



Reform of the NHS

The repeated exhortation to “protect the NHS” during the Covid-19 pandemic highlighted the fact that the nation’s “mending apparatus” was in itself in need of repair, an alarming situation because it hints at incipient collapse of the entire system. It is, however, somewhat reassuring that although the NHS seems to have lurched from one crisis to another ever since its founding, it and the nation continue to survive. On the occasion of the 60th anniversary of the NHS a debate about its future was organized in London [1]. Much polemic was exchanged, without progressing on the fundamentals. The oft-repeated phrase that the NHS is a “bottomless pit” with respect to its funding highlighted the absence of a robust way of calculating the right level of spending; typically comparison is made with other developed nations, revealing that not only does England spend about half *per capita* of what the USA spends (which is the highest in the world), but also somewhat less than other western European countries [2]. But spending alone does not mean very much; it must be compared with outcomes, and there is a clear correlation between life expectancy and GDP *per capita* [2], across a great variety of different geographies, cultures and health systems. Life expectancy is perhaps the simplest measure of health outcome, but it neglects an increasingly important phenomenon—the expansion of morbidity [3]—and here the UK does not do as well as its European peers [4]. It should be borne in mind that such comparisons neglect a host of possible confounding factors, including such basic things as latitude, climate (which in turn affects diet) and genes.

An important advance in computing optimal spend was made by considering the life quality index [2,5]: the monetary cost of a life-prolonging health intervention should not exceed the monetary equivalent of the gain in life expectancy. It has, however, been questioned whether it is legitimate to apply the life quality index approach to an entire health service [5]; the approach works well when applied to an intervention with well-defined costs and well-determined prolongation of life. The amount spent on the health service is known more or less precisely, but conceivably the money could all be

spent in ways that did not influence health outcomes at all. The effectiveness of the spending was a major topic in the 2008 debate [1]. At present, unprecedented levels of taxation are being levied in England in order to provide additional financial resources, above all to allow the NHS to clear the enormous backlog of operations and other medical interventions that were held up by Covid.¹ High taxation is of course unpopular, and this has fueled the perception that merely increasing spending is not sufficient to remedy the ills of the NHS; more fundamental reform is needed.

This need has often been recognized [12], but not hitherto met, certainly not in any revolutionary sense. In somewhat pedestrian fashion, the fairly recent Carter report merely compared performance in different parts of the NHS and recommended that the most efficient and productive practices were adopted everywhere [13]. There was no suggestion that advanced management practices, such as those based on syntegrity [14], and not (as far as I am aware) presently used anywhere in the NHS, should be adopted. Such an omission is particularly regrettable given the oft-criticized burgeoning administrative relative to medical staff—administrative efficiency seems actually to be in decline. The matter is of extreme importance not least because of the huge size of the NHS; not only is it the largest employer in the UK (1.7 million staff) but healthcare accounts for the largest proportion of new graduates starting work [15].

Reasons for rising costs

There are a number of reasons (factors) why healthcare costs more than what one might imagine it should, and why the trend is for these costs to rise faster than GDP:

1. Baumol’s “cost disease” [16]: wages in general tend to rise because occupations become more productive. This especially applies to manufacturing industry and agriculture because of mechanization and automation, but accountants, clerks and typists have also benefited from electric data processing (elektronische Datenverarbeitung, EDV). Notable exceptions are

¹ At the height of the pandemic, the NHS was essentially functioning as an anti-Covid service (and later as an anti-Covid vaccination service). The ruling principle was at all costs to avoid hospitals being overwhelmed by severely ill patients. The experiences especially in Bologna [6–8], echoing that of the plague in 1527 [9], seem to have had a disproportionate influence on policy, doubtless due to their widespread dissemination via television; hence, although they occurred a long way away, on the other side of the Alps, they really became shared experiences for the vast majority of the population, including politicians and those in charge of the health service. These experiences resulted in the swift equipping—albeit without the staffing to match—of the “Nightingale” hospitals in England. They were practically never used. It is certainly disappointing that—assuming that one accepted the underlying premiss of the ruling priority being to avoid overwhelming the NHS—no multiobjective optimization, preferably with interaction [10], was carried out to best allocate the available resources, with the help of the SIRDV model [11], in which D (death) is replaced by H (hospitalization).

healthcare and education, which remain heavily dependent on manual and intellectual skills. Nevertheless, the pay of practitioners in these services must follow the general trend, even though their productivity remains the same, otherwise it would become difficult to recruit new entrants into the workforce. Hence these sectors become relatively more expensive.

2. It has been argued that Baumol's cost disease cannot explain all of the relative increase of expense of healthcare and education. A further explanation is that these sectors follow Bowen's revenue theory of costs [17]—each institution raises all the money it can, and each institution spends all it raises. In other words, increased revenue is absorbed by increased expenditure with no rational upper limit. Thus, for example, schools tend to acquire ever more lavish sports facilities, laboratories, workshops, theatres etc. whenever revenue permits. In healthcare, this phenomenon is manifested by offering new technologies (e.g., magnetic resonance imaging (MRI) scanners, and seemingly ever more molecularly complex and hence expensive new drugs), and a wider range of treatment possibilities from which to choose. To some degree at least, however, these new technologies should enable better outcomes with, ultimately, cost saving; for example, early diagnosis of disease usually means that it becomes much less expensive to treat.

3. An aging population—most people's health deteriorates as they get older; as mentioned above, increased life expectancy is typically accompanied by increased morbidity; the national burden of disease increases.

4. Assaults on health are increasing [18]. Callahan included infectious diseases and obesity in his list of five "horsemen" riding to bring calamity to the world [19].

5. Rising expectations of perfect health [20].

6. Moral hazard [21]—knowing that a health service exists makes people more careless. This is related to Jevons paradox [22]—a falling commodity or service price leads to more demand for the commodity or service, rather than economies being made; it is also related to the growing sense of entitlement among many users of the NHS—mostly evidenced anecdotally but clearly foreseen in the debate on the first NHS bill [3,23].

7. Whereas some interventions of the health service—such as surgery or other treatment to remedy the deleterious consequences of an unforeseeable event—should benefit the nation's prosperity, since a person who would otherwise be an invalid is restored to good health, others lead to ever-greater phylogenetic maladaptation [24], prolonging lives that may necessitate increasingly frequent and more costly interventions.

8. Parkinson's law of bureaucracies—subordinates multiply [25]. Not only does this directly increase costs—bureaucrats' salaries and office space—but also makes the whole system less flexible and much slower to respond to needs, etc., which will generally tend to incur increased costs.

9. Vested interests, apart from those of the bureaucracy—for example, external suppliers such as drug companies will try to maximize sales and profit margins regardless of real clinical needs.

Goals of the health service

The first challenge is to identify drivers for cost increases. Once the drivers are known, measures to reverse them might be found, which would amount to an exercise in regulation [26]. Before doing so, however, it is essential to examine the ultimate goal or goals, which are set externally to the system being regulated.

Is the primary goal to eliminate the "giant" of disease [27]? The NHS is focused heavily on cure rather than prevention; for achieving the latter, sanitation may be at least as important as a health service. Furthermore, as Kropotkin has pointed out [28], a "cure" may be nugatory if the other giants are not tackled.

The actual aims of the NHS, as expressed today, are somewhat diffuse. The East of England Clinical Networks vision is "to improve people's health and wellbeing" (<https://www.england.nhs.uk/east-of-england/clinical-networks/about-us/our-vision-and-mission/>). The vision of the Wye Valley NHS Trust is "to improve the health and well being of the people we serve" (<https://www.wyevalley.nhs.uk/work-with-us/mission-vision-and-values.aspx>); its mission is "to provide a quality of care we would want for ourselves, our families and friends". These statements may be taken to be representative of the NHS as a whole, and are *prima facie* reasonable. Good health is taken to be a value, something desirable in itself without the need for further justification. But these statements do not seem to penetrate to the core of the matter. In particular, the question of personal responsibility is not addressed. In essence, the NHS is a giant insurance policy. By pooling resources in the way it does, it may be that (for a given outlay) a higher standard of medical services can be provided than with a haphazardly organized plethora of individual organizations, as existed before the establishment of the NHS.

From the viewpoint of the State, the NHS could be perceived as part of its general duty to protect the citizen, manifested *inter alia* by the army and the constabulary. Without the army, the nation could lose its independence; without good health, the nation would become so

enfeebled it would inevitably sink into obscurity. Maintaining a healthy workforce is just one aspect of this resistance to enfeeblement.

Remedies

Let us take the reasons in turn. One cannot do much about the “cost disease”, other than ensure that frontline healthcare practitioners are spared the need to undertake administrative work. The widespread introduction of EDV has led to the idea, not only in health services, that clerical staff can be dispensed with and the principals of the service can themselves deal with the routine administrative tasks associated with their work. This idea is erroneous and absurd and has led to a significant decrease in productivity. Simply reinstating the clerical apparatus would reverse the mistake.

As for Bowen’s disease, this can be countered by establishing a rational framework for determining the appropriate level of expenditure. Thanks to the work of Philip Thomas, we now have such a framework—the J-value [29, 30]. It is based on the concept of the quality of life index Q , which is, roughly speaking, the product of life expectancy X and annual income G . Expenditure on a (life-prolonging) health intervention will only be worthwhile if the loss in income required to pay for the intervention does not outweigh the prolongation of life. The J-value can be computed for any kind of intervention, medical or otherwise. In the UK, there is (since 1999) a body that oversees expenditure on medicinal drugs etc.—NICE (formerly the National Institute for Clinical Excellence, now the National Institute For Health and Care Excellence). It has developed internally standardized procedures for technology appraisal, ending up with a “final appraisal document” that is published (on the NICE website) and which constitutes official guidance for the NHS. The style of appraisal is narrative. Nevertheless, J-value analysis of some NICE decisions showed that their approval threshold was close to $J = 1$ [30]. This should be systematically applied to every service offered by the NHS. The associated staff and infrastructure would then be adjusted to match the requirements of the admissible services. Note that this intervention would not necessarily lead to an overall reduction in services: some new services (new in the sense of not hitherto offered by the NHS) might be found to have $J \leq 1$, and should immediately be adopted, since they will benefit the nation’s quality of life.

The desire to live for a long time is practically the same as the desire to live. One of Paracelsus’ most

popular books was *de vita longa*.² But simply living for a long time is not enough; the goal must be to eliminate morbidity. It is a weakness of the quality of life index that it does not explicitly invoke morbidity, but it can easily be modified to do so. Taking the expression for Q as [2]

$$Q = G^{1-\varepsilon} X, \quad (1)$$

where ε is the risk aversion associated with measures that will extend life expectancy, the simplest modification would be to subtract years of morbidity from X ; in other words they make no contribution to life quality. A less extreme modification could identify degrees of morbidity with a corresponding weighting; this would amount to substituting health-adjusted life expectancy (HALE) for X .

Many assaults on health can be remedied by eliminating the cause. Pollution, starting with air pollution, is an obvious one to tackle. The World Health Organization (WHO) estimates that the vast majority of the world’s population is exposed to air that is unhealthy to breathe. Much of the pollution is associated with urban living. The creators of this pollution constitute a very strong vested interest opposing remediation; paradoxically, in some cases the creators are also the sufferers (e.g., motorists). The matter is obviously very complex and belongs to sanitation rather than the health service.

Diet is considered to have a great influence on health and ill health, and is also prey to strong vested interests. For example, processed foods seem to be increasingly preponderant and form the basis of an extremely lucrative industry. Unlike pollution, from which it might be difficult to escape other than by moving to a remote rural location, diet can be largely controlled by personal volition. In the UK, cooking (sometimes called “domestic science”) is universally taught in schools, hence the machinery for remediation already exists.

Lack of adequate exercise is also an increasingly prevalent contributor to poor health. Renouncing motoring in favour of walking would resolve the problem, decrease pollution (directly from engine exhausts and tyre wear, and indirectly from the vast industrial machinery and civil engineering works that enable motoring), and free up personal funds for procuring food of higher quality.

Rising expectations of good health are not intrinsically bad. Ideally they would lead to a stronger sense of personal responsibility for maintaining it. Problems arise if, instead, they lead to a sense of entitlement to medical interventions that may have deleterious consequences in the long term.

The true remedy for moral hazard is, I suppose, will power but it can be assisted by appropriate measures,

² The book was published in many posthumous editions in the latter half of the 16th century. It originated in one or two tracts composed in German during Paracelsus’ tenure as Stadtarzt in Basel.

such as more severe triage. Upon feeling unwell, the normal path would be to make use of one's own medical knowledge along with any typically domestically available device such as a thermometer or blood pressure meter to reach a diagnosis, which then implies a remedy. If the malady is cured the process then comes to an end. If it is not cured, alternative remedies might be tried, or alternative diagnoses and their corresponding remedies, until all reasonable possibilities have been exhausted; if a cure has still not been achieved, the NHS can be enlisted. The standard route would be to visit one's general practitioner (GP),^{3,4,5} who has much greater medical knowledge, and a wider range of available devices, and may be able to achieve a diagnosis. He or she also has access to a much wider range of pharmaceutical remedies (prescription drugs). If, nevertheless, no diagnosis can be achieved or if all alternative diagnoses and remedies have failed to cure the malady, recourse can be had to even more sophisticated devices (such as ultrasonic or magnetic resonance imaging scanners, or X-ray photography) available in hospitals, and an appointment can be arranged with a specialist consultant (usually based at a hospital).

In a sense, the NHS became a victim of its own success. As Aneurin (Nye) Bevan forthrightly declared, "It is cardinal to a proper health organization that a person ought not to be financially deterred from seeking medical assistance at the earliest possible stage" [23]. The barriers to access became so low that some people nowadays even attend A&E to get a sticking plaster for a minor cut, or see their GP to get a prescription for aspirin or paracetamol as a remedy for a minor ache or pain; these materials are readily available over-the-counter not only in pharmacies but even in many supermarkets. Hence the need for triage. Many A&E departments have lengthy waiting times and many general practices lengthy delays in scheduling an appointment; these reflect the system responding to overwhelming demand. In effect it constitutes a form of rationing to keep demand in balance with supply, and has the advantage of not requiring explicit human judgment of the need of one prospective patient over another, which is likely to be invidious; it is as impersonal as food rationing during and after World War II.

The problem with triage is that one may miss subtle features symptomatic of a really serious and urgent case; the practical remedy is to increase the efficacy of the initial steps under the aegis of personal responsibility. Education is obviously of great importance. It is extraordinary that medicine is absent from the school curriculum. Hence it is not surprising that expenditure on healthcare increases *pari passu* with that on education [12]—much that is taught in schools is of low priority for survival, but squeezes practical matters of great importance (such as medicine) out of the timetable. More powerful and sophisticated devices need to be available in the home [31].⁶ Such is the rate of advance that home devices for DNA sequencing seem to be close to practicality [32]. Thanks to the Covid-19 pandemic, nearly every household acquired rapid antigen test kits for diagnosing the disease. There is, therefore, growing familiarity with the notion of more sophisticated self-diagnosis and self-care.

The problem of growing phylogenetic maladaptation seems to be insuperable, but if morbidity can be shrunk to almost zero, the maladaptation will no longer be of significance.

There is no real remedy for the consequences of Parkinson's Law: only by allowing the affected organization to die and be replaced by a brand new one can they be eradicated and, given the inexorability of the Law, this procedure will have to be periodically repeated. But perhaps the NHS is already too inextricably interwoven into the fabric of the nation to enable such a solution to be carried out. Hence novel approaches must be tried. If administration can be strictly separated from front-line clinical work, as already recommended above, and if no other aspect of the work of the administrators impacts negatively on the overall provision of healthcare, then the problem can perhaps be evaded, especially if the salaries of a great proportion of the administrators were taken out of the NHS budget, which would only retain those who were demonstrably essential to the running of clinical services.

Quite possibly, eradicating vested interests is the most difficult challenge to overcome. When the pharmaceutical company Roche, a major manufacturer—*inter alia*—of anti-diabetes drugs, took over Boehringer Mannheim, a

³ Out of hours (including weekends and public holidays) one could go directly to the accident and emergency department (A&E) of the nearest hospital.

⁴ About a decade ago the "111" number was introduced in the UK in order to relieve pressure on GPs and A&E. This telephone service is staffed by, typically, pharmacists, and might be used prior to considering a visit to a GP or A&E.

⁵ Some walk-in centres also exist; such medical centres are widespread in many other European countries and elsewhere, but relatively uncommon in the UK.

⁶ The objective of the "Smart Sensor Systems for Self-Care" symposium held on 18 January 2017 in London was to examine the practicality of providing such availability.⁷

⁷ Proceedings were published in a dedicated issue of *Nanotechnology Perceptions*—vol. 13 no 1 (pp. 3–80).

major manufacturer—*inter alia*—of diabetes test devices, a conflict was immediately established. It epitomizes many dilemmas in the overall healthcare system, which of course encompasses not only the NHS but the innumerable purveyors of goods and services to it. During the Covid-19 pandemic, (overly simplistic) contrasts were often drawn between the apparent efficiency of the private pharmaceutical sector that had produced vaccines in record time, and the apparently almost dysfunctional NHS that could only survive if all citizens pulled together to protect it. The comparison is misplaced because the two are inextricably intertwined (for example, vaccine delivery to subjects was exclusively in the hands of the NHS), but the NHS should—in theory—have an advantage because, not being constrained by the market, or shareholders, it should be able to apply rational thinking (e.g., based on the J-value) to determine the optimum course of action.

International comparisons

Succumbing to ill health is a risk, and like many other risks can be pooled through insurance. As the preamble to the Merchants' Assurances Act of 1601 (43 Eliz. 1 c. 12) states, “by means of which policies of assurance ... the loss lighteth rather easily upon many, than heavily upon few”. Up until 1996, individual citizens of Switzerland could take out private insurance policies to cover medical treatment.⁸ Young and healthy people were less likely to take out such policies, hence premiums had to be rather expensive to cover the costs of the preponderantly morbid participants. Some elderly citizens might indeed find them to be unaffordable. Introduced as a gesture of intergenerational solidarity, the 1994 Federal Health Insurance Act required all citizens to participate in health insurance, and required the insurers to offer coverage to all citizens, regardless of age or medical history. The introduction of this new law was hotly contested, not least because it diminished the incentive for an individual

citizen to adopt a healthy lifestyle. Many of the deleterious impacts of the new law foreseen by its critics have been realized.⁹ In particular, premiums have risen inexorably while the insurance companies, now highly profitable, relentlessly seek to reduce costs, to the great displeasure of front-line clinicians, who often find that a treatment they recommend as being the best for the patient is disallowed by the insurance company because it is too expensive.

Compulsory private health insurance can be deprecated in principle. The Swiss experience has shown that in practice, too, it has many disadvantages. The other extreme, universal State provision of healthcare—financed through general taxation—is *prima facie* an efficient solution. Although compassion—enabling everyone to access good quality healthcare—was a goal in founding the NHS,¹⁰ there is no need to invoke it to justify such a service: a universally healthy population confers economic advantages, including that of a productive workforce. According to J-value–quality of life analysis a health service should be able to pay its way, the extension of life expectancy resulting from medical intervention balancing the cost of that intervention.¹¹ Furthermore, the bigger the insurance pool, the greater the range of conditions that can be treated; specialized equipment and training can be offered even if only a handful of people nationwide suffer from the condition requiring it, and the possibilities of learning from experience are greatly intensified, provided that an efficient means of knowledge exchange is in place—here there is certainly room for improvement, as evinced, for example, by the findings of the Carter report [13].

In fact, the British system also has room for privately financed medicine.¹⁴ Doctors are able to use NHS facilities for carrying out operations upon payment of a fee by the patient. This option is useful if, for example, an operation is deemed to be of low priority

⁸ Accidents and occupational diseases were and are covered by a separate organization, the Suva (Schweizerische Unfallversicherungsanstalt).

⁹ See, for example, E. Rutz, “Swiss healthcare on the brink of intensive care”, *Swiss Review* (October 2021), pp. 6–9.

¹⁰ The NHS well achieves the goal of solidarity, not only between the healthy and the morbid, but also between rich and poor; if one's income is below the threshold for taxation no contribution to healthcare costs is required.

¹¹ This bald statement wholly neglects a host of other considerations. It is a natural instinct of human beings to succour the sick. Medicine also poses effort-inspiring challenges at many levels, from the research laboratory to the operating theatre, activity in which defies strict J-value analysis.¹²

¹² For example, in ref. 30, the basis for calculating the cost of a life-prolonging measure is the price of a drug. The price of a new drug will usually reflect the cost of the research and development that was required to bring it to market. Later, especially after any patent protection has expired, and with the benefit of vastly increased manufacturing experience, the cost might become much less. But supposing initially that $J > 1$. If the tenets of J-value analysis were strictly adhered to, such a drug should not be introduced.¹³

¹³ It is customary for national averages (life expectancy, annual income, risk aversion—this last anyway being more of a collective than an individual phenomenon) to be used in J-value analysis. The new drug might well have $J < 1$ in a rich country (which, anyway, probably hosts the R&D laboratories). Hence its introduction there would be justified. It is sobering to note that were global averages used, justification might never be achieved.

¹⁴ The UK's first independent (private) medical school was opened at the University of Buckingham in 2014.

from a clinical viewpoint (i.e., not life-threatening), but the condition to be alleviated by the operation may still be causing significant deterioration of the patient's quality of life.¹⁵

And in Switzerland, the State—at the level of the constituent republics of the Confederation—takes care of the training of medical professionals; most state universities have a teaching hospital attached to them. In the days before compulsory medical insurance, those without insurance who needed treatment could find it at low or no cost in those teaching hospitals—without, of course, the luxuries accorded to patients financed by insurance. A similar system was in operation in England prior to the introduction of the NHS.

Other countries occupy a variety of positions on the State–private spectrum. France's system is quite similar to England's. One minor difference is that a nominal upfront fee is payable for a visit to the GP, as is presently the case for dentistry in England but not general practice. Such fees are useful for encouraging a more consequential first level of triage, and given that the giant of want has been eliminated—at least in principle—by the welfare state [27], there can be little serious argument against it. Bevan stressed “seeking medical assistance at the earliest possible stage” [23]. While it may be generally true that the earlier the diagnosis, the better the chances of a cure, using overly extravagant means to establish that diagnosis can be counterproductive—such as by preventing those with more serious needs from being seen in a timely fashion.

Germany, spearheaded by Chancellor Bismarck, pioneered the system of social health insurance with (mandatory) membership through employment (from 1883).

The Soviet Union, under the aegis of Health Commissar Nikolai Shemashko, created a system of universal healthcare very like the NHS [33,34], which may have been, to some extent at least, modeled on the Soviet system [35].¹⁸ After World War II the new socialist republics of eastern Europe adopted similar systems, some features of which have been retained to

this day. The Soviet system put heavy emphasis on health centres (called polyclinics), which were also envisaged in the NHS (“The third instrument to which the health services are to be articulated is the health centre,” said Bevan [23], “to which we attach very great importance indeed”). An insidious weakness of the Soviet system, presumably not explicitly intended in the form that it took, was the gradual deprofessionalization of medicine [34]. Is such deprofessionalization an inevitable consequence of “putting medicine in the hands of the people”, which was Lenin's vision?

The USA has “health service accounts”, in which system consultations and minor treatments are paid for at the time of access and the costs of treating severe injuries are covered by a modestly-priced insurance policy. This system is rather similar to the Swiss one before 1996. Somewhat more sophisticated are the “health maintenance organizations” [37]. Nevertheless, healthcare constitutes a very expensive burden in the USA—roughly double the *per capita* expenditure in European countries. This might, however, be in large part due to the extremely litigious attitude of US citizens to healthcare, an attitude which is thankfully largely absent in Europe.

Singapore has a system similar to the US health service accounts except, as so many things in Singapore, it is compulsory. Citizens contribute to individual accounts in a central provident fund, which can be used at the discretion of the citizen to pay for various kinds of treatment. During the Covid-19 pandemic the Government, however, intervened in this discretion to deny treatment to those who had not been vaccinated, and there are now calls for a similar approach to be taken for other maladies—denying lung cancer treatment to smokers, denying any kind of treatment to the obese, etc. The problem with this “crusade against fecklessness” approach is that diseases do not usually have unique and incontrovertible causes. Now that a large majority of the population has been vaccinated, it is noteworthy that many vaccinated people are catching Covid—possibly

¹⁵ Critics of this hybrid system assert that medical practitioners working partly privately, and making some use of NHS facilities, necessarily detracts from the quantity of State provision S :

$$S = T - P, \quad (2)$$

where T is the total level of provision and P the level of private provision. But this seems much too simplistic. Private practice may actually lead to expansion of the total level of provision (financed by the extra injection of funds), and the inflexibility of the NHS bureaucracy leads to some underuse of the facilities.¹⁶

¹⁶ A case that came to my attention recently was of a patient who turned up at the hospital for an X-ray of her right knee. But the appointment letter had, erroneously, stated that it was the left knee that had to be X-rayed. The patient knew perfectly well which knee needed examination, but had (mistakenly) considered the error in the letter to be too trivial for correction prior to the appointment. The technician, however, refused to proceed and a fresh appointment had to be made, thereby “wasting” the slot. Perhaps one should be thankful that he did not needlessly X-ray the healthy knee!¹⁷

¹⁷ Had he done so, and examination revealed some incipient problem hitherto unsuspected, but easily remedied once revealed, one might finally have been very grateful for the initial inadvertence.

¹⁸ One should bear in mind that in the 1930s the USSR was much admired in Britain for its progress in science (see, e.g., ref. 36).

because their vitamin D reserves had been depleted by the hyperactivity of the immune system, making them more vulnerable—hence it is the vaccinated who have been feckless, unless they took steps to maintain appropriate vitamin D levels. The causes of obesity are not well understood, in particular the rôle of gut microbiota; it may not be simply the result of a lifestyle choice. And what should be done about genetic diseases? We are on the road to eugenics here.

Is there a market for healthcare?

The most basic framework of a market—the only one that needs to be guaranteed by the State—is the law of contract. There is a market for cellphones and a myriad of less complex goods and services, all of which are more or less well-defined and none of which are essential for life.

Well illustrative of the difficulties of medicine is the story of why Paracelsus, Stadtarzt of Basel, had to abruptly flee the city in 1528 [38]. A certain Canon, Cornelius von Lichtenfels, was in dire health and offered Paracelsus 100 florins (or guldens, a very substantial sum of money, far in excess of normal practice) if he cured him. Paracelsus gave him three small pills, upon taking which he was swiftly cured, but then declined to honour his promise. The subsequent Court proceedings did not have a satisfactory outcome (the Canon had powerful civic friends). The only redeeming feature of this episode was that a year later the University, where Paracelsus was also professor of medicine, was closed for a decade because of the Reformation [39].

Also illustrative is the story of the physician who settled in a remote jungle settlement and started to treat the tribespeople free of charge. His practice was successful and his fame spread as far as a city beyond the edge of the forest, whence one day a man came to ask if he could treat his wife, who was suffering from a severe malady that all the city physicians had failed to cure. The man was very rich and offered any fee the jungle physician cared to ask for. “Pay me”, he said with perfect rationality, “the same as the value of your wife’s life to you.” This put the husband into an irresolvable dilemma.

It would be perfectly possible for the contemporary citizen to calculate an individual J-value in order to decide whether to accept an intervention, based on its cost, his income and life expectancy, and its prolongation due to the intervention. But if its cost is zero to the patient, as with most NHS services, then any measure prolonging life, no matter how trivially, is worth having (presumably it would not be authorized by NICE and available if it did not have some beneficial effect).

Furthermore, there is a market-economic incentive (on the part of providers) for overutilization of drugs and treatments in general, and the performance of unnecessary services; and a tendency for health anxiety to promote acceptance of the superfluity. This is a particular problem in the USA and doubtless another factor contributing to the extraordinary expense of healthcare there. Yet, for the individual citizen, there may be nothing anomalous: purchasing “superfluous” healthcare is no different in principle from having an extravagant meal in a restaurant or any other kind of luxury.

For a state-funded health system, free market principles cannot be allowed to operate—the system would quickly collapse as demand would perpetually exceed supply. Can J-value analysis, based on the quality of life index, be used to determine the rational budget for a health service? If By applying small perturbations to equation (1), we end up with [2]:

$$J = H X(1 - \epsilon)/(\delta X G) \quad (3)$$

where H is the amount that might be spent on healthcare to achieve an increment δX in life expectancy. Note that it has been shown to be unnecessary to discount life expectancy [40], as has sometimes been suggested. In essence, $J = 1$ only defines a locus of a line in the G, X plane that maintains life quality; it cannot tell us how much we actually need to spend on health. For that we would need to decide how much we wish to increase life expectancy, which begs the question whether longevity is indeed a worthwhile social objective [41]. A more reasonable goal, certainly unexceptionable, would be to eliminate morbidity. According to Public Health England/ Office for National Statistics the average number of years in poor health M is about 18. Redefining X as $X - M$ (i.e., the number of years in good health) and rewriting equation (3) accordingly, we have:

$$J = H (X - M) (1 - \epsilon)/(\delta(X - M) G) ; \quad (4)$$

this tells us that, predicated on the strong empirical relationship between gross domestic product and life expectancy [2], and with the parameters in Table 1, it would be reasonable (in the sense of maintaining quality of life) to spend 0.39×10^{12} GBP—slightly over double the present NHS budget—to achieve one extra year of good health, averaged over the entire population. The huge unknown is whether this spending would actually decrease morbidity. It is highly conceivable that a lot of money could be poured into the health service (i.e., tripling its budget) without any benefit—such as might happen if all the staff were furloughed or spent their time playing computer games. Conversely the outcome of staff effort hugely depends on the level of medical knowledge and medical technology. What would life expectancy be without the NHS? Whether this can be estimated will be

left for later consideration. At any rate, the NHS has become inextricably woven into the fabric of the nation; nevertheless, the desirable decrease in morbidity might well be achieved more effectively via education, or alleviating poverty (*pace* Kropotkin [28]). Meanwhile attempts could be made to ascertain the sensitivity of life expectancy to individual treatments; a kind of “dose–response” quantification. But this would be a massive undertaking and way beyond the scope of this essay.¹⁹

Table 1. Parameters for J-value analysis.

Parameter Symbol	Value
Average life expectancy X	81 years
Average number of years of ill health M	18 years
Gross domestic product (one year) G	2.2×10^{12} GBP
Risk aversion ε	0.91 ^a
Annual NHS budget	0.1765×10^{12} GBP

^aFor the UK [40], and other developed countries [2].

Since such a “rational” approach to determining national health service expenditure seems *presently* to be out of reach (although not in principle), and since a free-market approach is inapplicable, various attempts have made to regulate matters. There was the 1983 Griffiths Report, which ended consensus management. The GP fundholding scheme was introduced in 1991; it enabled GPs to negotiate contracts with the NHS and private providers—if savings were incurred due to engaging the latter, they accrued to the benefit of NHS patients—but it was abolished within less than a decade. In 2003 a new contract was proposed between GPs and the NHS [43] which, Soviet-style, shifted the priorities of general practice towards generating the maximum number of “financially rewarded points”, for example by increasing the proportion of patients taking medication to lower cholesterol levels. The new arrangements increased GPs’ earnings but, it has been said, took the soul out of general practice. The 2012 Health & Social Care Act instituted GP-led Clinical Commissioning Groups, which were responsible for commissioning services from any qualified provider. They do not, however, appear to achieve the efficiency of the fundholding scheme. A new Health & Care Act is planned for 2022. The dilemma is always that, as Hermer has pointed out [44], healthcare has a shared status as a commodity and as a public good. But the status is complicated by medical ethics: in the USA, the AMA Code of Medical Ethics (1847) stipulates that physicians are obliged to provide charity care to those in need, although they rely for their livelihood upon payment for their services. The nature of

these services has long been governed by the precept *primum non nocere*. This, rather than the trap of *prévenance*, or the venal desire to maximize income, has dominated medical practice and allows a patient to approach his physician with confidence (formalized by signing an informed consent). Most physicians would forthrightly repudiate Arthur Hugh Clough’s “Thou shalt not kill; but needst not strive / Officiously to keep alive”.²⁰

Preventionism

The NHS has sometimes been criticized for focusing too exclusively on cure rather than prevention. The latter, it is argued, is much more cost-effective than curing disease after its onset. Without prevention, it is argued, the NHS is in effect a National Disease Service. Prevention extends the benefits of early diagnosis backwards in time. The notion seems at first sight unexceptionable, even laudable—who would not wish to applaud the work of the Royal Society for the Prevention of Accidents (RoSPA), for example? But prevention is an ethical minefield. Skrabanek describes the modern preventionist as dissatisfied with *primum non nocere*, which is seen as a minimalist programme that must be supplanted by the positive action of preventing diseases from occurring, by force if necessary [45]. The UK government has enthusiastically subscribed to preventionism, albeit preferring to use persuasion rather than force, as evinced by the formation of the Behavioural Insights Team by the coalition government in 2010; taxation is also used as an instrument (e.g., the Soft Drinks Industry Levy—also known as the “sugar tax”—introduced in 2018 to discourage sugar consumption); programmes have been kept separate from the NHS.

Vaccination is preventionism *par excellence*, and although the vaccinations long offered to infants (by the NHS) well illustrate what has been called Rose’s prevention paradox, that a preventive measure that brings large benefits to the community offers little to each participating individual [46], this has not deterred parents from arranging these vaccinations; uptake is very high. Matters changed with the Covid-19 pandemic, as a means of combating which novel vaccines were rapidly developed for adults, including some based on encapsulated mRNA more properly labeled gene therapy rather than vaccine [47]. Benefits to the community were smaller than might have been hoped for (partly offset by offering multiple repeat vaccinations), and subjects suffered some disbenefits, exacerbated by the repeats. In

¹⁹The US Drug Effectiveness Review Project (DERP) [42] is somewhat relevant to this endeavour.

²⁰From *The Latest Decalogue*.

some countries, notably Austria, a totalitarian approach has been adopted, with plans to make Covid vaccination compulsory for all citizens, and in many countries it is already compulsory for certain groups (all employees in Italy; all public-sector employees in Ukraine) to be vaccinated. Ironically enough, the stupendous effort needed to vaccinate a large majority of the population, undertaken by the NHS, effectively turned it into a National Covid Vaccination Service, setting aside practically all other services, for which barely any resources remained. Starting this month, in Singapore, the hospital fees of unvaccinated Covid patients will no longer be covered by the government, motivated by the need to conserve resources. Similar calls have been made in the UK, which have in turn renewed debate about whether to deny treatment to smokers, the obese and others whom society deems to be responsible for their ailments through feckless behaviour. Such denial represents a profound repudiation of traditional medical ethics, and is not new; the ideologues of the French Revolution reserved medical treatment for the law-abiding [48].

Medical philosophy

The swiftness of the introduction of the vaccination programme, and the involvement of nearly the entire population, brought into sharp relief the age-old (but first revealed with clarity by Machiavelli [49]) and ultimately irreconcilable tension between individual autonomy and communal purpose [50,51]. Michel Foucault has identified three successive modes of conceptualizing medicine during its great flowering from the 18th to the 19th centuries [48,52]: nosological (classificatory), concerned with the nature or type of pathology, and with a clear curative purpose based on discovering the essence of the disease—an approach pioneered by Paracelsus over 200 years earlier [53], and favouring recovery in the family foyer rather than the hospital; the medicine of epidemics, concerned with symptoms and causes, and requiring a central bureaucracy and police force to fix necessarily normative standards of hygiene, which in turn presupposed collective ideas of what constituted a “good life”; and finally the clinic and pathological anatomy, concerned with the precise description of symptoms and their combinations—these were the source of variation, not the individuality of the patient—and illnesses were defined by the lesion; by anomalies.²¹

To a great extent the third mode continues to define medicine today. Canguilhem has, however, pointed out that illness does not reside in individual cells [54], again echoing an idea strongly developed by Paracelsus [53]. The anomalies identified by this mode or paradigm are often referred to, seemingly synonymously, as abnormalities. But Canguilhem has reminded us that “anomaly” is derived from *ομαλος*, which means smooth, hence the etymology of anomaly suggests roughness or asperity as its root meaning; i.e., an objective physical property. On the other hand “abnormal” is derived from *νομος*, meaning norm or law, implying reference to a (social) value. Abnormality is thus not at all a synonym of anomaly.

While the presence of physically observable—and even often quantifiable—lesions in the patient makes his or her illness sufficiently objectively real, in the case of physical illness, so-called mental illness is in a wholly different category because physical lesions are not observable, despite some progress in brain scanning using nuclear magnetic resonance imaging or positron emission tomography [55]. Hence, as Szasz has pointed out [56], there is no such thing as mental illness; certain modes of behaviour may indeed be abnormal, in the etymologically correct sense of deviating from society’s current values, but—at least according to our present knowledge—are not anomalous and more properly termed “social and ethical problems in living” [57].

Summary of recommendations for reform

1. Frontline healthcare staff should be relieved of all administrative duties. At a stroke this should greatly increase productivity, defined as the quotient of (clinical) outputs and expenditure. If need be, extra staff should be recruited to serve as intermediaries between the front line and the administration. At the same time, administration should be simplified as much as possible, making use of what passes for artificial intelligence (AI) these days to mechanize and automate processes, especially those involving data handling. These administrative services could be outsourced if lower costs were achievable thereby.

2. Much greater efforts should be made to achieve a cure (which should be the fundamental mission of the NHS) in the home or the community. This may involve greater personal use of “smart” sensors.^{6,7} It is very encouraging that Covid-19 patients are to be treated at home.²² In line

²¹ In principle medicine could progress without any knowledge of the inner workings of the human organism. One could slowly build up a gigantic table with at least four columns: the nature of the subject (external traits in the absence of any genetic information); environmental circumstances (including lifestyle); symptoms; and the results of any attempted interventions. Knowledge of the inner workings can drastically diminish the amount of trial and error needed to find successful interventions.

²² S. Lintern, Covid-19 patients to be treated at home. *Sunday Times* (19 December 2021).

with this trend would be greater nanotechnology-enabled efforts to personalize treatment [58], including making use of an individual's gene sequences.

Greater efforts should be made to obtain feedback from patients about the success or otherwise of a prescribed remedy. At present, if the patient does not make a return visit to the GP, it is presumed that the treatment was successful; on the other hand it may well be that the patient ignored the GP's advice but the malady resolved itself anyway. This information should be logged in a centralized database.

This is just one example of an innovation that could be usefully introduced. Every effort should be made to encourage and promote a spirit of discovery and innovation among GPs. A substantial improvement in best practice would likely result in many areas.

3. There should be a nominal fee for GP appointments. Payment could be organized in such a way as to deter missed appointments, which constitute a significant fraction of total appointments.

4. Prevention should be eschewed. Debates about the merits of preventive measures should take place outside the NHS.²³

5. Treatment of mental illness should be removed from the NHS. Ideally it should be commissioned by the individual feeling a need for it. Since its very definition invokes normative values, it would be appropriate for it to become the responsibility of local communities in cases where apparent need surpasses an individual's ability to satisfy it.²⁴

6. Basic principles of medicine should be taught in schools from an early age.

It is futile to make recommendations without some notion of their feasibility. Let us consider each one in turn.

1. Mechanization and automation has already made great inroads into manufacturing, and many routine administrative and clerical tasks have also been automated. Further advances in artificial intelligence are likely to take this trend much further. Hence we must anyway be prepared for great changes in employment.

2. In England (unlike in France) not much thought has been given to the underlying philosophy of medicine in recent decades.²⁵ Discussion about it should be encouraged, not only among NHS staff but also among the general population.

3. Fees for prescriptions and dental work were already introduced a long time ago.

4. Discussion about prevention should form part of the wider discussion of the philosophy of medicine.

5. This recommendation is likely to be the most controversial, and should be included in the wider discussion of the philosophy of medicine.

6. Due attention should be to Vygotsky's notion of the zone of proximal development [61]. Prevention can usefully be included in the syllabus. The inculcation of good habits, with a good understanding of why they are important, is likely to be far more effective during the relatively impressionable school years than campaigns aimed at adults.

Regarding normative social values, which can usefully be discussed in the classroom, it is fascinating to note that "illness of any sort was considered in Erewhon to be highly criminal and immoral; and that I was liable, even for catching cold, to be had up before the magistrate and imprisoned for a considerable period" [62].

Ideally, the NHS should evolve towards a bottom-up system based on universal ties [63]. This would encompass health creation and disease prevention, but not via top-down interventions such as those of the Behavioural Insights Team. The goal is to change the present passive social model of health and medical care to active self-improvement.

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²³ See Bodirsky et al. [59] for an example of the intricacy of such debates.

²⁴ To some extent this is already happening. The first few pages of a monthly booklet The Oracle advertising local businesses and distributed gratis to all residents are filled with advertisements for holistics, reflexology, hypnotherapy, career change coaching etc.

²⁵ The converse may have been true two centuries ago. See, e.g., ref. 60.

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Appendix

Regional differences

Evening out regional differences in healthcare was also a motivation for setting up the NHS [23], and it has recently been asserted, partly in the contexts of post-Covid assessment and of the “leveling up” agenda, that significant differences in healthcare still persist (cf. ref. 64), both in terms of provision of services and of outcomes such as life expectancy. Yet, scrutiny at county or regional level does not support these assertions (Table 2). Differences there certainly are, but correlations are difficult to

discern. It would not be unreasonable to suppose that in more prosperous areas the cost of living is also higher, and that part of these higher costs would pay for improved healthcare services. The balance between cost and life expectancy can be calculated according to the J-value approach. It is, however, striking that some prosperous areas (such as Kent) have rather low provision of healthcare services.

Table 2. Some healthcare-associated factors in arbitrarily selected regions of England.

County (Region)	No GPs per 10 ⁴ people ^a	No dentists per 10 ⁴ people ^b	Mean house price/kGBP ^c	Mean total income/kGBP ^d	Life expectancy/years ^e
Cumbria (NW)	5.8	1.7	205	24.7	78.2
Devon (SW)	6.2	1.5	318	24.9	80.2
Dorset (SW)	5.9	2.1	347	26.4	80.2
Kent (SE)	4.5	1.3	366	30.6	80.6
Lincolnshire (E. Midlands)	5.1	1.0	219	24.4	79.4
Norfolk (E. England)	6.9	1.2	274	25.2	80.4
Yorkshire, N.	6.9	1.4	277	28.7	78.7

^a October 2021.

<https://www.nuffieldtrust.org.uk/chart/number-of-patients-per-gp-by-ccg>

^b November 2014.

https://lginform.local.gov.uk/reports/lgastandard?mod-metric=3705&mod-area=E06000031&mod-group=AllSingleTierAndCountyLaInCountry_England&mod-type=namedComparisonGroup

^c December 2020.

<https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/meanhousepriceforationalandsubnationalgeographiesquarterlyrollingyearhpsdataset12/current>

^d 2011–2.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/284842/table3-13-12.pdf

^e 2015–7.

<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/lifeexpectancyforlocalareasoftheuk/between2001to2003and2018to2020>

If one drills down into the data, insofar as finer geographical detail is available one can indeed find pockets of extremely high or low provision and outcomes. Probably a politician could always find the individual pieces of evidence to back up a point that he or she wished to make. But we are still a long way from establishing causal links between these factors.

Geography—latitude and longitude and all the attendant subsidiary features of weather, soil, flora and fauna etc.—constitute highly significant confounding factors. Leveling could perhaps be achieved by putting a huge geodesic dome above the entire country, which even the most hubristic politicians have not yet proposed.