An unsuitable and degraded diet? Part one: public health lessons from the mid-Victorian working class diet

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DECLARATIONS

Competing interests

PC provides consultancy services to a number of companies in the food and drink, supplement and pharmaceutical sectors, including Coca Cola Ltd, Univite Ltd, Biothera Pharma. JR is a historian who provides no consultancy services to anyone on any commercial basis, but provides academic comment to media and academic outlets, including Woman's Hour, European Social Science History Conference, etc.

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Introduction to the series

Principal findings

The research resulting in this series of three papers (further papers to be published in succeeding issues of *JRSM*), drawing on a range of historical datasets viewed through the lens of current scientific understanding, indicates that cultural and other biases have distorted the historical record, leading to conclusions which test many current health policy assumptions about a steady improvement in British nutrition since the nineteenth century. As these papers show, the urban mid-Victorians, including the working classes, ate a notably good diet, including significant amounts of vegetables and fruit, which enabled a life expectancy matching that of today. We follow the example of George Rosen (a public health practitioner, and in his time editor of the *American Journal of Public Health* and *Journal of the History of Medicine*, among others), in believing that a historical dimension is essential to a sound perspective in public health today.[1]

Methods, strengths and weaknesses

A strength, but also a weakness, of these papers is that they are not purely medical studies. They are based on genuinely interdisciplinary research and as such cannot be tested in the usual ways for studies appearing in this, and similar, journals. The authors revisited the historical record because of the mismatch between the assumed content of the Victorian working class diet and adult life expectancy. They then cross-referenced this material against current scientific/medical knowledge, using primarily a range of studies already in the public domain and so supportable by a wealth of scientific papers to reach their conclusions. Amongst their strengths is the breadth of the research drawn on and the widely-tested nature of the scientific data in particular. One of the authors is a historian experienced in data collection from a wide range of types of primary source material, as discussed in this first paper. This in itself has provided a high degree of internal cross-checking of the validity of the historical data. It has been considered necessary due to the reality that extensive quantitative data for the Victorian age, in formats recognized by today's scientific statisticians, do not exist. Consequently, it could be argued that our perspective (like the conclusions based on Rowntree *et al.*[2]) lacks representativeness and historicity. However, the full range of sources we have consulted provides the best possible survey of dietary habits, in ways that counterbalance the consciously biased records of surveys like those of Booth[3] and Rowntree[2]. We have re-examined the urban (as distinct from the rural) mid-Victorian working class diet and its nutritional values by looking in detail at typical food consumption patterns of the time. The use of a qualitative approach is thus not a weakness but a real strength, giving insights into life experience that cannot be readily deduced from quantitative statistics. The other author is a pharmacologist and pharmaconutritionist, who has drawn on the fullest possible range of scientific and medical data to interpret the historical material: his work is apparent throughout but is most fully discussed in the final paper.

In providing this challenge to assumptions about the steady improvement in British nutritional history since the mid-nineteenth century, however, the authors acknowledge that historical materials cannot provide the fully testable data normally considered essential to medical studies. Yet we argue that the historical data used, and the methodologies employed to interrogate it, are appropriate to both science and social science, as the development of the argument that follows will explain in detail. Inevitably, in the limitations of a short series it is impossible to rehearse all the historical data drawn upon. However, that incorporated in these papers was identified on the basis of historical typicality and connotations for both the

Ethical approval
Not appropriate or relevant: all modern data cited is already in the public domain, and all historical data is either anonymized or untraceable

Guarantor
PC

Contributorship
This series of three papers was jointly conceived and researched. JR took primary responsibility for searching out both the primary historical sources and the relevant secondary references; PC took primary responsibility for searching out the scientific and medical data. The general tenor and conclusions of the papers (including the exercise of drawing up dietary patterns and levels of physical activity which are summarized in the first and second papers) are a joint effort, representing 50% input from each contributor. While comment on penultimate drafts was sought from specialists in both the historical and scientific/medical fields, no other

historical and the scientific perspectives. In this series we present, respectively, analyses of mid-Victorian levels of physical activity, dietary intakes and public health patterns. The significance of our findings and their relevance to health care design and delivery today are integrated and developed in the third paper, together with suggestions for future research. In this first paper, the issue of Victorian life expectancy is revisited in the context of contemporary health policy.

Introduction to part one

Current expressions of concern about national levels of ill-health from government and leading health figures, often focusing on the nutritional value of the nation's diet, are not original in either motivation or substance. The importance of diet as a determinant of health was first recognized by the state in the mid-nineteenth century because of pressure from leading scientific and medical figures of the day. One of the leading protagonists in entrenching the concept of a medical dimension to public health policy thinking was John Snow, Medical Advisor to the Privy Council under the governments of Lords Aberdeen and Palmerston. Governments continue to rely upon this dimension in developing public health policies.

We contend, however, that serious historical, methodological and class-based biases about individual diet as a source of nutrition, dating back to the Victorian era, have been integrated into the public health model used today, and are now contributing to unnecessary ill-health and premature death because they have obscured the debate about the relative merits of dietary guidance, intervention and individual responsibility. The purpose of this three-part series is to revisit the dietary patterns of those with the least money and, supposedly, the worst health in the mid-Victorian era; to illuminate the historical biases that have subsequently been integrated into twenty-first century public health policy; and to suggest ways in which the contemporary diet could be improved.

Nineteenth century public health policy focused on reducing mortality rates.[1] Seeking to explain what he correctly identified as an improvement in life expectancy, Thomas McKeown suggested that an improved working class diet was likely to have improved resistance to infectious diseases.[4] For him this, rather than public health interventions or medical improvements, explained the first improvements in morbidity rates.[5] Demographic historians subsequently challenged much of McKeown's work,[6,7] thereby restoring the emphasis on public health and medical interventions. Should this have led to a wholesale rejection of McKeown? We argue that there is one area where his thesis has considerable merit: that relating to nutritional standards, which in turn rehabilitates his claim for an improved adult life expectancy in the period after 1850, a claim substantiated by later detailed statistical studies.[8] To this we add the concept that to life expectancy was also added health expectancy.

A significant source of error is the established view is that the mid-Victorian urban poor ate an inadequate diet that contributed to increased morbidity; and that consequently, medical advances and post-1880 environmental sanitary improvements were the crucial factors in expanding life expectancy. In terms of reducing perinatal mortality, the role of modern medicine from c1890 was central; but we argue that this does not hold true for improvements otherwise. Improvements in *adult* life expectancy are discernable by the 1861 census, when figures show that by comparison with the 1841 figures, twice as many men and women per 100,000 births had an average expectation of a further 20 years of life.[8]

The concept of a short, because malnourished, life has been promoted by numerous historians, making assumptions about the nutritional value of the mid-Victorian urban working class diet.[9–11] Sources for such scholars include reports from nineteenth century philanthropists like Fanny Calder, who believed that the working classes ate an 'unsuitable and degraded diet',[12] and from medical commentators like William Farr, seeking to relate what he saw as the flaws in the working class (and particularly the workhouse) diet to causes of death, especially among infants.[13] Agenda-driven studies of poverty like Booth[3] or Rowntree[2] have also been influential in establishing a belief in consequent nutritional inadequacy.[14]

In revisiting the issue of mid-Victorian urban nutritional standards and returning to the McKeown thesis, we have a clear focus on the mid-Victorian period, from c1850 to c1877–80. Rather than taking the established view of an ongoing dietary improvement during the Victorian era, our analysis suggests the reverse: that mid-Victorian nutritional standards were significantly better than generally realized, and then declined to a nadir at the end of the nineteenth century, making that date a highly misleading starting point for illustrations of twentieth century nutritional 'progress'. Consequently, there is a need to

consider afresh the concept that it was indeed dietary improvement via affordable available foodstuffs, rather than public health and medical advances, which had the most positive influence on the quality of working class health.

This has considerable implications for the present public health model, rooted as it is in medical (pharmaceutical and surgical) intervention and moral exhortation. We argue that the lessons of the mid-Victorian period indicate that the most (cost-) effective way of maintaining and improving public health today is to promote standards of nutrition via facilitating informed individual choice and educational strategies, rather than legislation and medical intervention.

There has been some development in this direction in the state-managed push for 'five portions of fruit and vegetables per day'. But it leaves untouched the vexed question of whether a 'sensible balanced diet' is achievable today without the additional intervention of supplements and/or fortification programmes, given current levels of physical activity, food consumption patterns, and the nutritional content of many modern foods[15] compared to those of the past. In this series we seek to improve comprehension of this reality through an exploration of the mid-Victorian diet and public health profile.

Much is made today of Victorian reports of individuals so poor they died from starvation. It was undoubtedly an issue in the 1840s, appositely labelled the 'Hungry Forties'. By the end of that decade, however, a real improvement in the economics of the working classes had taken place. Measures such as the repeal of the Corn Laws in 1846 signalled the beginnings of the age of affordable food. The impact on the health of the poor was swift.[16] It is our argument that not only the dangers of starvation were avoided, but also the dangers to adult life expectancy associated with malnutrition, because by 1850 the working class diet had improved markedly in terms of both quality and quantity.

Between 1850 and 1870, deaths attributable to starvation and malnutrition accounted for around 1.5% of reported causes of death in urban conditions, though malnutrition undoubtedly contributed to other causes of morbidity and mortality, such as increased vulnerability to infection.[17] However, these figures are not significantly higher than occur today.[18,19] The comments of regular visitors to the poorest quarters of Britain's cities in this period underline the comparative rarity of death from starvation alone;[20,21] instead, they noted that infectious illness, brutality, accident and the effects of intemperance were the most common causes of ill-heath and death.[21] This is amply borne out by the public health records of the time, which clearly promote the role of disease and accident as the main causes of mortality.[8] The only common disease supposedly related to malnutrition was rickets[22] but increased incidence of this disease in the early Victorian period was largely due to decreased exposure to sunlight among the urbanized working classes.[23] Paradoxically, a re-classification of rickets as a primarily nutritional disorder in the 1920s[24] contributed to and exacerbated subsequent received views of Victorian malnutrition.[25]

Victorian misinformation underpins current misconceptions. Much concern about nutrition then was rooted in middle-class disapproval of the way that the working classes supposedly 'wasted' food.[26] Public health commentators believed that freedom to buy what they wanted was 'bad' for the working classes; that they did not know what was 'good' for them nutritionally, nor how to cook what they did buy.[26,27] Middle-class views were also influenced by the food adulteration scandals of the time (see the second paper in this series), which affected all consumers but the working classes most severely. These were associated with the Victorian *laissez-faire* approach to business, but it is only fair to point out that there are almost identical concerns today about food content and composition, labelling and advertising.[28] Victorian food adulteration was rightly a high-profile issue, arguably amounting to a 'moral panic';[29] but its extent is unclear and assumed incidence should be balanced against the evidence for a diet-based improvement in working class health. (The often intemperate media coverage of dietary issues and their implications for lifestyle and health provides an interesting parallel today!)

Prejudices about class and diet unduly influenced first Victorian writers and policy-makers reflecting on health, then those who have cited them uncritically thereafter. They are still used as a basis for modern public health models.[8,30] But by taking a wider range of sources into account we have reassessed the diet of the mid-Victorian poor; concluding (in contrast to received wisdom) that the majority ate a diet vastly superior to that generally consumed today, one substantially in advance of current public health recommendations. Reverting to the nutritional essentials of the mid-Victorian diet and lifestyle would materially improve human well-being in Britain today.

contributor was directly or substantially involved in the writing of these papers or the research thereof. Those cited have been cited where the contributors judged that their work was relevant and supportive, or where we wished to identify work that we wished to challenge

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Historical-nutritional context

From 1877, historians generally agree that food costs fell as much as 30% due to imports of cheaper basics such as cereals and meat. As a result, supposedly, 'the first really appreciable nutritional improvement … occurred'.[31] Imported American wheat and modern milling techniques reduced the price of flour, while fresh and tinned meat arrived from the Argentine, Australia and New Zealand. Canned fruit and milk became more widely available. These changes increased the variety and quantity of the working class diet, and was advertised as reducing the opportunities for adulteration.[31] Simultaneously, cheaper sugar promoted the huge increase in sugar consumption (in confectionery, processed foods like evaporated milk, and fruit canned in heavy sugar syrups) from the 1880s on. Consequent assumptions about what has been labelled an 'improvement' in food quality between 1877 and 1889 have led to the conclusion that previously, the value of the working class diet must have been even worse, and that since malnutrition was so widespread at the end of the century, it must have been almost universal at the mid-century.

This 'progressive improvement' conclusion, however, is at odds with the evidence. Mid-Victorian navigators (navvies), who as seasonal workers were towards the bottom end of the economic scale in terms of their purchasing ability, could (when in work) routinely shovel up to 20 tons of earth per day from below their feet to above their heads;[32] an enormous physical effort that most modern workers would be totally unable to emulate, and one that required great strength, stamina and robust good health. Yet after 50 years of supposed 'nutritional improvements', the British army recruiting for the Boer war at the turn of the century found around 50% of young working class recruits to be so malnourished as to be unfit for service.[14,33] This was a rapid decline. The recruiting sergeants had reported no such problems during the Asante (1873–4) and Zulu Wars (1877–8). Twenty years later, there is evidence of a precipitous drop in nutritional standards: the infantry were forced to lower the minimum height for recruits from 5' 4″, where it had remained fairly constantly since 1800, to 5' in 1901. (Army recruits up to the 1870s were generally drawn from the better-nourished rural population: thereafter they were mainly from the urban working class.)

In 1903, and as a direct result of the Boer disaster, the government set up the Committee on Physical Deterioration. Its 1904 Report, emphasizing the need to provide school meals for working class children, reinforced the idea that the urban working classes were not only malnourished at the start of the twentieth century but also (in a leap which seemed logical then and has ever since) that they had been so since the start of the nineteenth century's industrial urbanization.[34]

A detailed re-reading of Victorian sources, however, reveals that diet and public health reached a high point in the mid-Victorian era, to decline noticeably at the end of the 1870s with the introduction of the first generation of processed foods. The increased sugar intake alone caused such damage to the nation's teeth that many people could no longer chew tough foods, thereby reducing their intake of vegetables, fruits and nuts.[35]

That some mid-Victorians (especially women and children but also seasonal workers at adverse times) were malnourished is indisputable; but in this paper we contest the claim that it was a majority experience. Rather, we suggest that the first generation of processed foods, far from improving the late Victorian urban working class diet, 'degraded' it to the state observed by Rowntree in 1901;[2] and that prior to this in the period c1850–1880, the working class diet was far superior. While a substantive mass of Victorian quantitative data is not available, our sources compensate for this in their range and depth. They include details (including statistics) provided by contemporary sources from official sources such as Blue Books, Reports from charitable organizations, Mayhew's *London Labour and the London Poor*,[20] and information in medical texts and dietaries from workhouses, hospitals and army records. We drew on depictions of purchase, cookery and consumption in contemporary fiction and periodicals, including authors like Dickens with his detailed descriptions of the consumption strategies of the mid-Victorian poor. We also investigated information from more neglected datasets, notably Victorian cookery books and diet advice for the poor, where recent studies have also confirmed their relevance.[27] This information (when integrated with the other sources) can give a more nuanced picture of working class diets and its values.

Walton, reviewing Oddy's *From Plain Fare to Fusion Food*, noticed the absence of working class voices therein, and added, fairly, that we cannot trust the official records on working class diets, because in recounting what families and individuals consumed there was likely to be self-censorship.[36,37] We recognize this, and have

looked at more inclusive secondary sources[38] and also oral accounts where they exist for this period. It is also why we amplify these with sources including fiction, periodicals, and records like London Police Court Mission reports. We draw on typical (and so cross-referential) 'throwaway' comments in these sources, contextualizing them with data on food supply chains, food availability and pricing, and retailing practices,[39–42] to give a composite overview of dietary patterns and a more realistic estimation of the mid-Victorian working class diet.

Important and relatively costly staples in the working class diet (meat, bread, potatoes) are the key known constituents of the mid-Victorian working class 'food basket': but detailed study reveals that they were used as headline cost indicators of consumption. They were not the *only* foodstuffs consumed in significant quantities. Because many commonly consumed ingredients were not considered sufficiently costly to count as part of even a poverty diet, they often went unrecorded; their consumption being taken for granted by all sides. One woman, when quizzed by the Charity Organisation Society in 1877 to explain her budget for a cheap rice-based dish to feed her family of ten 'What would the onions and the fat that you put in the rice cost? You did not put that down at any cost', responded 'hardly a half-penny'.[43] There is extensive informal evidence indicating the major role played by vegetables (especially onions), fruit (especially cherries and apples), and items like bones, dripping, offal and meat scraps in the mid-Victorian diet; but little in the official record simply because these foods were so cheap that housewives took their purchase largely for granted[44–46]

Yet the myth of widespread malnutrition persists. According to Wohl, modern study locates the calorie consumption of the average Victorian working class adult at a mere 2,099 per head; while an intake of at least 3,770 calories represents the amount then needed to undertake strenuous work and stay healthy.[10] These figures are self-evidently incorrect, as on this negative calorific balance these average mid-Victorian working adults would not have been able to work, procreate or indeed survive, as many did, into a surprisingly healthy old age. His figures assume that the diet consisted largely of carbohydrates and fats and fail to take into account calories regularly derived from fish, meat and plant foods. If the calorie count is so obviously fallacious, what does this say about the rest of the commonly held assumptions about the mid-Victorian diet?

Victorian calorific intakes

It is not just the composition of the mid-Victorian diet that is so distinct from our own, but also the amount of the food typically consumed. Due to the levels of physical activity routinely undertaken by the mid-Victorian working classes, calorific requirements ranged between 150–200% of today's historically low values. Almost all work involved moderate to heavy physical labour, and often included that involved in getting to work. Seasonal and other low-paid workers often had to walk up to six miles per day.[47] While some mid-Victorian working class women worked from home (seamstressing for instance), more went out to work as domestics or worked in shops, factories and workshops, necessitating long days on their feet, plus the additional burden of housework.[47,48] Men worked on average 9–10 hours per day for 5.5–6 days a week, giving a range from 50–60 hours of physical activity per week.[48] Factoring in the walk to and from work increases the range of total hours of work-related physical activity up to 55–70 hours per week. Women's expenditure of effort was similarly large.[48] While women also had housework to do, male leisure activities, including gardening and informal football, also involved substantial physical effort.

Using average figures for work-related calorie consumption, men required between 280 (walking) and 440 calories (heavy yard work) per hour, with women requiring between 260 and 350 calories per hour. This gives calorific expenditure ranges during the working week of 3000–4500 calories/day (men) and 2400–3500 calories/day (women). Total calorific requirements were likely to have been even higher during the winter months. With less insulated, poorly-warmed homes, working class mid-Victorians used more calories to keep warm than we do. The same held true for workplaces, unless the work (certain factory operations, blacksmithing, etc) heated the environment to equally demanding unhealthy levels. At the top end of the physical activity range were the navvies, building (largely without machinery) the roads and railways that enabled the expansion of the British economy, and when in work, expending 5000 calories or more per day.

Dietary summary

Clearly mid-Victorian working class men and women must have consumed between 50 and 100% more calories than we do today to maintain

their ability to work and survive. The next paper argues that their diet was rich in vegetables and fruits, with consumption of these amounting to around eight to ten portions per day. It also contained significantly more nuts, legumes, whole grains and omega three fatty acids than the modern diet. Much meat consumed was offal, which has a higher micronutrient density than the skeletal muscle we largely eat today.[49] These factors ensured far higher intakes of micro- and phytonutrients than are consumed today. Prior to the introduction of margarine in the late mid-Victorian period, dietary intakes of trans fats were very low. There were very few processed foods and therefore little hidden salt, other than in bread. Recipes also suggest that significantly less salt was added to meals. At table, salt was not usually sprinkled on a serving but piled at the side of the plate, allowing consumers to regulate consumption in a more controlled way. In general, the mid-Victorian diet had a lower calorific density and a higher nutrient density than ours. It had a higher content of fibre (including fermentable fibre) and a lower sodium/potassium ratio. In many respects, therefore, it resembles the dietary recommendations made by today's advocates of the paleolithic diet, but has the critical advantage of extensive Victorian documentary evidence.

In terms of alcohol consumption, the comparisons with today are particularly revealing. Many contemporary reports suggest that around a fifth of mid-Victorian working class men might, when employed, spend up to a fifth of their income on beer.[50] Assuming an average urban income ranging from £1–4 per week, and given mid-century pub prices of 3d upwards per pint for beer,[51] the reported expenditure would account for around 16–20 pints per week maximum or between three and four pints per night. As mid-Victorian beer generally had an alcohol content ranging between 1–3.5%,[52] this is equivalent to 1.5–2 pints of beer per day in contemporary terms. Seen in this light, the enormous Victorian concern about drunkenness in the working classes appear to be more a reflection of respectable morality than a real public health issue.[53] Cost implications ensured that, for most, the mid-Victorian 'alcohol problem' was certainly less significant than it is today, when the frequency of public inebriation and levels of injury and illness have become a serious public health concern.[54] Finally, mid-Victorian tobacco consumption was very much lower than today, and their levels of physical activity were, as described, much higher.

A case for supplements?

In marked contrast to this, modern diets are rich in processed foods, have a higher sodium/potassium ratio, with less fruit, vegetables and wholegrains. They are lower in fibre and phytonutrients, in proportional and absolute terms; and, because of our high intakes of potato products, breakfast cereals, confectionery and refined baked goods, are likely to have a significantly higher glycemic load. Given this, and our low calorific throughput, it follows that we are more likely to suffer from dysnutrition (multiple micro- and phytonutrient depletion) than our mid-Victorian ancestors were; this is now being referred to as Type B malnutrition.[55,56] This is supported by survey findings on both sides of the Atlantic; the USDA's 1994 to 1996 *Continuing Survey of Food Intakes by Individuals*,[57,58] and the National Diet and Nutrition Surveys[59] both show that many individuals today are unable to obtain Reference Nutrient Intakes (RNI) values – or even the Lower RNI values – of a variety of vitamins and minerals. Malnutrition in the UK is now reckoned to cost in excess of £7.3 billion per annum.[60] The authors believe that, since it would be unacceptable and impracticable to recreate the high calorie mid-Victorian working class diet, this constitutes either a persuasive argument for a more widespread use of food fortification and/or food supplements, not only in hospitals and in long-term care facilities but in the community; and a review of agricultural subsidies to make locally grown fruit and vegetables cheaper.

Conclusion

Contrary to received wisdom, the mid-Victorian working classes appear to have been following modern advice about healthy lifestyles almost to the letter. Not yet having acquired the taste for processed foods, they were in fact eating something closer to the Mediterranean diet or even the Paleolithic diet than the modern Western diet. This should have created enormous public health benefits; or, at the very least, very significantly reduced levels of degenerative disease, in an interesting reflection upon the McKeown thesis. That this was indeed the case, at least for the mid-Victorian period, will be demonstrated in the following papers of this series; the second in the series analyses mid-Victorian dietary patterns in greater detail, and the third correlates the nutritional pharmacology of the mid-Victorian diet with contemporary health records.

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