NICE PDG on CVD Prevention in Populations

Cardiovascular disease prevention in populations and effects on health inequalities

Introduction

The primary prevention of cardiovascular disease (CVD) is crucially dependent on the effective reduction of the major risk factors, particularly through tobacco control and a healthier diet.

However, the excess CVD burden of morbidity and mortality in deprived groups raises major challenges. Social gradients in the major cardiovascular risk factors may explain approximately three quarters of this excess burden; smoking alone could explain over half the excess. (Law 1998, Woodward 2003) .

Assessing the potential effect of risk factor reductions on subsequent socio-economic inequalities is thus crucial. There is increasing empirical evidence to suggest that CVD prevention using whole population approaches generally reduces social inequalities, whereas screening and treating high risk individuals tends to increase the inequalities gap.

The whole-population approach for preventing CVD

Some two decades ago, Geoffrey Rose suggested that a small reduction in risk in a large number of people may prevent many more cases than treating a small number at higher risk."Rose 1992 Policy interventions can indeed reduce risk factors across entire populations. National fiscal changes and legislation can be both effective and relatively cheap, whether banning trans-fatty acids (Denmark), halving dietary salt (Finland), or promoting smoke-free public spaces (UK, Ireland, and Italy). Stender 2006; Karppanen 2006

Empirical evidence to support the Rose hypothesis has progressively emerged from British, US and European studies.Emberson 2004; Wiklund 1980; Kabir 2007; Graham 2007, Young 2009 Small reductions in population cholesterol concentrations, blood pressure, or smoking then translate into substantial reductions in cardiovascular events and deaths. Unal 2005;Emberson 2004

Evidence that whole population CVD prevention generally reduces social inequalities

1. **Arithmetic** *Deprived groups experience a greater CVD burden. They are thus likely to gain extra benefit if a risk factor is uniformly reduced across the entire population.* This simple arithmetic was spelt out by Finn Diederichsen,(2007) and is detailed in the Appendix.

More recent support came from Kivimaki et al, who calculated the 15 year risk of CHD death in British men aged 55. They then quantified the benefits of decreasing risk factors uniformly across the population: a 10mmHg reduction in blood pressure, 2mmol/l reduction in total cholesterol and a 1 mmol/l decrease in glucose. These interventions would reduce the mortality gap between rich and poor by approximately 70% Kivimaki 2008

2. **Smoking** Smoking rates and exposure to environmental tobacco smoke is higher in deprived groups in England and in Scotland Edwards 2006 . Following the Scottish smoke free legislation in 2006, there was a uniform drop in hospital admissions for heart attack and "acute coronary syndrome" involving a 14% reduction in smokers and a 21% fall in never smokers. Pell 2008

Men and women in lower social groups are more responsive to uniform increases in cigarette price than affluent groups. A large meta analysis therefore concluded: "population-level tobacco control interventions have the potential to benefit more disadvantaged groups and thereby reduce health inequalities" Thomas 2008; Townsend 1994 Main et al likewise concluded that "increase in tobacco price may have the potential to reduce smoking related health inequalities Main 2008

3. **Diet interventions** Social gradients are apparent in diet, as in smoking. Thus residents in Northern Britain consume twice as much saturated fat as those living in the South.SatFat 2009

Supporting empiric evidence comes from a recent population wide intervention. The US introduced folic acid fortification of cereals in 1996. Social gradients in blood folate levels were subsequently reduced by 67% Dowd 2008

Dissenting views One US article suggested that population wide interventions may increase disparities. However, this was based on a theoretical approach which misunderstood the Rose approach. Furthermore, it provided no empirical evidence in support. Frohlich 2008

The high risk approach for preventing CVD

In the UK, the high risk approach for preventing cardiovascular disease is typified by the Department of Health programme *Putting Prevention First.* DH 2008 All adults aged over 40 are to be invited to be screened for CVD risk. Individuals found to exceed a 20% risk of a cardiovascular event in the next ten years are then to be treated with a combination of lifestyle advice plus tablets to reduce blood cholesterol and blood pressure, as appropriate. DH 2008

However, critiques suggest that this cardiovascular risk screening strategy may have low effectiveness, substantial residual risk, small population impact and high cost; plus medicalisation of previously healthy individuals.Ebrahim, 2007; Sheridan 2008; Jackson & Capewell, 2008

More seriously, this high risk approach will also certainly increase inequalities.

Evidence that the high risk approach generally increases social inequalities

1. Any healthcare activity focussing on individuals generally favours affluent and educated people, thus increasing social inequalities. This was memorably described by Julian Tudor Hart as the "Inverse Care Law"- the people with most ill-health get the least interventions. Tudor Hart 1971 Disadvantage can occur at every stage in the process, from the person's health beliefs and health behaviour, through to presentation, screening, risk assessment,Payne 2009 negotiation, participation, programme persistence, and treatment adherence.Browning 2008; Thomas 2005; Cubbin 2006

Mildred Blaxter's recent review concluded The evidence certainly suggests that interventions to change behaviour do not necessarily reduce inequalities in health, and may sometimes exacerbate them.Blaxter 2007

2. Inequalities have also been reported in screening, and detection of cancer as well as CVD. Women who attend the National Health Service Breast Screening Programme come from less deprived areas.Garvican 1998; Banks 2002

One recent UK study suggested that social and ethnic disparities in the detection and management of hypertension have persisted despite major investment in quality

improvement initiatives, including pay for performance. [Ashworth 2008] Furthermore, Tunstall-Pedoe recently emphasised the need to consider deprivation when scoring cardiovascular risk in individuals, lest social gradients are actually exacerbated. [Tunstall-Pedoe 2006]

3. Examples of the inverse care law in primary prevention **prescribing** have also been reported. Substantial socioeconomic gradients exist in **statin** use, both in the UK and in the Danish health care system which aims, like the NHS, to ensure a high degree of equity in medical care. [Thomsen 2005]

Likewise **anti-hypertensive medications**. A recent study suggested that social and ethnic disparities in the detection and management of hypertension have persisted in the United Kingdom despite major investment in quality improvement initiatives.[Ashworth 2008]

4. Long term adherence (compliance) with primary prevention medications barely reaches 50%, and is often worse in more deprived groups [Vrigens 2008; Morisky 2008; Johnell 2005] Furthermore, inequalities in adherence with primary prevention medication have been reported for both statins and anti-hypertensive medications. [CHaudhry 2008; Bouchard 2007]

Smoking Cessation For smoking cessation services, greater use and higher quit rates by more affluent people is a real concern.[Low 2007] Affluent smokers tend to receive more help, and are are more likely to quit (Browning 2008; Bauld Tobacco Control 2007). Increasing quit rates in more affluent smokers were also recently reported in the Danish trail of primary prevention in general practice, Inter99 [Jakobsen 2009] Similar inequalities have also been reported in smoking interventions targeting workplaces. [Ogilvie 2008]

Dietary advice In the USA, which favours individual approaches over public health policies, Kanjilal has recently reported bigger falls in CVD risk factors in more affluent groups [Kanjilal 2006]

Supporting evidence comes from a recent systematic review of nutrition interventions in individuals and groups. In schools, fruit and veg consumption typically increased more in affluent families; interventions were correspondingly less effective in disadvantaged areas. In a US primary care setting, interventions to reduce fat intake were less successful in blacks than in whites [Oldroyd 2008] In Germany, the Cardiovascular Prevention Study compared three strategies involving advice from professionals and media. After seven years, hypercholesterolaemia improved only in upper social groups, thereby increasing the gap. [Helmert 2004]

Dissenting opinions The concept of identifying and targeting disadvantaged individuals living in deprived areas has recently gained popularity.[NICE 2007] Evidence to confirm or refute the effectiveness of such interventions on reducing social inequalities is awaited with great interest.

Conclusions

CVD prevention strategies for screening and treating high risk individuals represent a relatively ineffective approach that typically widens social inequalities. These high risk approaches may distract from cheaper and more effective policy interventions for entire populations which will usually narrow the inequalities gap.

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