

EDITORIAL

Risk and Beneficial Factors - Fallacy at the Individual but Not the Population Level? Relevance to a Practical Prevention Program

The results of the large body of work reviewed by Hamajima and his group in the present issue (2001) point to significant interplay between genetic polymorphisms and environmental risk factors in only a small proportion of cases, basically where there are good grounds from experimental findings with animals to expect that this would be the case. Thus if we dose ourselves with carcinogens in tobacco smoke, then we naturally will have an elevated risk of tumor development, and giving the roles of Phase I and Phase II metabolic enzymes in activation and deactivation processes then it would again be very much in line with expectations if individuals with greater potential for metabolism of carcinogens to water soluble forms which can be readily excreted would have a lower risk. Conversely enhanced toxification potential would entail a greater chance of neoplasia.

We can induce a 100% yield of almost any neoplasm that we wish in experimental animals by judicious application of large doses of an appropriate carcinogen, especially with

added growth stimulation, and there is no reason to doubt that equivalent exposure of human beings would similarly bring about tumour development within the lifespan in all cases. With few exceptions, however, limited mainly to endemic radiation exposure from the atomic bomb explosions in Japan at the end of WWII and the Chernobyl disaster, we are luckily in the situation that total exposure only leads to a particular tumour in a relatively small proportion of the population. Thus while we may encounter 'field neoplasia' in some sites, with multiple primary tumours developing independently in individuals who are genetically susceptible and presumably with relatively high exposure to carcinogenic agents (Slaughter et al., 1953) the vast majority of their neighbours sharing basically the same environment remain unaffected.

With the exception of cases of inborn disease states associated with persistent inflammatory states, where all the affected people have to endure cancer development, as with tropical calcifying pancreatitis (Chari et al., 1994) and

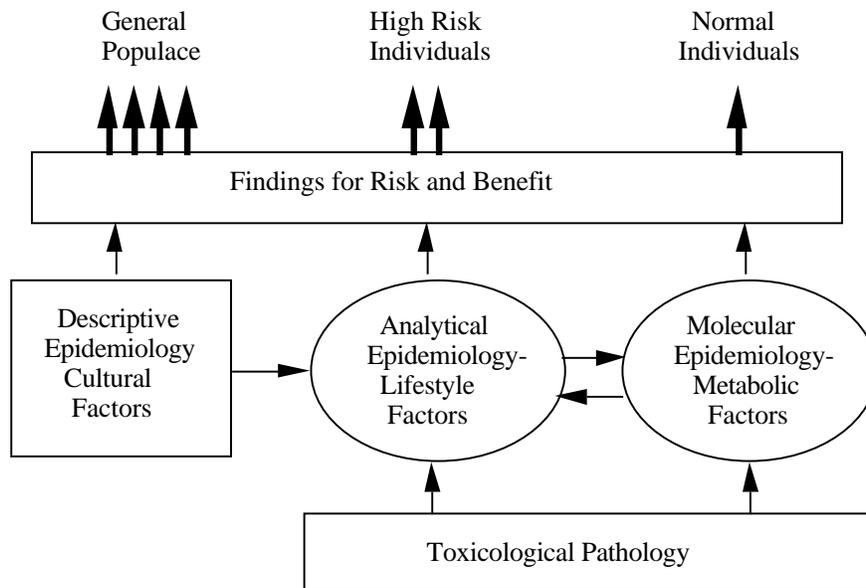


Figure 1. Interplay between Methodology for Generation of Information and Practical Prevention Efficacy , Population-based; , Individual-based; , Magnitude of the Expected Effects of Intervention

familial polyposis coli (Nugent et al., 1996), the likelihood of an individual developing a cancer is only to a limited extent dependent on his or her environment and genetic makeup. We are not in the position, and are very unlikely to ever be in the position, to say with certainty that any such person will or will not develop a cancer, even in the case of highest or lowest risk potential in terms of exposure to carcinogens or modifying agents and genetic background. We must conclude that at the individual level there will always be an element of chance. At the population level, however, exposure to risk and beneficial factors is much more likely to have predictive power and this provides the rationale for recommendations that can be made for cancer prevention in terms of both diet and exercise (Ames et al., Moore et al., 1998; Hill, 2001). While benefit can not be promised for the individual, we have every reason to believe that advantages will definitely accrue for the group of people improving their lifestyle (see Figure 1).

There is continued debate in the literature, however, as to the best policy to adopt in order to make a real contribution to reducing the burden of cancer on our societies, as evidenced for example by a series of papers which appeared in the March issue of the American Journal of Public Health. While Colditz (2001) argued the case for translating our large body of data for modifiable risk factors such as smoking, physical activity, weight gain, sexual culture and hormone exposure into practical intervention strategies, and placing less emphasis on the 'dubious search for new risk factors', Begg (2001) on the other hand proposed that we continue the present emphasis on endeavours to assess individual and interactions between genetic and environmental parameters. Both authors make strong cases and in particular the criticism of Begg that we can not take seriously the conclusion that cancer is a preventable disease if we removed all the identified risk factors, one that might be drawn from the optimistic estimates in the published Harvard Reports on Cancer Prevention (Colditz et al., 1996; 1997), appears very valid. This is running in the face of biology and the obvious link between neoplasia and aging. That is not to say, however, that we can not slow down the processes leading to cancer so that the majority of lesions would occur in the very aged, when the "Natural End Cancer" concept comes into play (Kitagawa et al., 1998), or outside of the normal lifespan of *Homo sapiens*.

Given the enormous investment in our research facilities and the underlying political culture, there is clearly not going to be a sudden disengagement from studies of cancer risk factors and their elucidation. This task will continue to provide gainful employment for the foreseeable future and hopefully also contribute to achieving a deeper and deeper understanding and perhaps new treatment approaches. The practical problem is that the prevailing ideology, based on 'privatization or individualization' of risk factor knowledge with the onus placed squarely on the individual to improve his or her lifestyle, is not going to reap rapid rewards in terms of reducing actual disease and has given rise to major criticism within the epidemiology world (Pearce, 1996;

Burris, 1997; Susser, 1998; Schwartz et al., 1999). The basic question is whether epidemiologists and other public health researchers have responsibilities above and beyond churning out findings for relative risk which are often contradictory. The World Cancer Research Fund/American Institute for Cancer Research jointly produced volume 'Food, Nutrition and the Prevention of Cancer: a Global Perspective' (1997) is the result of a gigantic effort to comprehensively review the accumulated data from epidemiological and experimental studies for different food items. However, despite the apparent abundance of data, the conclusions regarding influence of major food items on cancer risk are severely limited. As eloquently argued by Rockhill (2001), risk factors are very poor tools for screening at the individual level, and it has been calculated that only a relative risk greater than 20 would be useful for this purpose (Wald, 1999).

While we are dependent on individuals making the decisions which will reduce exposure to risk factors or enrich their lifestyle for cancer prevention, it may thus only be at the population level that the improvement will be statistically significant (Rose, 1990). Where we are talking about a balance between risk and benefit, as with recommendations for screening and employment of tamoxifen or some other hormone based intervention for breast cancer (Gail et al., 1989; 1999; Russo et al., 1990), there are a number of moral questions to be answered. Particularly with the present major interest in genetic susceptibility, the socioeconomic and psychological ramifications of the results now being generated *en masse* need very serious consideration. This aspect seems, however, to have been almost totally ignored, given the dearth of relevant publications in the same journals which are devoting so many of their pages to results on genetic polymorphisms.

The editors of the APJCP feel that it is therefore timely to enact a new program under the auspices of the APOCP, a Practical Prevention Program (PPP), aimed at encouraging primary and secondary prevention measures in the general public while actively contributing to research on psychological and socioeconomic factors and how they impact on cancer prevention measures. The idea is basically very simple - concentrate on enlightening the endangered general populace and ensuring easy access to measures which are well established to have potential to prevent development and/or mortality from cancers, in terms of both cost and convenience. To encapsulate, lifestyle improvement and early detection. For this purpose small community-based centres might be the most efficient approach, sufficiently large to encompass:

- a) an information/subject recruitment centre
- b) a vegetable/juice/health food bar
- c) an aerobics/dance studio
- d) a pedal bicycle sale and service centre
- e) a nurse-staffed screening facility

A pilot centre is envisaged in the first instance, under the direction of the APOCP Training Centre in Bangkok, which

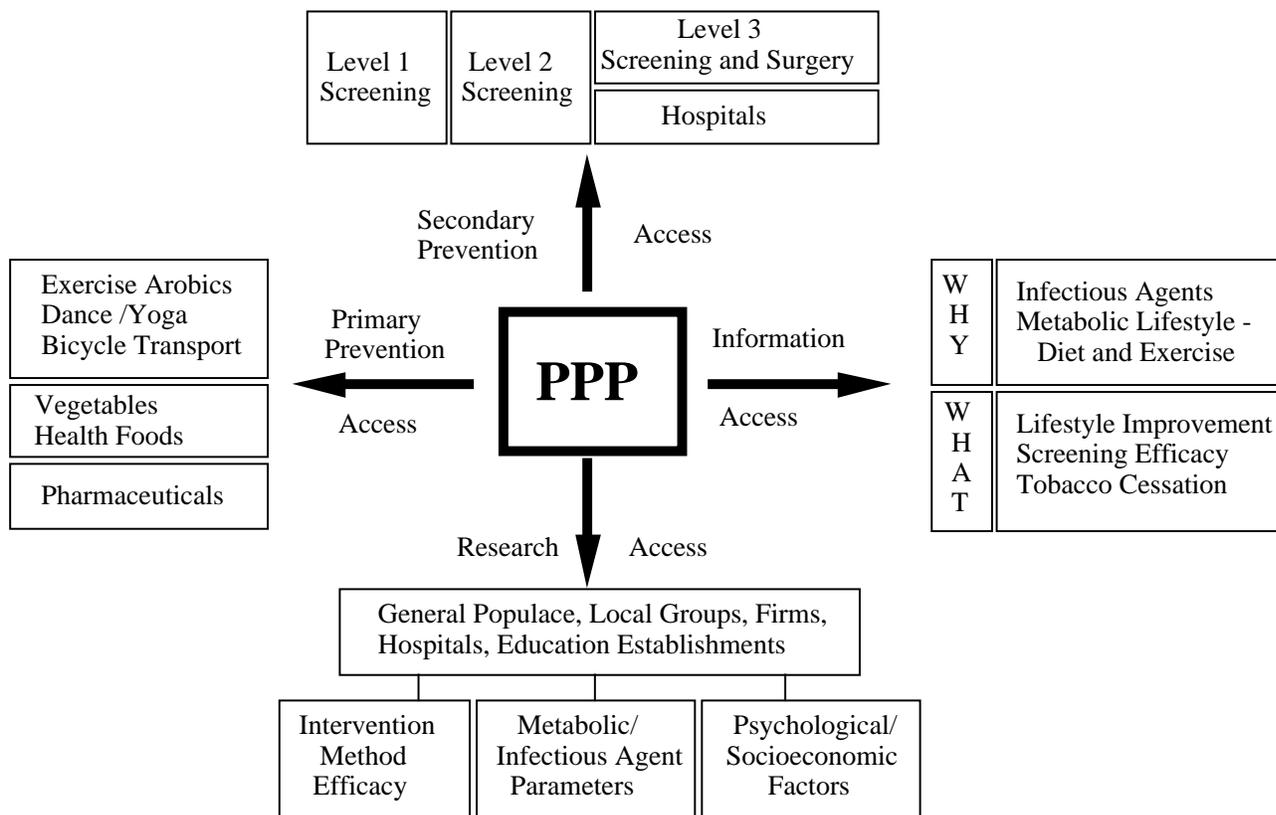


Figure 2. Envisaged Interactions and Functions of the PPP Pilot Centre

would eventually be self-financing and cater primarily to people in the immediate local community. The PPP should enable their direct participation. Given success, others who are enamoured with the idea and have appropriate premises and background would then be enfranchised with a suitable endorsement to enable them to join the scheme. Provision would then be made of a support package for dietary improvement, physical exercise and screening for early lesions, together with the infrastructure to support research activities (see Fig 2 and Table 1).

Very major difficulties with primary preventive efforts are getting across the message to the target population in a convincing fashion and enlivening people to actually make changes in lifestyle which are conducive to a more healthy existence. All of the available communication routes clearly need to be exploited and at the local community level that

would mean interplay between PPP centres and firms, schools, hospitals and other government offices and interested parties. Clear and concise information needs to be readily available, together with access to facilities for increasing vegetable and other nutritious food intake, as well as aerobic-type exercise in a controlled environment. The PPP could offer this at the same time as allowing recruitment of individuals for participation in research into nutrition, physical exercise and behavioural aspects of cancer prevention. Liaison with other local groups would ensure the greatest interaction and feedback to maintain awareness of the opinions of the general populace, as well as experts actively involved in related fields.

The arguments are particular strong to enjoin individuals to make a shift in lifestyle to avoid not only cancer but the related chronic diseases, diabetes and circulatory disorders.

Table 1. Possible Research Projects for the PPP

Determine Socioeconomic and Family Background with Regard to Smoking Initiation and Cessation
Assess Psychological Reactions to Tobacco Advertising and Anti-smoking Materials with Different Emphases
Determine Base-line Knowledge of Cancer Risk and Beneficial Factors and the Relative Efficacy of Screening
Assess Factors Responsible for Attendance/Non-attendance for Screening
Determine Socioeconomic and Family Background with Regard to Physical Activity
Assess Serum Physiological Parameters With Reference to Lifestyle and its Improvement

Table 2. Levels of Sophistication for Screening for Early Lesions

Level 1		
Naked Eye		Skin, Buccal Cavity, Cervix
Palpation		Breast
Occult Blood	Urine	Kidney and Urinary Bladder
	Faeces	Colon and Rectum
	Sputum	Lung
Level 2		
Body Fluids		Lung, Cervix
Serum Testing		Prostate, Pancreas, Stomach
Occult Blood		Oesophagus, Stomach
Assisted examination		Cervix
Level 3		
Ultrasound		Thyroid, Liver-Pancreas, Ovary, Endometrium Prostate
X-Rays		Lung, Stomach
Endoscopy		Oesophagus, Stomach, Colon
Spiral CT		Lung

The battle against smoking, overindulgence in alcohol and environmental contamination on the one hand, and promotion of dietary improvement and increased exercise, on the other, including how we allocate resources for transport, needs a coordinated approach. We now know a great deal about risk and beneficial factors and the time has come to put more emphasis on new research areas such as psychosociology and the balance of pain and gain in behavioural modification. PPP centres could also play a major role in engendering an awareness of the necessity for such studies and how they could actively participate in generating new and useful information for their own communities. This is also very true for motivation with regard to screening for early cancers.

The costly nature of screening individual patients for individual cancers argues that the most effective approach to secondary cancer prevention is to provide simple local facilities (see Table 2). Methodology depending on the naked

eye or palpation can be readily married to detection of occult blood for many of the most prevalent cancers. Paramedical assistance increases the scope with sampling of blood and other body fluids. Only methods requiring expensive equipment in the hands of expert medically qualified individuals might be beyond the limitations of small local centres. Thus nurses specially trained for providing information on recommended primary prevention to the general public as well screening services could be entrusted with this arm of comprehensive cancer prevention program. This should optimally take place in a complete environment featuring facilities for economic aerobic exercise, vegetable juice and wholesome food bars. The idea is not to encroach on the territory of hospitals but rather act as a partner in detection of early cancers so that they can be appropriately dealt with (see Figure 2).

At the second American Cancer Society Workshop on methodology in Behavioural and Psychosocial Cancer Research, in 1989, a number of authors already presented cogent arguments on new epidemiological perspectives and assessment of how people change (Celentano, 1991; Prochaska, 1991; Shiffman et al., 1991). Some of the details on priorities for behaviour research in cancer prevention and control (Lerman et al., 1997), presented in the Introduction to a Supplement Issue of Preventive Medicine which appeared in 1997, are listed in Table 3. In both Europe and the US, community based projects have been found to be promising, with a major role for active participation of the general populace (Schwab and Syme, 1997). Nurses can be particularly important in this respect (Box et al., 1997) and the possibility of employing trained volunteers has been explored, for example in an urban inter-generational program for cancer control education (Lowe et al., 1997). However, this area is still in its infancy in Asia and the PPP could thus make a valuable contribution by conducting basic research into how community interactions might best be harnessed for prevention purposes.

It is obviously very necessary that our cancer institutes and research facilities in universities continue their basic and applied efforts to unravel the mechanisms underlying cancer and other chronic diseases and develop novel treatment and intervention strategies. At the same time, this does not mean

Table 3. Priorities and Socioeconomic Considerations in Behavioural Research and Prevention Practice

<u>Priorities</u>	<u>Considerations</u>
Preventing Tobacco Use among Children and Teenagers	Social Class and Culture
Enhancing Risk Communication, Comprehension, and Informed Decision-Making	Political Ramifications and the Economic Impact of Interventions
Integrating Preventive and Early Detection Services	Economy and Convenience
Improving Outcomes of Genetic Testing for Cancer Susceptibility	Broad-Based Multiple-Level Interventions Involving as Wide a Cross-section of the Community as Possible
Promoting a Healthy Diet and Physical Activity	Cognitive Theory-Basis for Hypothesis Testing

Adapted from Lerman et al., 1997

that approaches to practical prevention at the community level do not deserve support. The PPP idea is a start in this direction and may be particularly important as an attempt to enlarge the section of society involved in policy debate and decision-making as far as possible. Our governments need to make essential choices to ensure a healthy future for our societies, ensuring this is not compromised by massive medical burdens, either in terms of finance or human suffering. We should all be able to have our say.

The proposed PPP Pilot Centre could thus initiate a movement to assist all three legs of the tripod for integrated prevention: generating new information for risk and benefit and its implementation; helping with feedback responsive education of all sections of the public; and providing guidance for policy decisions by government and local authorities. The APOCP was set up to promote all aspects of cancer prevention across our area of the globe. The question now is whether this new project launched under its auspices will receive the support it needs for success. We appeal for comments from like-minded individuals and institutions throughout the region.

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