



**BONE MINERAL DENSITY (BMD) TESTING:
WHO NEEDS IT? WHO WANTS IT?**

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The aim of BMD testing is the early detection and treatment of women prior to irreversible bone mineral loss. Large cohorts of peri- and post-menopausal women are being offered the test; unless they have retained the bone mineral density of a 20 or 30 year old, most will eventually be labelled with osteopenia or osteoporosis and be eligible for hormone replacement therapy because “normal” bone mass is defined in terms of the bone mineral density of healthy women of reproductive age¹.

There is mounting evidence that BMD measures have a very low positive predictive value. A BMD measurement is a risk factor for, not the equivalent of, a clinical disorder. Most women eligible for BMD testing will never suffer from symptomatic hip fractures². Risk of hip fracture is dependent not just on bone mineral density, but also on proneness to falling and the ability to protect oneself from injury from a fall. Factors such as limited physical activity, poor vision, fair or poor health, psychotropic drug use, being age 80 or over, and having a prior postmenopausal fracture, have been found to be stronger predictors of symptomatic hip fractures.

Moreover, claims made by proponents of a positive effect on women's lives following BMD testing are not supported by the research evidence. On the one hand, women who are pre-menopausal, those who do not identify themselves as members of the designated “high risk” ethnic groups, and those who test normal for BMD, misguidedly may not take preventive measures to enhance their bone health. On the other hand, there is evidence that women identified as being at high risk on the basis of BMD testing modify their lifestyle inappropriately by restricting their activity level; a strategy which could decrease BMD.

Given that the evidence on effectiveness clearly does not support current patterns of diffusion, what are the forces driving BMD testing? WHO's interests are being served?

This paper takes a critical approach to health technology assessment. Such an approach makes central the social, economic and political contexts in which health technologies are embedded. The task of this paper is to make explicit the hidden assumptions about aging women's bodies that drive the use of BMD testing. Primarily, it challenges the medical model of the aging female body as a diseased body, and questions the use of marketing strategies which create and capitalize on women's fear of aging. Finally, the paper raises questions about the ethical implications of proliferating technologies for economic and political motives at the expense of

¹ WHO Study Group, 1994.

²The greatest burden of suffering occurs in elderly postmenopausal women; it does not follow that all postmenopausal women are at risk for hip fractures. 85% of white women age 50 with a life expectancy of 80 years will not suffer a hip fracture.

women's own needs and interests.

Critical health technology assessment

Since the mid-1970s, social studies of medicine have examined the social and political contexts in which medical knowledge is produced and applied. Medical sociology, anthropology and related disciplines have illustrated how medicine does not merely describe a pre-existing biological reality, but reflects and perpetuates societal relations of power.³ This does not mean that medicine is unscientific; it means that medicine and science, like all beliefs and practices, both reflect and support the cultural values of society at large.

Further to this examination of biomedicine as a cultural system, insights from feminist theory have merged with critical studies of science to question the validity and appropriateness of many preventive technologies for women.⁴ There is a growing volume of evidence that the promotion and use of preventive technologies may be driven primarily by economic motives, rather than the health care needs of women⁵: the pharmaceutical industry, the medical devices industry manufacturers, and the researchers these engage, all depend for their incomes on expanding the scope of medical intervention. These powerful commercial interests place heavy and continuing pressure on policy makers, caregivers and patients to routinely use technologies which are deemed preventive for large cohorts of women, despite the lack of demonstrated effectiveness.⁶

Increasingly, feminist critiques are challenging the ease with which life processes such as menopause are being medicalized⁷ and questioning women's placid acceptance of motives, which

³See for example, Armstrong 1983; Comaroff 1985; Ehrenreich 1978; Frankenberg 1980, 1986; Foucault 1975, 1979; Latour and Woolgar 1979; Lock and Gordon 1988; Scheper-Hughes and Lock 1987; Taussig, 1987; Wright and Treacher 1982; Young 1980, 1982, 1983; Zola 1978.

⁴See Casper Koenig (1996) and Franklin (1995) for recent reviews of this literature.

⁵See for example, Haraway (1995), Martin (1994), Rapp (1995, 1996), Strathern (1992a, 1992b), Traweek (1993) and Wajcman (1991).

⁶This has been shown for ultrasound (Rapp 1993), electronic fetal monitors (Bassett 1996, Kunisch 1989), predictive genetic screening (Nelkin 1996, Nelkin and Tancredi 1994), and mammography (Gifford, 1986), among others. See Koenig (1988) for a clear introduction to these issues, and Ratcliffe (1989) for a review of the early literature.

⁷Beyene, 1989; Brown and Kerns 1985; Gifford, 1994; Lock, 1993.

don't relate to women's health needs, as the main determinant of technology diffusion.

This research shows that BMD testing has been effectively diffused because it is marketed and promoted in ways that draw on, and reify, three trends in Euro-American popular culture: (1) the medical model of the aging female body (2) the fear of aging and its association with dependency and immobility; and (3) the health prevention consciousness in North American society.

Aging and disease

Since the mid-nineteenth century, female life cycle transitions in Euro-American society have been increasingly medicalized, interpreted by physicians as a series of events that should be subject to medical management⁸.

Biological changes associated with aging are spoken about in a language of decay and abnormality. The biochemistry of women of reproductive age is taken as the standard measure for what is normal and healthy; and aging women's bodies are understood in terms of disease, "endocrine deficiency disorder", specifically a hormone deficiency disease that is to be treated with estrogen supplements. Popular magazine articles and books on menopause contain essentially the same message⁹.

The feedback loop between popular and scientific knowledge has created and perpetuated the notion that the aging female body is a diseased body. Aging is associated with a cluster of meanings involving emotional and physical losses. These losses include declining social status and degradation of self-image, as the cultural ideal (youthful femininity) can no longer be met. The social meanings associated with aging also include deeper fears of disability leading to loss of independence.

Interestingly, cross-cultural research indicates that the association of aging with decay and loss is a specifically Euro-American phenomenon. In many societies, women expect to continue to be well and gain increasing worth and even veneration as they age and become respected elders.¹⁰

BMD testing "works" in Euro-American societies because it has emerged out of, and responds to, culturally accepted norms about women's bodies and women's roles in society. The well-entrenched medicalized model of aging has paved the way for the medicalization of bone

⁸.Kaufert 1988; Kaufert and Gilbert 1986; Kaufert and McKinlay 1985; Lock 1993.

⁹ Lock 1993:xxxv.

¹⁰Beyene, 1989; Brown and Kerns 1985; Lock 1993.

mineral loss.

Marketing of fear

While natural phenomena become labelled as disease, anxiety is heightened as the general public is inundated with media coverage about the "discovered" disease¹¹. In the early 1980s, most women had never heard of osteoporosis. Beginning in 1982, an education campaign was sponsored by Ayerst laboratories to create public awareness of osteoporosis as an important women's health issue. The company clearly stood to benefit from increased public awareness of osteoporosis (Ayerst manufactured Premarin, a popular form of estrogen replacement therapy) and women who sought advice from physicians about prevention might easily end up with a prescription for ERT.

The Ayerst campaign included radio, television, and magazine coverage, including articles in *Vogue*, *McCall's* and *Reader's Digest*. As Whately and Worcester explain, by the mid-1980s, women have not only heard of osteoporosis, but they had become frightened of the seeming inevitability of postmenopausal hip fractures and of a life of disability and dependency¹²

Burden of suffering statistics have been widely misused to "sell" the fear of osteoporosis, reported in ways that play on images of immobility, dependency, and even death. An American television advertisement for a calcium supplement shows a healthy thirty-year-old woman transformed to a stooped sixty-five-year-old in thirty seconds¹³ A popular guide to preventing osteoporosis stated:

The consequences of hip fractures can be devastating. Fewer than one-half of all women who suffer a hip fracture regain normal function. Fifteen percent die shortly after their injury, and nearly 30 percent die within a year¹⁴.

Once the fear of becoming disabled/diseased has been created, women are made to feel personally accountable for future illness and are encouraged to take appropriate measures to prevent such disease.¹⁵

Prevention consciousness

¹¹ Gifford, 1986; Nelkin 1996, Strabanek, 1985; Susman, 1994.

¹² Whately and Worcester 1991:203.

¹³ Giges 1986.

¹⁴ Notelovitz and Ware 1982.

¹⁵ Nelkin, 1996; Whately and Worcester 1991.

In the United States and Canada, increasing emphasis is being placed on a particular model of health promotion that emphasizes lifestyle change and individual responsibility. Patients are encouraged to take more control in the clinical encounter (for example, patients are encouraged to review their medical charts and x-rays; increasing emphasis is being placed on informed consent) and individuals are being held accountable for behaviours which place them at risk for poor health. Societal responsibility (for example, ensuring adequate nutrition and attention to environmental hazards), in stark contrast, receives much less¹⁶.

Along with diet, exercise, and stress reduction, BMD testing has been promoted and understood as part of the package of how to prevent the health problems associated with aging¹⁷. By 1990, HRT had developed into a massive industry showing annual sales in the range of four hundred sixty million dollars¹⁸. In 1992, Ayerst's estrogen, Premarin, was reported to be the fourth most prescribed medication in the United States¹⁹. In 1993, the World Health Organization redefined osteoporosis, making it dependent on bone mineral density measures. The redefinition emerged from a four day meeting financed by Rorer Foundation, Sandoz Pharmaceuticals, and Smith Kline Beecham²⁰.

In the time leading up to the WHO redefinition, drug companies were poised and waiting, recognizing that a massive potential target population existed and was growing. Given that in 1992 only an estimated 15% of the female population in America received some form of HRT²¹, the economic implications of the WHO redefinition are staggering. For example, in June, 1995 the company Frost and Sullivan reported that Europe's osteoporosis market is growing, and that the growth was being fuelled by increased life expectancy and by the more widespread acceptance of hormone replacement products by menopausal women²². The company reported that in Europe alone, the HRT treatment market was at \$379 million in 1995; and will rise to \$580.2 million by 2000. The total market for osteoporosis treatment (comprising preventative as well as curative measures) in 1995 was valued at \$1.05 billion, and forecast to reach \$1.55 billion by the year 2000 (Ibid.).

Since the WHO redefinition, drug companies have been particularly aggressive and visibly

¹⁶ Crawford 1984; Gordon 1988.

¹⁷ Whately and Worcester 1989.

¹⁸ Lock 1993:350.

¹⁹ Office of Technology Assessment, 1995.

²⁰ WHO Study Group, 1994.

²¹ Office of Technology Assessment, 1995.

²² Marketletter, June 12, 1995.

hostile to one another in their promotional materials, each vying for the largest share of the potential market for a combined estrogen-progesterone product²³. The Osteoporosis Society of Canada (OSC) has recommended that reports of BMD measurement should "refer to the World Health Organization's recommended definitions of osteopenia and osteoporosis"²⁴. The OSC's recommendations emerged from a series of consensus conferences, all sponsored by pharmaceutical companies, and were published as a (non-peer reviewed) supplement to the Canadian Medical Association Journal²⁵. In the United States, the pharmaceutical industry is currently lobbying the American government with a plea that estrogen therapy is necessary to the continued health of all women aged forty and over. Most of the specialists whom the U.S. government has called on as advisory consultants are the recipients of research money from these same drug companies²⁶.

WHO's needs are being served?

This examination of BMD testing demonstrates how market forces may create and capitalize on a climate of risk and reassurance, driving the use of health technologies irrespective of whether they lead to improved health outcome. The implications of the WHO's redefinition of osteoporosis for the lives of women is as yet largely unexamined.

At the very least, the testing of large cohorts of pre and peri menopausal women and their labelling as "abnormal" in BMD is leading to an increased dependency on BMD and associated interventions. Repeat testing is necessary, and HRT must be administered over many years in order to ensure that women retain "normal" levels of bone mineral density. The possible side-effects of long-term HRT are still under investigation.

Psychological side effects of BMD testing should also be considered, these may result from being labelled "at risk." As well as the anxiety caused by inundation of media coverage about a "new" disease, evidence on a variety of preventive technologies has shown that psychological distress may result from the procedure itself.²⁷ Goffman, in his classic work *Stigma* (1963), was the first to argue that being labelled affects identity and shapes the life experiences of

²³ Lock 1993:358-9.

²⁴ Sturtridge et al., 1996.

²⁵ Hanley and Josse 1996.

²⁶ Lock 1993:351.

²⁷ Bloom and Monterossa 1981; Haynes et al., 1978; Marshall 1996; Meador, 1994; Monk 1981; Soghikian and Hunkeler 1981.

those who are thus labelled. It is now well established that being labelled "sick" has an effect on social relationships and behaviours of the individual, irrespective of whether the symptoms or the disease itself have appeared.²⁸ In the case of BMD testing, being labelled affects individual lifestyles in the **absence** of symptoms or disease.

Equally important are the broader social implications of the WHO redefinition. Being diagnosed as abnormal in BMD establishes risk, not a clinical disorder. Low bone mass is asymptomatic and not problematic apart from fragility fractures. The trend toward defining osteoporosis, entirely on the basis of BMD diagnostic criteria, ends up transforming a risk factor into a disease entity. As Gifford has argued for breast cancer screening, the very act of transposing the concept of risk from the probabilities of epidemiology into clinical practice means that risk is interpreted as something which the patient suffers. Being at risk in itself comes to mean being diseased.²⁹

As the onus for not getting sick falls increasingly on the individual, and individuals strive more and more to reach the ideal of normality, the area including 'normality' is shrinking, and the area of 'abnormality,' or less than perfect health, is increasing. The proliferation of disease categories and labels in medicine and psychiatry results in even more restricted definitions of "normal". This leads to increasing numbers of people being labelled abnormal, sick, or deviant³⁰. Popular and scientific notions of normality, risk, and prevention are continually being transformed, thus perpetuating the need for screening and diagnostic technologies even when they do not lead to known therapeutic solutions. Still largely unexamined are the power relations and private interests which are served by this health dynamic. Critical health technology assessment provides the appropriate focus to undertake and comprehensive needs assessment

²⁸See, for example, Ablon 1981; Anspach 1979; Edgerton 1967; Estroff 1993; Susman 1994; Schneider and Conrad 1980; Waxler 1980; Zola 1984, 1993.

²⁹Gifford, 1986. Nelkin, in a discussion of screening for inherited breast cancer, refers to this as the creation of the "presymptomatic ill" (Nelkin, 1992).

³⁰ Hacking 1990.

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