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Exploring the continuum in public response-styles to medical screening for disease.

## Introduction

This paper analyses public responses to medical screening tests for disease. The conceptual approach in this paper draws on those approaches developed by scholarly thinkers who have addressed the genesis of human knowledge, the phenomena of disease/illness and the social meaning(s) arising from the public experience of illness. I will briefly describe some aspects from these approaches of significance for this paper. Firstly, the paper's approach to the genesis of human knowledge is based on a particular understanding about how knowledge can emerge from apparently differing methodologies which seem to be radically different. For example,

"In works of scientific genius, it is reflection which draws the inner essence out of the simple fact. In humbler imaginative works of art, it is reverie which attires and embellishes the solitary fact. The complexity or simplicity of the work is irrelevant. The working of the spirit is the same for both." (1)

Secondly, the approach to understanding the phenomena of health and illness is premised upon an ontology of caring with well-known historical antecedents. For example,

"..the commonest exclamation which will be instantly made is - Would you do nothing, then, in cholera, fever, &c. ? - so deep rooted and universal is the conviction that to give medicine is to be doing some-thing or rather everything: to give air, warmth, cleanliness, &c., is to do nothing. The reply is, that in these and many other similar diseases the exact value of particular remedies is by no means ascertained, while there is universal experience as to the extreme importance of careful nursing in determining the issue of disease." (2)

Thirdly, the paper takes a post-relativist stance on the social meaning(s) of disease (3). In this approach scientific statements are not seen as just mirroring nature's realities but as engaging phenomenal realities in highly ritualized ways which "talk-back" with "..a logic not wholly human and in ways richly generative of human meanings and social imperatives" (4).

In this paper what is termed scientific knowledge is seen as involving ill understood processes which incorporate the 'natural' into human history for social purposes (5). In relation to scientific knowledge of AIDS (Acquired Immune Deficiency Syndrome) and human Retroviruses, this paper assumes that "contradictory evidence and widely divergent interpretations exist" within biomedical knowledge in terms of AIDS and the nature of Retroviruses, which are often not "..identifiable among categories of professional training" (6), like biomedical scientists and other experts who are practitioners of science and health care within our conformist institutions.

## Public Response-Styles To Medical Screening Technology

It seems that a crucial issue for conformist or mainstream medical practice is the public's response to medical biotechnology. This impacts the current debates on the value of medical screening technology in detecting disease. I will describe why this issue is an important one by using an approach which is similar to Langdon Winner's which takes account of the diversity in public responses to biotechnology and the specific artefacts of screening technology (7), like medical 'tests', which are often routinely applied to populations under the apparent guise of bettering the public health.

This particular approach to medical biotechnology seriously considers these technologies by paying attention to their characteristics as technical objects, or artefacts, and the meaning those characteristics convey, perhaps imperceptibly, to the public who after all comprise the 'end user' or consumer in our conformist health services. This approach appears useful because it can assist both public and professional to focus on and analyze the way medical tests aim to detect phenomena of ill-health solely in terms of cellular or molecular events (8). Armed with such technologies, health professionals are increasingly charged with marketing to a healthy public the message that they must '..come to us [health professionals], go through this procedure, and there will be a subsequent benefit'(9). In practice, screening 'tests' bring few benefits and are often imprecise (10); a fact now openly admitted by a British Government authority, the National Screening Committee (NSC). In 1998, the NSC, charged with determining British standards in screening for all diseases, stated:

"Any [medical screening] test will find true and false positives, and true and false negatives. An ideal test only finds true positives and true negatives. In practice this is rarely possible, and there is a trade-off between not missing real cases (sensitivity) and not finding false cases (specificity). It is because screening is rarely precise that much of the potential for harm may come."(11).

Given the above 'official' disclosure about the actual effectiveness of medical biotechnology, it is not difficult to work out why this issue is so political for modern health services and why the debates on modern biotechnology and its safety are increasingly common amongst the public; fuelled, of course, by an ever increasing, some say justified, public scepticism over the politics of science and the often sensational media coverage of such issues.

In the United Kingdom for example, women have notably impacted the efficacy debates on Cervical Screening; parents have contested the received wisdom on Mass Childhood Immunization (12) and many groups are actively involved in the debates on Genetic Modification (GM) of foods. Also, scientific experts are seen to disagree on the 'correct' interpretation of scientific research as well as on how best to go about doing the research in the first place. This crisis point now reached in the public understanding of science is reflected in the current Eurocentric debates on what exactly are the criteria for an 'abnormal' cervical smear (13), what is really 'safe' about GM foods, or what

'really' causes 'BSE'/'new variant CJD' (14). These issues are also reflected in the British public's reduced level of trust in scientists, now reportedly lower than its trust in the police force, according to a recent opinion poll (15).

To further illustrate the nature of these debates, I will describe two differing responses that suggest a spectrum, or perhaps, a continuum exists in public responses to medical biotechnology. I practice as a Registered Nurse (RN) in a Men's Health Clinic where young men often request sperm counts to measure their fertility without any intent to father children. The way that they can speak of this so-called 'simple' measure shows they actually perceive of it as a test of their 'virility'. This is one style of response, a form of social incorporation of the available technology; it can alter the so-called purely 'technical' meaning in line with the social or 'technosocial' realm of the particular individual; a mode of self-reinvention, or self-encounter, within a technological space itself perceived of as a 'socio-physical' environment - a form of techno-nature (16). This consumerist style of response may impact health care via public expectations and also maybe of utility to multinational corporations in future commercial design or manufacture of specific technologies. For example, in 1999 it was noted how public litigation in the United Kingdom had influenced the industrial development and production of medical devices to be marketed in the new Millenium (17).

Another response-style can be more difficult for mainstream or conformist health services to appreciate. It can arise after experts' endorsement of the specificity and reliability of screening technologies, based upon scientists' perceptions of consensus on disease causation (18). For example, the British Department of Health now says that HIV screening of all pregnant women, having no AIDS risk factors, is "better for your baby" (19). Their leaflet says "...you will have time to think about your choices for care and treatment during pregnancy and labour..you can decide whether or not you want to breastfeed."(20) Yet the biomedical literature also cites evidence that pharmaceutical treatment with the anti-HIV drug Zidovudine (AZT) damages human blood cells and bone marrow (21); AZT has not been tested in extensive Phase 3 clinical trials and is still considered toxic for both adults and foetus. Some pregnant women and biomedical scientists (22) now imply, what if 'better for baby' is really misguided coercion to swallow pharmaceutical 'poison'; perhaps (yet) another iatrogenic dose of Thalidomide or Stilboestrol, yet another bitter pill to swallow with who-knows-what real effects ? (23).

For example, in Oregon United States in October 1998, Kathleen Tyson - a woman with no AIDS risk factors - tested HIV antibody-positive after mandatory HIV screening whilst pregnant (24). Tyson describes how by stealth she tried to evade perinatal transfusion of the AZT. Tyson's rebuttal to the doctors cited biomedical data on AZT's 'side-effects'; further data questioning HIV as the sole causative agent in AIDS; as well as querying the specificity and sensitivity of the HIV antibody test-kits, patronisingly simplified for public consumption into a misnomer term, 'the HIV test', which incredibly manufacturers warn can test 'false-positive' after a prior pregnancy (25). Following birth of what was Tyson's second child, later named Felix, the State of Oregon judged Tyson to be endangering his welfare and legally enforced the administration of AZT syrup to Felix. Tyson's second 'option', if she was non-compliant, meant the State took legal custody of Felix; hardly a

'choice' for any parent. Armed guards were reportedly posted outside her hospital room so insuring her compliance with court orders to medicate Felix and to stop Tyson from breastfeeding. In 1999, this scenario was presented to the United Nations Commission on the Human Rights of Women (26), cited as an example of abuse fuelled by the North American evangelical-style AIDS health legislation, the Ryan White Health Care Act, which promotes mandatory screening of all pregnant women for antibodies to HIV, via the stick-and-carrot of increased Federal government funding.

Leaving aside the key issues over whether this increasingly common North American scenario represents either 'prevention-of-infection' or 'biomedical fascism' (and its ethical dilemmas for health workers), what was different about Tyson's engagement with science concerned the manner in which her decision-making was quickly perceived of as dangerous, in context of the conformist and hegemonic medical opinion that her positive HIV antibody-test result was a 'true' positive, perceived by her infectious diseases paediatrician as overwhelmingly indicative of an infectious Retroviral agency. Tyson's resistant response-style incorporated so-called dissenting biomedical views on AIDS causation and treatment. It parallels current British parental opposition to Mass Childhood Immunization now waging a lengthy battle in the British High Court against the Department of Health for allegedly suppressing information on the effects of Measles, Mumps and Rubella vaccines (27).

What is signified in AIDS technics?

In his book *The Birth of the Clinic*, Michel Foucault analyzed the emergence of pathological anatomy. A key axiom in pathological anatomy was the postulation of an organic basis to the human experience of illness. In his analysis, Foucault postulated a medical or clinical gaze, *le regard*, at once perception and an active mode of seeing through which social objects like disease categories come into being. Foucault argued that this gaze was reorganized in the Modern episteme to inspect pathological reactions, not essential diseases, in order to seek the organic root of disease before visible lesions arose. Significant was "not what can be seen of these alterations, but what is determined by the place in which they develop" (28). The axiom was localization over visibility; whereby disease was considered to exist in space prior to existing for sight, in a spatialization of medical experience that defined a physiology of morbid anatomy. Our modern day technologies of screening for diseases like AIDS are epistemologically grounded in this notion of organic disease existing in space prior to its existence for sight.

For example, in the case of AIDS and its so-called causative Retrovirus (human immunodeficiency virus type 1, HIV-1), antibodies to HIV are said to be localized within the patient's bodily fluids years before any AIDS-related diseases are seen in the patient's body. Whilst the patient is said to appear well, the patient is also said to have the localized marker of infection, antibodies to HIV, which the approach of pathological anatomy determines as causative of the Syndrome of diseases now known as AIDS.

Modern technological medicine is developing more and more sophisticated algorithms for which to test for conditions like Cancer and for agents like prions on the assumption that a pathological/organic basis for disease always exists in an undetectable form without overtly evident signs or symptoms; thus, biomedicine aims to reduce all illness to its organic basis. The overarching axiom of all such modern medical screening technologies appears to be the detection of an occult spatialization of disease in the body before the reportage of symptoms and/or the emergence of signs. In this manner, antibodies to HIV are considered to represent a prodromal sign of possible and/or probable development of AIDS-related illness/disease. Using this conceptual understanding, it is possible to research the public understandings and experiences of the screening technologies utilized within the AIDS Clinic, like HIV antibody-tests, T-4 (CD4+) cell counts and the Viral Load tests, which are themselves artefacts of this reductionist approach arising inevitably from within our Modern episteme of pathological anatomy.

The basis of such AIDS screening and testing technologies emanates from particular biomedical 'truths' and/or meanings surrounding the concept of exogenous Retroviral infection and its assumed clinical effect upon the human immune system. Long before the AIDS era, Mumford noted that the principles which develop any particular scientific method are often used to underpin technological invention (29). Mumford further stated: "Technics is a translation into appropriate, practical forms of the theoretic truths, implicit or formulated, anticipated or discovered, of science." (30). Given that modern biomedicine most often portrays AIDS as caused by HIV; the biochemical tests for HIV antibodies, T-4 cells and Viral Load, together constitute AIDS technics, because they are translations into appropriate, practical forms of the theoretic truths implicit or formulated, anticipated or discovered, of the biomedical approach to AIDS as a Retroviral disease. In addition, Bijker et al. considered the difference between 'technology' and 'technics' as being like that between 'epistemology' and 'knowledge' (31). Similarly, whilst the technology of AIDS is premised on the episteme of pathological anatomy, the practical day to day biomedical knowledge of AIDS is premised on the application of AIDS technics, the biochemical tests for HIV antibodies, T-4 cells and Viral Load. Taken together, and within the AIDS Clinic, these screening tests are utilized in the medical determination of the pathological agency of the Retrovirus and its assumed effects upon the human immune system. Through analyzing individual's discourses on AIDS technics we may come to understand the hegemonic meaning(s) inherent within these screening technologies and how individuals formulate their own knowledge of AIDS premised upon their Inter-action with these theoretic 'truths' or hegemonic forms of knowing of AIDS as a Retroviral disease, wherein the concept of 'cure' is impossible by definition of the agency of exogenous infectious Retrovirus. In my research into the lived experience of AIDS, I have utilised Foucault's analysis of pathological anatomy as an artefact of the Modern episteme in order to develop a conceptual framework and methodology for analysing individuals' experiences of AIDS in relation to the routine screening, diagnostic and monitoring tests.

In the following quote<sup>1</sup> one individual refers to their T cell count following their description of their understanding of the meaning of the

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<sup>1</sup>All real names attributed to the quotations cited in this paper have been changed.

positive test result for HIV antibodies. The individual focuses on the vagueness of the new context within which the test result has positioned him and his surveillance of his bodily symptoms together with the confounding nature of other factors like advancing years,

"..skin things rashes, recurrent herpes attacks which appear to become increasingly virulent rather than less which is the normal progression and that's it really. Sometimes tiredness and fatigue. But then it's very difficult to put these in a context because you know I am not the energetic person I was ten years ago and that's maybe as much as to do with the fact that I am ten years older as anything else in a way it's part of the problem with HIV is that it's very difficult to grasp. But it's all rather vague things. There's nothing really specific and objective that I can grasp about it. I suppose one objective measure is something like declining T cells. But again these are sort of invisible things in your body." (Henry)

In the above quote, the individual's experience of having received a positive test result for HIV antibodies was described as lacking in a 'specific' and 'objective' frame of reference. One specific/objective frame of reference was spoken of as being the T cell count. This count was spoken of as enabling the person to 'grasp' something 'objective' about the experience of life following the HIV antibody test; perhaps, because the knowledge of the count involves the individual receiving a quantification of their own 'invisible' T cells. Thus, this particular 'measure' is spoken of in terms which shows how it appears to facilitate a quantifiable delineation of life after the experience of testing for HIV antibodies. In the next quote, a similar reference is made in connection with the meaning of having tested positive for HIV antibodies,

"Part of the problem with HIV is that it's very difficult to grasp because you have this enormous burden of a knowledge loaded on you about an underlying medical condition. Until there's something specific and real to react to its quite difficult to get a purchase on it and I suppose one objective measure is something like declining T cells." (Henry)

In the above quote the individual speaks of the indeterminate nature of what is signified by a positive test result for HIV antibodies. This signification is spoken of in terms which are both problematic and contradictory. On the one hand it signifies something difficult to grasp whilst on the other hand it signifies an underlying 'condition' which is loaded upon the individual. This ambiguous signification is spoken of in ethereal terms as something difficult to reckon with in any specific and real sense. One 'objective measure' of this 'underlying condition' is spoken of as knowing of a declining number of T cells in the body via the quantitation of the count. It enables the individual to react to something which is thus spoken of as being 'specific' and 'real'. This particular 'objective' knowledge is spoken of as facilitating the individuals' purchase on the key notion of there now existing, in a localized form (in the blood/bodily fluids), element(s) (antibodies) within their body's anatomy which are pathological (signify Retrovirus) and which is seemingly signified by the positive antibody test

result which had been previously spoken of as difficult to grasp. In the next quote, the knowledge of the falling T cell count is specifically referred to as eliciting a specific reaction,

"..my T cells went down to 50 last year that was as I said a shock because whatever the arguments about what they actually mean there's something very objective about that I felt a need to react to and not in a perhaps, not in a.. and I have had to think what do I want to do with my life in the period of good health that I have left." (Henry)

In the above quote, the speaker suggests that there are arguments over what is 'actually' signified by the T cell count. The speaker describes the experience of being told about falling numbers of T cells in the body in terms of shock. The speaker says that whatever their precise signification their so-called 'very objective' nature facilitates the feeling of need. In this way, knowledge of the count verbalized to the individual in the AIDS Clinic may generate or seed certain needs within the individual. This speaker's need is that of having to react to this particular biomedical knowledge. The terms in which this is spoken of are those of being 'shocked' and following this 'shock' having to think about the period of life which is remaining before death and dying. In this manner, the quantification of lifetime remaining which is signified by the T cell count may operate so as to reframe an individual's thinking more towards death and dying in a predetermined and powerful fashion. The latter is spoken of in terms which are less reminiscent of an individual's own particular experience of living and more reminiscent of the biomedical 'truth' of an incurable Retroviral disease. This psychological reframing of an individual's own thinking, via the technic as a translation of the hegemonic 'truth' of a Retroviral disease and as signifying biomedical knowledge of impending death, is further spoken of in the next quote,

"..knowing that I've got fewer T cells than I had 2 years ago has a kind of psychological effect and in the last couple of counts which have been extremely low were a shock. I think they made me reassess what I am doing with my life in a way that surprises me really."  
(Henry)

In the above quote the same speaker relates the shock of the knowledge of the count which signifies far more than its mere quantitation. Within the biomedical model of Retroviral AIDS a falling T cell count signifies impending illness and ultimately death and dying; and its psychological effect is that of making the individual reassess what they are doing in their own lifetime. It is noticeable that in the next quote from this particular speaker, who does not contest the signification of the test technology pertaining to HIV, the cause of the falling count is also hypothesized as being due to other than a Retroviral agency,

"It's interesting that the massive fall in my T cells has happened over a period when I've been taking drugs specifically Acyclovir and it's not to say that it wouldn't have happened anyway but you do wonder to some extent." (Henry)

In the above quote, the cause of the falling count is spoken of in equivocal terms as the speaker equivocally associates the lowered count



with taking prescribed medication. Such effort after meaning may lead to the generation of experiential knowledge of the technic which can compete or supersede the conformist or orthodox knowledge of the technic. In the following quote another speaker relates this engagement with alternative significations of the technic as being an inaccurate measure open to variation,

"..because I've heard that it [CD4 count] is diurnal. I'd heard if you take it in the morning then take it in the evening of the same day and stuff like this. But the other reason for the morning thing too is [Doctor's name] said, and I knew and I knew what he was going to say, and I was waving pretty fists [at the Doctor who says] its of course like, "If you can get them off in the morning you can get them back the next day because of the lab." I said, "O.K. I check that. I can buy that, but I still feel, I still believe that, it is these variations that are recorded." I said, "Because we all have biological clocks you know that rhythm changes if your biological rhythm changes according to the hour of the day and stuff like that I am sure everything else in your body is being affected at the same time." So you know, I didn't want to get Bolshie with him, because I do like him but I mean I couldn't. I said to him, "I don't buy everything you say", he said, "That's fair enough." (Andy)

In the above quote, knowledge of the limitations in the test technology leads the speaker to openly question the conformist or orthodox signification of the technic. Subsequently the speaker's admission of not being swayed or influenced by the conformist or orthodox signification of this technic appears to have been acknowledged; in this sense, the speaker's dissentience appears to have been supported from within the AIDS Clinic. In all of the above quotes the technic is spoken of as embodying specific significations. In the next quote the technic is spoken of in terms indicating that certain significations actually constitute knowledge of apparent value for the speaker,

"... but in a sense it is a shame that I didn't know then what I know now. I'm not quite sure what a difference it would have made maybe I would have approached things differently at an earlier stage." (Henry)

In the above quote, it is ambiguous exactly how knowledge of the technic is valuable except that such knowledge now known was previously unknown, implying that the technic strategically or qualitatively alters one's life experience. In all of the above quotes the technic is spoken of as having an inherently ambiguous yet fundamental effect upon an individual's own decision-making processes. Part of this effect is spoken of in terms which indicate that it may reframe the individual's thinking towards death and dying. In this manner this particular technic may constitute a mode of biomedical terrorism as it can facilitate psychological trauma for individuals through its embodied significations of death and dying. However, as shown in the previous quote not all individuals are so fatally reframed by the technic in this manner. Similarly, the next quote also shows how this technic is spoken of in terms of its social as opposed to its biomedical signification,

"You know I could just sort of have gone on and maybe had 2 cells T cells whatever you know. And it doesn't bother me. I don't particularly want to know unless he [the Doctor] wants to tell me. You know I had to know for my benefits and things. Because they had to know. Because I have to be signed off sick." (John)

In the above quote the technic is spoken of as a form of knowledge important for the social welfare status of the speaker, as it may form part of the determination of their right to receive social welfare payments known colloquially in Britain as being "signed off" (meaning when one is medically judged as being unable to undertake employment due to sickness or suffering from a specific illness). Thus, the technic serves other more social and less biomedical functions such as providing 'objective' (biomedical) evidence of the speaker's 'sickness' through the technic's particular embodied form of biomedical significations which are institutionalized within the conformist and biomedical definitions of AIDS as Retroviral disease. The offer of knowing about the technic made in the AIDS Clinic may be spoken of as having a particular imperative for the individual so that initially they feel they must know of it, as described in the next quote,

"Oh to begin with yes because everybody thought it was important. But my CD[4+ T-4] count has been below 20 for about the last three years. I don't even ask what it is anymore. It's probably in minus figures now and I just realised the reason I was not interested in CD4 [T-4 cell] counts was from what I'd read professionally. And also, that the people who'd had CD4s of 400 had dropped dead and people who had CD4s of 20 and didn't even have an AIDS diagnosis. I mean one of my friends was diagnosed in 1983 and he hasn't got an AIDS diagnosis yet." (Jerry, health professional)

In the above quote the speaker relates their understanding of the technic as having changed from one of a perceived significance to a perceived non-significance. This is spoken of as being due to the speaker's engagement with professional or 'expert' knowledge. This speaker further implies how such expert knowledge alone may not actually disqualify the embodied signification of this particular technic. From the above quote it appears that experiential knowledge may further disqualify the predictive biomedical signification embodied within this particular technic. Therefore, the imperative significations of this technic which may be inculcated within the AIDS Clinic can be effectively rendered unnecessary through experiential knowledge of the technic.

The above analysis of one AIDS technic, the T cell count, has found that such a technic embodies biomedical significations which have some power to reframe an individual's psychological thoughts and decision-making. This power may be invested within the social context of the biomedical language and especially within the social context of the words as spoken by biomedical authorities. Through these specific significations as socially embodied or invested within this technic, an individual may be in turn shocked and affected by these specific significations. Such significations are transmitted via the social context of the spoken word to the individual in the AIDS Clinic by the agency of a practising biomedical authority, the orthodox or conformist doctor.

Foucault conceived language as an "enigmatic multiplicity" that must be mastered (32). Thus, it is "in the holder of the discourse and more

profoundly still, in the possessor of the word, that language is gathered together in its entirety" (33). Thus, from the above analysis it is clear that non-experts may come to hold and possess certain biomedical significations of AIDS which are embodied within its technics or practical forms of knowing of its theoretic truths, like the HIV antibody-test and the T cell count. This engagement with biomedical knowledge within an emergent experiential knowledge of AIDS technics (itself played out through and within language), may enable an appropriation of the biomedical phenomenon of AIDS by those to whom the testing technology is applied/administered by conformist or orthodox health authorities like doctors. The above analysis, together with the above discussion of response-styles, all serve to show how public resistance may have the potential to subvert medical orthodoxy or conformity. Together these response-styles represent a form of public dissidence or dissentience from technological medicine; often acknowledged as such samizdat-style only within the columns of public action magazines, like CONTINUUM magazine (U.K.), INDEX ON CENSORSHIP (U.K.) and RETHINKING AIDS (U.S.A.), or from within other academic journals.

#### Ramifications of dissentient discourse

Unfortunately the particular form of public resistance discussed above in relation the antenatal screening and the more subtle resistance or dissentience seen in the analysis of the T cell count as technic, may run the precipitous gauntlet of coercion from conformist or orthodox health care experts and professionals. For those who respond like Tyson, the discourse on informed consent/prevention of infection reads more like enforced compliance/adherence, yet surprisingly the health professionals directly involved with Tyson (who may have done nothing verbally, behaviourally or politically in support of Tyson's position), could perceive they were 'truly' caring.

How such disparity between the perceptions of 'patient' and 'professional' arise is partly influenced by the prevailing ideology, in this case the 'science-related social currents' (34) which are institutionalizing mandatory HIV antibody screening as a 'standard of care' (sic) in the United States and likewise in the member states of the European Community (35). Ideological currents can have their own peculiar agnostic effect on our professional view about exactly what it is we, as health professionals, think we are doing to people during institutionalized care-giving. For example, German doctors interviewed after the Second World War said they perceived they were 'caring' for inpatients on the experimental wards of the Nazi's prison camps (36). Nurse Rivers, a central figure in recruitment of experimental subjects, reportedly thought she was instrumental in 'caring' for men from deprived communities throughout the unethical Tuskegee Syphilis experiment (37). Knowing that ideology underpins health professionals' actions and decision-making in institutional care does not exempt us from a duty to look beyond medical ideology and its dogmas. To be able to look beyond the ideology and the dogma means that to begin with, you, have to be willing to see. And to see alternatives to a status quo, you need to know, not where to look, but how to see.

For today's 'end user' of biotechnology who is aware of its pitfalls - the 'patient' now retitled in health promotion jargon as the 'client/consumer' - scenarios like Tyson's stand as caveats if you like for public engagement with modern biotechnology, a consumer's warning, for those openly contesting dominant or hegemonic biomedical opinion that underwrites commercial development of ever newer medical biotechnologies. It is also implied that Tyson faced not only State-enforced medication but also ideological conformity to a perceived biomedical consensus, aided and abetted, by attending physicians and staff RNs directly involved (but by all?). Health services appeared to enforce conformity by duping Tyson into thinking 'informed consent' meant she could refuse administration of AZT to her child; in reality what was meant was 'no choice'. Just 'knowing' that biomedical science embodies differing views on drug efficacy, AIDS causation and the meaning of informed consent seemed to fail Tyson. However, the question may be posed does the old adage 'knowledge-is-power' no longer apply if one dissents from a medical orthodoxy? Well, dissenting knowledge leads to the exercise of power through legal and other behavioural strategies, so the old adage kind of still stands.

Differing public responses to medical biotechnology may indicate specific skills and knowledge are needed for health professionals to apprehend the nature and caveats of screening. If the education of health practitioners only attends to the technical tools and uncritically promotes biotechnical medicine, ignoring public apprehension over the design and arrangement of its biotechnology's artefacts, like screening tests, then health care practitioners may become more a-gnostic to that which is intellectually and practically crucial about modern biotechnology (38).

In Britain, the professional body governing the Nursing and Midwifery professions, the United Kingdom Central Council (UKCC) for Nursing Midwifery and Health Visiting, determines that, "...each registered nurse, midwife and health visitor shall act, at all times, in such a manner as to...recognize and respect the uniqueness and dignity of each patient and client, and respond to their need for care, irrespective of their ethnic origin, religious beliefs, personal attributes, the nature of their health problems or any other factor." (39). Therefore it may be assumed that some health care professionals, like Registered Nurses, have a professional duty to respond to the public's needs irrespective of their response-style to medical biotechnology.

From this assumption several implications may follow about the nature of the services which those professionals offer to the public, if an increasingly science-aware and consumer-active public is not to be further turned away from established or conformist health services. The 'end consumer' of health services is the 'general public'. When consumers of care are discerning over biomedical science it must have a knock-on effect upon professional care providers and their educators. Professional practitioners and their educators need to be seen as accountable, open to scrutiny and mindful of the very real limitations of institutionalized science and the plural manner whereby the public can and do engage with the methodology and epistemology of science. This highlights a rationale for a more knowledgeable and reflexive awareness on behalf of health professionals about the problems, not just the so-called advantages, of modern biotechnology which have demanded greater and greater slices of the health budget in all members states within the European Community.

For example, in the case of increasing antibiotic resistance, British health authorities are now reluctantly beginning to see some benefit in other strategies: the non-prescription of antibiotics (now termed "watchful waiting"); government encouragement of the public to ensure a 'normal' bacterial flora (meaning "free of chronic prescription antibiotic use"); the potential negative public effects of pharmaceutical corporations on health service research. The latter issues have served to demonstrate exactly how the British health authorities, since the Second World War and the founding of the British National Health Service in 1948, have all fostered to a greater or lesser degree a blind faith in the efficacy of the 'magic [antibiotic] bullet' to alleviate, or even 'cure', every common symptom from the sore throat to ear ache (40).

The educators of health professionals also facilitate technical 'know-how' on behalf of health practitioners within the context of promoting their caring and empathetic skills which are highly valued by the public. If the education of health practitioners is politically entrusted with only the crafting of 'bio-technical' health professionals, to oversee the public's 'compliance' or 'adherence' to biomedical prescriptions, this may only act to bolster existing norms and power relationships, benefiting powerful pharmaceutical corporations and medical researchers in the process.

Although it is known that some health professionals, like Registered Nurses, want to stay abreast of developing technology whilst also wanting to promote humane caring (41), nevertheless in reality the professional carer working within the established or conformist health services too easily becomes just an uncritical prosthesis of medical biotechnology. Using the example of professional Nursing, the public's choice in terms of nursing personae may come to resemble little more than the 'choice' between, on the one hand the pharmaceutical straight-jacket of 'Nurse Ratchett' in Milos Forman's film *One Flew Over The Cuckoo's Nest*, or on the other hand the humane prowess of 'Carol Hathaway', the Charge Nurse of the popular television programme *ER*, whose technical proficiency is often portrayed as secondary to her humane caring. The question is not just one of health services being politically charged with producing biotechnical Nurse Ratchett's or humane Carol Hathaway's, but more like how does the trade-off work between such power-laden and technically 'skillful' personae in order for a knowledgeable and critical public to have a realistic choice over their own health care options in relation to their own beliefs and value systems?

The education and training of health professionals is a tentative balance between public need and public expectation; and is subject to commercial market forces and political involvement from Governments (42). It may foster positive alliances between the public and health professionals, and encourage reflexive understanding on behalf of professionals of such issues (43); but these insightful developments should not be dependent upon enforcing public belief in the so-called 'rightness' of biotechnical options over other health choices which may be premised on differing beliefs and value systems to the end user. Health care professionals need to apprehend how differing ideologies engender power-laden conflicts; within which professionals can never be truly neutral. The education and training of health care professionals can reflect a philosophy of science which embraces public challenge, like those on AIDS published by CONTINUUM, as well as varying degrees of scientific uncertainty or scepticism.

In and of itself, public challenge, like that described above in relation to the signification of AIDS technics and to antenatal HIV screening tests, cannot preclude the role of professional agency in support of public decision-making to refuse medical biotechnology or facilitate health professionals' disregard of human rights or professionals' refusal to care for an increasingly knowledgeable and ever challenging public.

The ambiguous nature of modern biotechnology and the diversity in the public engagement with its methods and epistemology must mean that whilst a dissenting public may reject modern biomedicine, health care professionals cannot themselves ethically to choose ignore those who dissent from modern biomedicine nor enforce public 'consent' to what appears to resemble a socially constructed consensus within the uncertainties of science. If so, then health care professionals are truly entering into a biomedical era more akin to Huxley's Brave New World or the agnostic modus operandi of those doctors and nurses who are often portrayed in the historical accounts from those who survived the internment camps during the Nazi era.

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