, before managing a programme of clinical audit and service evaluation within North Staffordshire and Stoke-on-Trent primary care. Sarah then moved into research in 2011, joining Keele CTU, coordinating research projects from the applied research programme investigating the efficacy and clinical effectiveness of treatments for musculoskeletal pain and arthritis presenting in primary care.

Sarah now holds the position of Senior Trials Manager, responsible for the operational management and coordination of study delivery within the UK CRC registered CTU, managing a portfolio of high quality clinical studies, delivering them to time and target in accordance with applicable milestones, resources and governance requirements.

Sarah trial managed the ENHANCE Study, a RCT based within CLAHRC WM Theme 4, Chronic Diseases (Integrated and Holistic Care), which used a stepped wedge design. Sarah used the ENHANCE Study to illustrate the operational considerations of delivering stepped wedge designed trials at the First International Conference on Stepped Wedge Trial Design, 2016. In addition, she is currently working on the development of Health Informatic services for research purposes within the West Midlands and has presented the developmental work at a variety of national and international conferences.

Sarah has also has been appointed to the UK Trial Managers Network (UKTMN) Working Group, which facilitates the development of trial managers within the UK healthcare system, who make an important contribution to the efficient delivery of high quality clinical trials. In addition, Sarah is kept busy with three children and enjoys a nice glass of vino!

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Selected Replies

Re: A Second Sanitary Revolution?

The “hoary chestnut” of our sanitary habits and the vague relationship between “constipation” and Western Diseases, is significant and true. 20-30% Western populations “strain” to initiate or complete defaecation (Heaton, 1991). 1% of the population only achieve defaecation once per week, 0.1% once per month !! (Heaton, 1991). Physical efforts during defaecation injure autonomic nerves at different anatomical sites (mouth open or mouth closed). If you are a bottle-fed infant in the supine position you injure coeliac nerves (causing T1DM, Mundinger, 2016) or cardiac nerves (asthma). If you are an adult then stage 4, nulliparous endometriosis and chronic prostatitis are the inexorable outcomes. There are many descriptions of colectomy “curing” diseases (Sur WA Lane, 1924) and DP Burkitt observations from 1973 are pertinent – squatting prevents straining.

The key outcome is that autonomic denervation carries diverse and varying consequences that produce different manifestations of many Western diseases (Quinn, 2014). These range from tissue hyperplasia in adenomyosis and leiomyoma, opportunist infection in preterm labour, viscerovisceral reflexes in preeclampsia, pain in endometriosis, impaired visceral and ducal motility in appendicitis and cholecystitis, etc etc,

The message is simply touch your toes (squat) on contemporary sanitary arrangements (Thomas Crapper, 1861 et seq) and wait for things to happen (anorectal reflex is usually intact and effective !).

-- MJ Quinn

One astonishing thing is the enormous and egregious spike in diarrhoea deaths in India and Nigeria – so far above the other LMICs that it seems to me that the rapid urbanisation and mixing of cultures from different areas and has to be a factor in these two changing economies. Perhaps the cheaper option of factor 6 awareness programmes – wash your hands properly – is something that should be done anyway regardless of whether rubbish collection and good nutrition can be afforded (and without stopping anyone from squatting as MJQuinn discusses above).

-- Mrs Westrop

Re: An Extremely Fascinating Debate in JAMA

The concept of design thinking should be correctly attributed to Hernan and Taubman and rightly cited by Goodman et al. As Hernan clarifies in his obesity question one can reduce BMI by amputating a limb but this is unlikely to have the same causal effect as increasing physical activity or reducing calorie consumption which in turn may have additional cardio-metabolic protective over and above a reduction in BMI. By forcing one to consider the RCT equivalent it is clear BMI reduction is an intermediary variable to assess whether the intervention is active just like serum cholesterol would be measured in a RCT of a lipid lowering agent. This approach to causal thinking is indeed very useful but also can be criticised as it has been argued this may negate the value of looking at variables that cannot be modified e.g. chronological age, sex (one could argue that there are medical methods to alter hormones), race though clearly these are important public health variables..

-- Yoav Ben-Shlomo

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Recent Publications

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