

# C A R M E N

*An Initiative for*  
Integrated Prevention of  
Noncommunicable Diseases in the Americas



**Pan American  
Health  
Organization**

*Regional Office of the  
World Health Organization*





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# Presentation

**C**hronic noncommunicable diseases (NCDs) can be prevented if a public health approach is adopted. This implies the recognition of the continuum of healthy populations, disease prevention, and disease control, and in this context, the implementation of cost-effective population-based actions which consider the needs of different groups. Strategies for the prevention and control of NCDs must bridge across three different levels of action: policy building, community-based activities, and health care services.

In the Americas, the economic burden related to NCDs is of increasing concern given the high costs to society, families, and individuals. It can be analyzed in two contexts: first the effects of public health policies on opportunities for prevention and control, and second, the potential cost-effectiveness of interventions. Recognizing the concerns of its Member States, the Pan American Health Organization (PAHO) supports national efforts to incorporate integrated NCD prevention and control into public health agendas. Considering each Member States' perspectives, PAHO assists in the implementation of initiatives and programs, giving priority to increasing access to knowledge and networking among countries.

In the area of NCD prevention, public health policies cannot be effectively or efficiently implemented without integrated action. The Pan American Health Organization recognizes this and therefore has deemed it essential to network. International partnerships can yield maximum benefits and the results can be greater than what could have been accomplished by performing actions independently.

The 23<sup>rd</sup> Pan American Sanitary Conference, held in September 2002, endorsed the CARMEN Initiative as a main strategy for the integrated prevention of NCDs. Consequently, PAHO offers its technical cooperation in order to increase the countries' capacity to respond with a public health approach to NCDs.

CARMEN, as a PAHO initiative, is also part of the Global Forum on NCD Prevention, since PAHO is the regional office of the Americas of the World Health Organization. The Global Forum encourages the development of national integrated NCD prevention and control strategies and programs including community-based initiatives, surveillance and demonstration projects. It also supports regional networks through collaboration and partnership with government agencies, nongovernmental organizations, and research and academic institutions.

The following document illustrates how CARMEN can facilitate the control of NCDs of major public health importance. By using health promotion strategies and disease prevention actions at the community level, as well as through health care services, CARMEN is oriented towards the simultaneous prevention of several NCDs by reducing and controlling their shared risk factors.

It is important to begin a process of change, and the region of the Americas can lead developing countries in incorporating new approaches and innovative and appropriate technologies to prevent and control chronic diseases at a cost that is feasible and reaches all population groups with the goal of reducing current health inequities.



Mirta Roses Periago  
Director

Pan American Health Organization



# Introduction

**N**oncommunicable diseases (NCDs) are the leading causes of death and disability worldwide. In 2001, 33.1 million deaths, almost 60% of mortality worldwide and 45.9% of the global burden of disease were attributable to NCDs. If current trends continue, these diseases are expected to account for 73% of deaths and 60% of the disease burden in the year 2020.<sup>1</sup>

The rapid rise of NCDs represents a major health challenge to global development. While the threat of NCDs in developed countries has long been recognized, the predominance of these diseases in developing countries is of increasing concern. For example, all of the following risk factors - hypertension, tobacco use, alcohol consumption, high cholesterol, obesity, and the diseases linked to them - have traditionally been more common in industrialized countries. However, as the World Health Report 2002 demonstrates, they are now becoming more prevalent in developing nations. For low- and middle- income countries a double burden is created as they have not yet conquered the infectious diseases that also inflict them.<sup>2</sup>

**The majority of noncommunicable diseases and related disabilities are preventable, and many are curable if detected early.**

In the Americas, researchers, policymakers, and public health advocates are increasingly recognizing the critical need to provide support for efforts to combat NCDs. The Pan American Health Organization (PAHO), Regional Office for the Americas of the World Health Organization (WHO) has identified programmatic objectives and policies that seek to effectively prevent and control NCDs in the Americas. The recommendations include a variety of strategies to reduce the burden of NCDs and rely on the implementation of integrated community-based prevention projects, known as the CARMEN Initiative (Conjunto de Acciones para la Reducción Multifactorial de las Enfermedades No transmisibles), a Spanish acronym meaning an Initiative for Integrated Noncommunicable Disease Prevention in the Americas. The general objective of CARMEN is to improve the

health status of targeted populations by reducing common risk conditions associated with NCDs. This public health approach considers the entire continuum between health and illness, thus not isolating risk factors or specific preventive interventions.

In this document, the critical nature of NCDs is highlighted, but moreover, it is argued that most NCDs are preventable or can be postponed. The document provides essential information about the methodology of the CARMEN Initiative. Finally, Member States are encouraged to join the CARMEN Network for the integrated prevention of noncommunicable diseases, as recommended by the 26<sup>th</sup> Pan American Sanitary Conference.



# Multiplicity of Risk

**M**yth surrounding NCDs present them as inevitable conditions and therefore, are not containable with prevention or control. Fortunately, current knowledge has proved both of these presumptions false.<sup>3</sup> Most NCDs are preventable or can be postponed. Many are reversible, and many are amenable to secondary preventable and are curable. These efforts however, rely on the proper identification and control of essential risk factors.

Risk is defined by the WHO as “a probability of an adverse outcome, or a factor that raises this probability.”<sup>2</sup> Multiple risk conditions are associated with the etiology of NCDs. These risk conditions tend to cluster in different population groups. The following classification is useful for population-based assessment and surveillance.

**“In order to protect people – and help them protect themselves – governments need to be able to assess risks and choose the most cost-effective and affordable interventions to prevent risks from occurring.”**

**World Health Organization.  
World Health Report.  
Geneva, 2002.**

## **IN INDIVIDUALS**

- **Background risk factors**, such as age, sex, level of education, and genetic composition;
- **Behavioral risk factors**, such as smoking, unhealthy diet, and physical inactivity; and
- **Intermediate risk factors**, such as serum cholesterol levels, diabetes, hypertension, and obesity.<sup>2</sup>

## **IN COMMUNITIES (CONTEXTUAL FACTORS)**

- Social and economic conditions, such as poverty, employment, family composition;
- Environment, such as climate, air pollution;
- Culture, such as practices, norms, and values;
- Urbanization, which influences housing, access to products, and services.<sup>2</sup>

Risk is built collectively, and the aggregation of risk conditions is part of the process that leads to disease production. For example, if in communities there is reduced access to fresh fruits and vegetables, and it is easier to acquire fast foods due to lower prices and availability, then obesity and diabetes epidemics can be an expected result. Since this is a collective/social process, solutions must include population wide approaches.

Although risk can have different meanings to different people, the scientific community has been attempting to identify and quantify risks to health. The perception of risks by the population may differ substantially from that of the scientific and public health community. There may be different perceptions of risks by different sectors of society as well. These understandings of risks are shaped by the underlying culture, environment,

media, special interest groups and access to products due to the influence of globalization. Therefore, it is expected that interventions, tool kits and educational material designed from the perspectives of the “experts” affect only segments of the population, if any. The traditional lifestyle approach has relied on improving knowledge and beliefs, thus placing the burden on the individual to commit to behavior change. Conversely, broad population-based changes at all levels require consensus building among different stakeholders, bringing their own perspectives to bear over the issues being addressed. This is important at the policy level, where public and private interests are more evident, such as the case of tobacco control; but it is important also in the community, where power structure plays a role in the possibilities of different constituents to participate. Health care delivery and particularly clinical preventive care are not exempt. Organizational change is often required to include the persons at risk and/or with disease as active participants, so that behavioral changes are feasible.

## NCDs in the Americas

In Latin America and the Caribbean (LAC), NCDs account for 44.1% of deaths among males, and 44.7% among females under the age of 70. Combined, NCDs are the main cause of premature mortality in the Region.<sup>4</sup>

The NCDs of major public health importance in LAC have been identified as

- **Cardiovascular diseases**, of which stroke and ischaemic heart disease are the most frequent in terms of mortality, and hypertension in terms of prevalence;
- **Cancer**, particularly cervical cancer and breast cancer among women; stomach, lung, colon, and prostate cancer among men; and
- **Diabetes**, which can dramatically increase premature mortality and disability.<sup>5</sup>

The importance of NCDs is evident. In 2000, it was estimated that the prevalence of hypertension in Latin America and the Caribbean ranged from 14 to 40% among those 35 to 64 years of age,<sup>6</sup> with a full 140 million people suffering from this condition. It was also estimated that almost 35 million people were living with diabetes in the region. It is expected that the prevalence of diabetes will increase up to 64 million by the year 2025.<sup>4</sup> These two conditions lead to an increasing burden of cardiovascular diseases, particularly ischaemic heart disease and stroke, as well as complications such as amputations, renal failure, and blindness among others.

## Demographic Changes and Social Determinants

In the Americas, the clustering of disease risk is inextricably tied to critical demographic, cultural, social, and economic factors. This region has witnessed some of the most pronounced effects of demographic shifts, characterized by declining fertility rates and steady improvements in life expectancy over the latter half of the 20th century. Thus, the proportion of the adult population is increasing, and it is during adulthood that factors consolidate and diseases manifest. The significant increase in the absolute number of NCD cases represents a major burden on the population.<sup>4</sup>

Comparable and reliable data on risk factors are scarce in spite of the many reports on specific population groups published. Only five countries in the Americas can report nationwide data. The data are depicted in Table 1.

**Table 1**  
**Prevalence of Risk Factors for Noncommunicable Diseases**  
**in Selected Countries of the Americas (%)**

Country	Gender	Tobacco Use	Alcohol Use	Cholesterol $\geq$ 200 mg dl	Physical Inactivity	Obesity IMC $\geq$ 30
Barbados	Male	34.6	24.0	-	87.6	8.6
	Female	6.9	9.6	-	78.4	22.6
	Both	18.0	17.9	-	82.9	16.8
Canada	Male	31.5	13.0	-	54.0	48.0
	Female	26.3	4.0	-	60.0	
	Both	28.9	9.0	-	57.0	
Colombia	Male	26.8	-	24.8	72.0	-
	Female	11.3	-	28.3	85.0	-
	Both	-	-	-	-	-
Cuba	Male	48.1	7.1	-	25.7	6.0
	Female	26.2	1.4	-	39.8	11.1
	Both	36.8	4.0	-	32.9	7.6
USA	Male	25.3	-	19.0	-	-
	Female	21.0	-	22.0	-	-
	Both	22.9	17.0	21.0	78.0	23.0

Source: Barbados: Risk Factor Survey, 1992; Canada: National Population Health Survey, 1996; Colombia: 2nd National Study on Risk Factors for Noncommunicable Diseases, 1999; Cuba: National Risk Factor Survey, 1995; USA: NHANES, 1988-94.

In the Americas, demographic shifts have been exacerbated by rapid urbanization, incorporation of women into the labor force, and accelerated decentralization of governance. Increasing demands for social services and strains in health care systems have been observed. Institutional development within the health sector has not kept pace with these changes, and urbanization has acted as a catalyst for magnifying social and economic inequities. Consequently, within Latin American and Caribbean populations, there are large and patterned health disparities associated with socioeconomic status, gender, and ethnic groups, revealing links between disease risk, health outcome, and social living conditions.<sup>7</sup>

Several of the most profound disparities in the Americas between the affluent and the poor are related to the provision of public services, which is often inadequate in deprived areas. Also, new urban settlements often lack essential public services, and poor countries can rarely afford the extension of services, including education and health. Thus, the poor are often not informed about NCD risk factors and have restricted access to care. A preventive approach for individuals is also important. Care and education for one family member may result in a reduction of risks for all immediate relatives, as risk factors tend to cluster in families. Studies on the social dynamics of poverty have documented that the poor have less control over their own lives and decisions; and perceive the future and possibilities of social mobility as out of reach. Early adopters of desired health seeking behaviors and with access to preventive services are usually the more educated. Paradoxically, the introduction of new clinical preventive services, such as screening, or chemoprevention in developing countries have increased the gap between the rich and the poor, and at the same time have decreased the incidence and mortality of NCDs among the rich.

**“Poor people generally have less education, and thus less information concerning health practices. Their lack of financial resources restricts their opportunity to obtain the best of medical care ... their frequent sense of helplessness and social isolation raises their vulnerability to illness; their increased incidence and prevalence of disease make steady employment difficult. The cycle of poverty and disease does not always begin with people who are already poor. Disease and disability can create poverty.”**

**Feist J. and Brannon L. Health Psychology: An Introduction to Behavior and Health. Waldsworth. 1998. Belmont, California, p.238**

# Lessons from NCD Prevention Initiatives

In an effort to modify risky behavior, initial NCD prevention interventions only targeted individuals. The low impact of these interventions led to a new approach. In the early 1970s, cardiovascular disease (CVD) prevention programs began to take the form of community-based intervention projects targeting entire populations rather than focusing solely on high risk individuals. Community-based interventions continued to increase throughout the 1980s. A population wide approach examines the potential benefits of community resources and aims to address the impact of social and economic factors. Two influential initiatives are described below.

## The North Karelia Project: A Pioneer in Integrated NCD Prevention<sup>8,9</sup>

The first community-based health intervention, the North Karelia Project (NKP), was launched in 1972 in Finland, with governmental support for urgent and effective measures to reduce the burden of exceptionally high CVD mortality rates in the area. At the time, North Karelia's relatively homogeneous population had the highest CVD mortality in the world and the lowest socioeconomic status of any Finnish province for the past 20 years.

The initial main objective of the NKP was to reduce CVD mortality, with an emphasis on middle-aged men due to their very high rates of CVD mortality among this group. This was to be accomplished by reducing the main risk factors for CVD through lifestyle changes and the promotion of secondary prevention. Later, the NKP incorporated the reduction of major NCD mortality into its goals. The NKP had great success in meeting its objectives. Following the first 25 years of the project, mortality rates for men aged 35-64 years in North Karelia declined significantly, with the CVD mortality rate decreasing by 68%, coronary heart disease (CHD) mortality by 73%, and deaths from all causes by 49%. Smoking rates, serum cholesterol, and blood pressure levels also declined, and widespread dietary changes occurred (Graphic 1).

The use of a population-based approach and a risk factor reduction strategy based on social and behavioral context were essential for the success of the NKP.

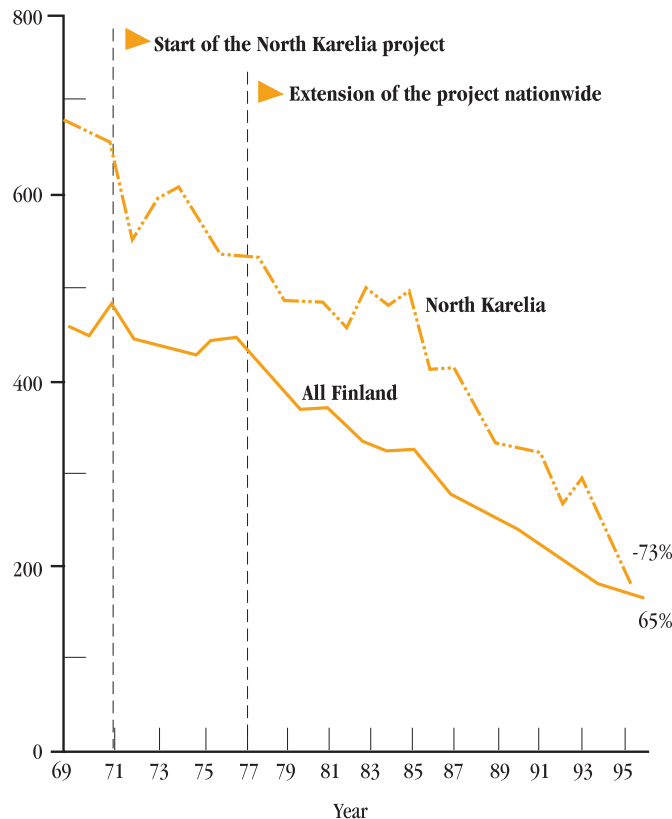
Key components of the project included

- Innovative media and communication activities;
- Involvement of numerous community organizations and residents;
- Systematic participation of primary health care and other service providers;
- Training programs, including targeting of non-traditional providers (i.e. lay personnel);
- Environmental changes through partnerships, including collaboration with the food industry;

- Policy change activities, including close collaboration with national health policy makers; and
- Continuous monitoring and feedback to improve the intervention processes.

Strong leadership and broad institutional support for the NKP contributed to its long-term sustainability. The National Public Health Institute of the Ministry of Social Affairs and Health coordinated a nationwide expansion of the demonstration project. Results of the countrywide intervention have paralleled the positive findings measured in North Karelia. The NKP's successful growth from a community-based project in a homogeneous, low socioeconomic status area to a national, large-scale disease prevention program has contributed valuable lessons for integrated NCD prevention.

**Graphic 1**  
**Decline in Coronary Heart Disease (CHD)**  
**in North Karelia and all of Finland, 1969-1995**



Source: Puska, P, Tuomilehto J, Nissinen A and Vartiainen, E.  
 The North Karelia Project: 20-Year Results and Experiences.  
 The National Public Health Institute (KTL). Helsinki, 1995.



## **CINDI: The Countrywide Integrated NCD Intervention Program**<sup>10,11,12</sup>

Following the example of the North Karelia Project and other health promotion and disease prevention programs in North America and Europe, the WHO Regional Office for Europe created the *Countrywide Integrated Noncommunicable Diseases Intervention Program* (CINDI) which began with national demonstration programs in 1985 through 1992. While the NKP initially focused on a small region in one country, CINDI represents a major collaborative effort among countries with different degrees of development and distinct populations.

CINDI's primary objective is to simultaneously reduce common risk factors and achieve health improvement through the reduction of morbidity and mortality due to NCDs. Priority areas include smoking, hypertension, nutrition, elevated blood cholesterol, and programs targeted to youth. CINDI aims to accomplish its goals through mechanisms that parallel those used in the NKP.

CINDI utilizes

- Integrated activities by building on existing health infrastructures and resources in health promotion, disease prevention and basic health care services;
- Community outreach through the mass media and public education;
- Professional education and intersectoral cooperation between, and involvement of health and other service sectors;
- International collaboration to share implementation experiences, results, and additional research;
- Rigorous evaluation and research methods; and
- Policy tools to measure and effectively market evaluation results to policy makers at the local and national levels in an effort to achieve consensus and secure support.

Each CINDI program follows a common protocol and common guidelines for design, implementation, monitoring, and evaluation as they move from smaller demonstration projects to a national intervention. CINDI has also established a number of working groups to continuously reevaluate and improve its efforts to achieve success in priority areas.

In 2002, CINDI had 105 demonstration areas in 29 European countries and Canada. CINDI is not only a major collaborative effort for preventing NCDs in the European Region, but it has also become a model for the development of WHO's other regional programs. CINDI's implementation structures parallel those successfully used in the NKP, but the program goes one step further. Its extensive evaluation instruments are able to provide very detailed, uniform analysis of outcomes, offering a blueprint for critical measurement and analysis tools of community-based NCD prevention initiatives.

## Other Experiences in NCD Prevention\*

A variety of community-based NCD intervention programs seeking to simultaneously reduce common risk factors have been implemented. Several reviews on the effectiveness of these interventions have been conducted. Data from selected comprehensive programs is presented in Table 2. No attempt is made here to interpret or compare these publications as there are still unanswered questions, particularly pertaining to developing countries. Evidence needs to be increased as programs are implemented and evaluated in their specific context. Successful programs are those with a multidimensional approach, incorporating several levels of action which include: national policies, health services, and community based actions. In addition, NCD intervention programs in which participation of the population is consciously facilitated tend to have a greater impact and more sustainability. In general, one-dimensional approaches are less successful. Typically, they rely on partial community action and neglect the role of the health sector, including public health and service delivery.

**Table 2:  
Summary of Selected Community-Based  
NCD Prevention Projects**

Study	Period	Objectives	Basic methods	Strategies	Main Outcomes
<b>North Karelia Project</b>	1972-97	<p><b>Main Objective</b> To reduce major CVD mortality and promote health in the local population.</p> <p><b>Intermediate objectives</b> To reduce the levels of main risk factors (tobacco uses, elevated serum cholesterol, elevated blood pressure).</p>	<p><b>Design</b> One intervention population and one control population.</p> <p><b>Population included</b> Over 250,000 in each group.</p> <p><b>Measures</b> Baseline and follow-up cross-sectional surveys (randomized samples).</p>	<p>Media activities Health service activities Community organization activities Environmental and policy activities</p>	<p>In the first five years there was a greater fall in coronary ischemic disease greater in NK than in reference area, however, with a low difference. Fall in smoking prevalence, cholesterol levels and blood pressure occurred in both study groups.</p>
<b>Stanford Three-Community Study</b>	1972-74	<p>To determine whether community health education on risk factors prevention (tobacco use,</p>	<p><b>Design</b> Two intervention populations (different) and one control population.</p>	<p>Media activities Direct education (face to face)</p>	<p>Fall in smoking prevalence, cholesterol levels and blood pressure was higher in the intervention group.</p>

\* At the end of the document, full references and abstracts are included for consultation.

Study	Period	Objectives	Basic methods	Strategies	Main Outcomes
		high plasma cholesterol levels, high blood pressure and obesity) can reduce cardiovascular diseases	<p><b>Population included</b> Over 12,000 in every group.</p> <p><b>Measures</b> Annual interview in one randomized sample.</p>		
<b>Stanford Five-City Project</b>	1978-98	To test whether community wide education about risk factors prevention (high levels of cholesterol and blood pressure, tobacco use, obesity, lack of physical activity) can reduce stroke and coronary heart disease.	<p><b>Design</b> Two intervention populations (different) and three control populations.</p> <p><b>Population included</b> Between 40,000 and 85,000 in intervention groups, and 35,000 and 161,000 in control groups.</p> <p><b>Measures</b> Baseline and follow-up cross-sectional surveys (randomized samples).</p>	Media activities Direct education (face to face)	A greater reduction in the prevalence of risk factors in the intervention group. No differences in weight. Slight change in mortality rates for CVD without differences among groups.
<b>Minnesota Heart-Health Program</b>	1980-93	To improve population health behaviors and reduce population levels of blood cholesterol, blood pressure and tobacco use.	<p><b>Design</b> Three community matched pairs, each pair had one intervention city and one comparison city.</p> <p><b>Population included</b> Between 25,000 and 110,000.</p> <p><b>Measures</b> Baseline and fol-</p>	Media activities Health education at individual and community level Environmental activities	Fall in the prevalence of risk factors in intervention and control groups. A greater increase in physical activity in education group without differences in weight. A reduction of CHD in all groups; no changes in stroke incidence.

Study	Period	Objectives	Basic methods	Strategies	Main Outcomes
			low-up cross-sectional surveys (randomized samples).		
<b>Pawtucket Heart Health Program</b>	1980-91	To determine whether community-wide education could result in changes in CVD risk factors and risk of CHD. The target behaviors included control of blood pressure and serum cholesterol levels, smoking cessation, enhancing regular aerobic physical activity, and maintenance of desirable body weight.	<p><b>Design</b> One intervention population and one control population.</p> <p><b>Population included</b> Over 70,000 in each group.</p> <p><b>Measures</b> Baseline and follow-up cross-sectional surveys (randomized samples).</p>	Community activism, mobilizing and involving the community in all aspects of heart health program (planning, implementation, evaluation, and management). The program was carried out through the use of a volunteer-based delivery system.	Fall in the prevalence of risk factor in both groups. Stable trends in coronary heart disease mortality.

# CARMEN is Born

## Defining the Framework to Act

The evidence provided by the influential community-based studies highlights the complexity of the issues involved in NCD prevention. In 1996, when initial steps were given by the Pan American Health Organization to support Integrated NCD Prevention Programs in the Americas, it benefited from the experience and collaboration of CINDI to develop the CARMEN Initiative. Once under development, Member States requested a more flexible approach that could adapt more easily to the conditions of Latin American and Caribbean countries. In September 2002, the Pan American Sanitary Conference endorsed a public health approach to chronic NCDs that entails the following four principles:

1. The problem is addressed from a broad cohesive system perspective, that takes into account the social context and international environment;
2. Actions, whether to promote policy changes, or to develop community-based programs or health service interventions, are evaluated in order to ascertain their effectiveness;
3. Financing and a supportive infrastructure are present to assure sustainability and coverage; and
4. The needs and perspectives of the population served are considered, so that they can be active participants in prevention and control programs.

**“...given the complexity that the burden of NCD imposes on developing countries, the problem cannot be analyzed only in epidemiological terms. One-dimensional solutions, dealing with risk factors or diseases independently, have too narrow scope...It requires a comprehensive systems perspective that examines the multilevel processes that frame the prevention and control of NCD.”**

**PAHO. Public Health Response to Chronic Diseases. 26<sup>th</sup> Pan American Sanitary Conference, 130<sup>th</sup> Session of the Regional Committee. Doc.CE1130/17.**

The Pan American Sanitary Conference also approved a resolution that endorses CARMEN as one of the main strategies for the integrated prevention of chronic diseases, and has requested that PAHO provides technical cooperation to Member States in developing an integrated approach to NCDs, based on the CARMEN Initiative.<sup>5</sup>

## Responding to the NCD Epidemic and to the Needs of the Americas

The aim of the CARMEN Initiative is to improve the health status of populations in the Americas by reducing risk factors associated with noncommunicable diseases.

CARMEN strives to develop, implement, and evaluate

- Policies aimed at simultaneously reducing a set of common NCD risk factors;
- Social mobilization and community-based interventions;
- Epidemiological surveillance for risk conditions; and
- Prevention practices that can contribute to the reduction of health inequities.

# The Risk-Reduction Component

## Objective

The objective of the CARMEN risk-reduction component is to promote and support the reduction of NCD risk factors and risk conditions through integrated community-based interventions.

## Strategies

The CARMEN Initiative applies three strategies to achieve its objectives: Integrated Prevention and Health Promotion; Demonstrative Effect; and the Promotion of Health Equity.

### **Integrated Prevention and Health Promotion**

Integrated prevention entails developing interventions aimed at simultaneously preventing and reducing a set of risk conditions common to major NCDs. This requires combined and balanced efforts for preventive health care and general health promotion, to enable communities to become active participants in decisions concerning their health. In this context, it is necessary to develop strategic consensus building among different stakeholders, such as governmental, non-governmental, and private sector organizations in an effort to increase cooperation and responsiveness to population needs.

### **Demonstrative Effect**

Interventions are first introduced in a demonstration area, so that acceptability, safety, and ultimately effectiveness can be evaluated in a given context. It is feasible to conduct evaluations by monitoring the impact on NCD risk factors, morbidity, and mortality. Basically, this requires the following core activities:

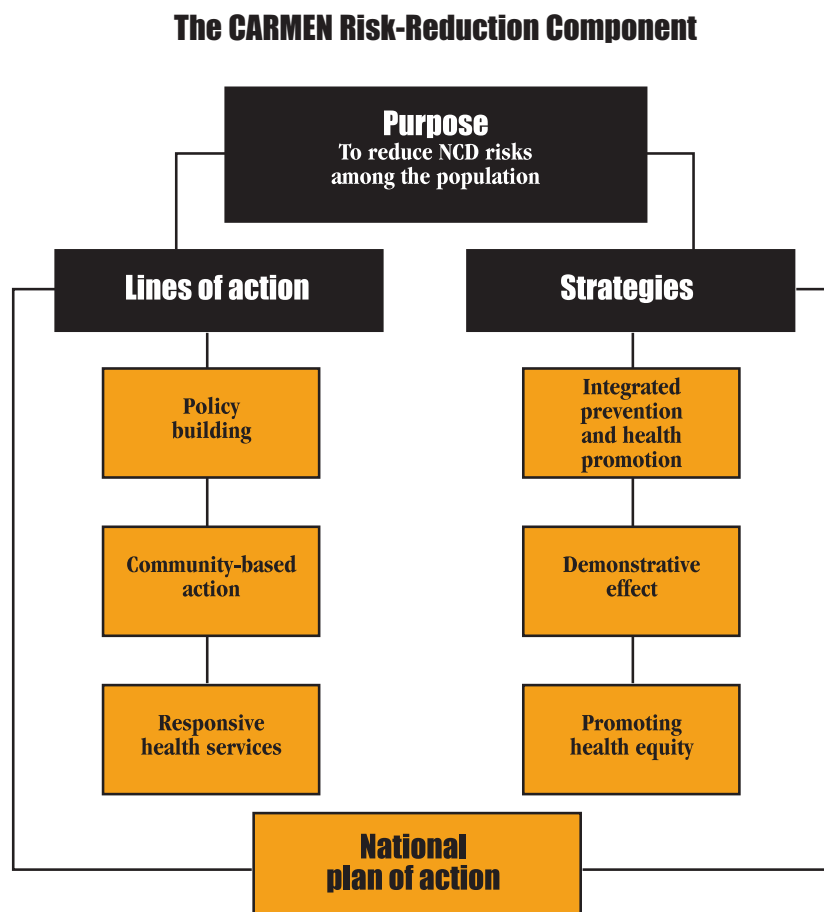
- Baseline measurements for future comparisons;
- Surveillance of risk conditions; and
- Systematic collection of general information related to the implemented intervention.

Partnerships with academic centers are highly encouraged in order to strengthen the evaluation component and to increase the participation in international research and training activities.

### **Promotion of Health Equity**

Prevention strategies should consider underlying influences on health inequalities such as education, income distribution, public safety, housing, work environment, employment, social networks, and transportation among others.<sup>13</sup> It is important that strategies be aimed at reducing overall population risk and at the same time reducing the gap among different population groups. This requires, in many instances, redesign and evaluation of interventions of well documented efficacy. It also entails the identification and special attention to key population groups, such as indigenous people, new urban migrants and women, particularly heads of

households. Prevention strategies aimed at improving health may not substantially contribute to the reduction of the health inequity gap. This is because the well off may absorb the benefits since they have easier access to goods and services as compared to the less well off.



## Lines of Action

The CARMEN Initiative is rooted in the following concurrent lines of action:

### 1. Policy Building

Policy building is a cyclical process that includes the definition of a problem which leads to policy development, implementation, and evaluation. Once the policy is evaluated, the process begins again.<sup>14</sup> Successful NCD prevention programs have adopted a variety of policies, laws, and regulations. There are a number of policy options that have demonstrated effectiveness in different contexts, particularly in industrialized countries. Each country's policy building and implementation processes are unique and the specific policy analysis must begin at the coun-

try level. This approach requires support from a diversity of stakeholders: governmental and non-governmental institutions, opinion-makers, and the private sector among others.

Additionally, there are key policies that demand consensus among international and transnational stakeholders, which no country can do on its own. Participation in major international initiatives is central to place NCD prevention in the public agenda. The role of CARMEN programs is to seek contributions from all sectors of society for successful policy building processes.

## 2. Community-Based Actions

Initially, interventions on NCD prevention targeted individuals only, in an attempt to modify risky behaviors. The very low impact of these interventions as well as their lack of sustainability led to a new preventive approach. This new approach looks for the effective involvement of families and communities, pooling and sharing resources to ensure integrated prevention interventions. It entails the identification of leaders, organized groups and institutions, and the development of strategic coalitions and alliances. One important element in the work of local coalitions is to ensure that all involved organizations and professionals are trained and are provided with technical assistance in coalition development, community planning, and program implementation. This will guide them in developing needs assessments, in using data for comprehensive strategies, and in evaluating partnerships and interventions.<sup>15</sup> In this context the health sector becomes a partner rather than the head of the intervention.

## 3. Responsive Health Services

In an effort to improve outcomes in the population, health care services should shift their focus from episodic care for the response to acute illnesses to a more proactive approach that considers participation in prevention programs and the needs of persons with chronic conditions. Health promotion, prevention and care are part of a continuum, which is indivisible if effectiveness is expected. They overlap and reinforce each other in operational terms. Health care services need to incorporate preventive approaches that have demonstrated effectiveness and need to play a significant role in health promotion efforts. In a climate of progressive decentralization it is now possible to expect and promote organizational changes towards this end.

## Why does CARMEN need to be a national program?

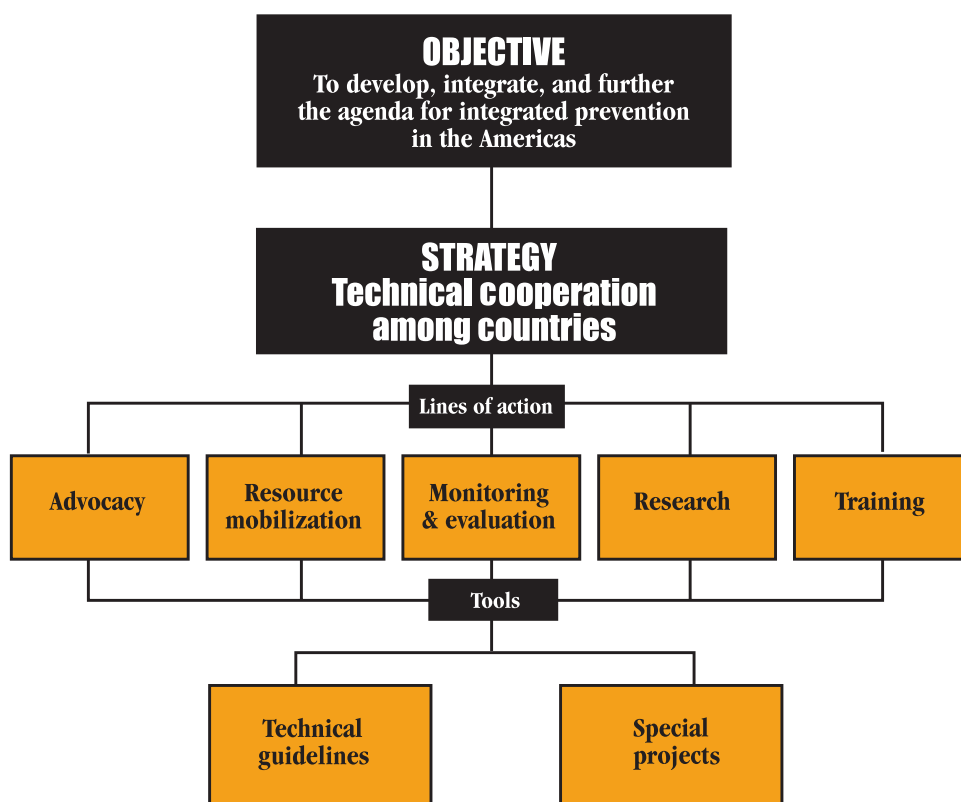
- A policy building process for the integrated prevention of NCDs requires the involvement of multiple sectors of society that can only be convened nationally.
- A national program can facilitate the international involvement of the country in international initiatives that can strengthen national efforts for integrated NCD prevention.
- A national program on NCDs based on the evaluation of local experiences can build-up the evidence that Latin American countries have been requiring.

## Why should CARMEN be a regional network?

- CARMEN is about partnerships. Countries that participate in the network are expected to bring together all groups working or interested in working on NCD prevention and in developing their own national network.
- Many of the CARMEN demonstration sites are linked or are based in academic institutions, others in non-governmental organizations or in municipal governments. However, considering the existing evidence of the success of concurrent lines of action, it is clear that there are a number of activities in the integrated prevention approach that no local group, community and country can do alone.
- The involvement of countries is essential in the area of legislation and regulation; but the involvement of NGOs and local groups is fundamental to help build and implement such legislation.
- CARMEN has a research agenda which would be enriched by the participation of several member countries.



# The CARMEN Network Development Component



## Objectives

The main objective of this component is to set up, develop, integrate, and further the agenda for integrated NCD prevention in the Americas. This is to be accomplished by increasing the technical capacity for the prevention of NCD risk factors in the Americas. Specifically, this component seeks to

- Promote and support cost-effective interventions for NCD prevention;
- Develop adequate strategies and methodologies for NCD prevention, considering the countries unique characteristics;
- Develop strategies to obtain the support of legislators and other key players;
- Promote and support community participation in NCD prevention initiatives; and
- Promote a regional agenda for tackling the NCD epidemic.

## Strategy: Technical Cooperation Among Countries

The CARMEN Network promotes and supports technical cooperation among member countries in the area of NCD prevention, and is linked to the other five WHO Regional Networks and to the Global Forum on NCD Prevention and Control. In this framework, it promotes the exchange of knowledge and experiences between countries and regions, addresses problems, and supports collaboration to tackle the increasing burden of disease due to NCDs. The CARMEN Network is based on the principle that all countries in the Americas can benefit from other CARMEN programs and similar programs in other regions of the world. All member countries and territories are entitled to participate in the CARMEN Network with their national, provincial, state, and local programs, or non-governmental institutions.

Networks have repeatedly been demonstrated to be effective, practical, and innovative tools for solving public health problems. They are rooted in the union of two or more entities that share resources and have the capability of developing coordinated actions through methodological agreements. It is expected that these partnerships will yield maximum performance and the results will be greater than what could have been accomplished by performing actions independently. It is also hoped that alliances and coalitions will prevent overlapping efforts and reduce waste.

Globalization elicited a series of influences on people's lives that can positively and/or negatively affect their health, such as information about other cultural models, intense migration processes, economic and market adjustments, exposure to risky behaviors, intense urbanization, the search for governmental efficiency, and many others. Networks capitalize on these interactions and seek to promote the positive consequences of their being.

Ultimately, CARMEN is a network of networks, and functions as a superhighway for global, regional, national, and local communication for sharing resources, information, and collaborating to prevent and control NCDs.

## Lines of Action

### Advocacy

The Advocacy Institute defines advocacy as the “pursuit of influencing outcomes—including public policy and resource allocation decisions within political, economic, and social systems and institutions - that directly affect people's lives. Advocacy consists of organized efforts and actions based on the reality of what is. These organized actions seek to highlight critical issues that have been ignored and submerged, to influence public attitudes, and to enact and implement laws and public policies so that a vision of what should be in a just, decent society becomes a reality”.<sup>16</sup>

Advocacy is a tool that is increasingly being used in public health efforts to advance or advocate for policy, institutional, and behavioral changes based on scientific evidence.<sup>17</sup> In an effort to accomplish its objectives, the CARMEN Network advocates for sustainable and effective NCD prevention in the Americas.

## Resource Mobilization

Global and national economic conditions demand efficient resource allocation and expenditure processes. Thus, strategic resource mobilization for NCD prevention requires a defined conceptual and operational framework, sufficient technical knowledge and support, as well as evaluation tools to ensure progress and satisfy donor demands.

The CARMEN Network, with the support of PAHO, promotes the development of technical skills for satisfying these requirements. PAHO is in an excellent position to support participating countries due to its historical role as an honest technical cooperation broker with access to a variety of donors, countries, agencies, and non-governmental organizations.

**“The main objective of an evaluation is to influence decisions. How complex and precise the evaluation must be depends on who the decision maker is and on what types of decisions will be taken as a consequence of the findings.”**

**Habicht, JP, Victora CG and Vaughan JP.  
Evaluation Designs for Adequacy,  
Plausibility and Probability of Public Health  
Program Performance and Impact.  
International Journal of  
Epidemiology.1999;28:10-18.**

## Monitoring and Evaluation

Monitoring and evaluation should be complementary components in a comprehensive system. Accordingly, monitoring is defined as “a continuous internal management activity whose purpose is to ensure that the program achieves its defined objectives within a prescribed timeframe and budget.”<sup>18</sup> Evaluation is defined as “an internal or external management activity, to assess the appropriateness of a program’s design and implementation methods in achieving both specified objectives and more general development objectives; and to assess a program’s results, both intended and unintended and to assess the factors affecting the level and distribution of the benefits produced”.<sup>18</sup> Efficient and reliable monitoring and evaluation systems are crucial for change processes.

In an effort to provide feedback for the continuous improvement of programs, the CARMEN Network promotes the evaluation and monitoring of programs and initiatives.

## Research

Based on the experiences of NCD prevention previously described, there is an obvious need for the support of research initiatives, especially in developing countries, in order to obtain stronger evidence on the acceptability and effectiveness of integrated NCD prevention programs or their components. The CARMEN Network supports research projects on integrated NCD prevention within the Americas, and will continue to disseminate results.

Partnerships with CARMEN collaborative academic centers provide the necessary technical support for research development, particularly translational research, which is putting science into practice. Sharing of resources, experiences, and knowledge, is an intrinsic action of the CARMEN Network, and is a powerful tool for improving the research capacity among countries.

## **Training**

There is a clear need to create a critical professional mass to support the implementation of integrated NCD prevention in the Americas. This can only be achieved through a well-conceived, easily accessible human resource training and development program, which will produce skilled health workers who are able to develop and provide effective NCD preventive health care. The training process should include general components as well as the discussion of relevant theories, international frameworks, state-of-art practices, examples from various programs, and specific training according to program needs. In addition, training of organized community groups is also necessary in areas such as fundraising, project management and NCD prevention in general. The CARMEN Network will play a crucial role in identifying the need for training by utilizing the skills and technical resources of its members.

## **Tools**

In order to support the implementation of NCD prevention initiatives within countries, the CARMEN Network has defined two main tools:

- Technical guidelines
- The CARMEN Special Projects Portfolio.

### ***Technical Guidelines***

The technical guidelines strive to provide simple and clear guidance, based on scientific evidence, regarding the implementation of activities for the prevention of NCDs. They provide the foundation for professional education, utilization of health services, community participation, improvement of risk factor surveillance, and many other important issues for the CARMEN Initiative. Developing guidelines, however, isn't enough. They must be disseminated, incorporated by health professionals and other related actors, and implemented taking into consideration the unique cultural aspects of a given community. The adoption of CARMEN's technical guidelines by participating members can also facilitate the technical cooperation between countries, allowing for comparisons between health outcomes. The CARMEN Network can help the development process by promoting shared definitions, and advocating for similar implementation and evaluation methods.

### ***CARMEN Portfolio of Technical Cooperation Projects***

As part of a well documented portfolio, a range of innovative projects for the prevention and control of NCDs have been designed and implemented by the CARMEN Network. These projects are financed by PAHO in conjunction with participating states and international donors. The portfolio covers several areas of interest, and allows space for new and innovative topics. This strategic and dynamic tool seeks to provide the CARMEN Networks with essential support for the development and implementation of specific NCD prevention initiatives, or for essential subsidiary or complementary actions that seek to identify what determines effectiveness.

# Conclusion

**T**hrough integrated community-based intervention and networks, the CARMEN Initiative seeks to significantly impact the NCD epidemic in the Americas. Its research-based principles are rooted in a commitment to address common risk factors simultaneously, and to integrate preventive measures aimed at promoting changes at both the individual and population level.

CARMEN centers its actions around country needs and demands, and provides effective technical support to fulfill these needs.

Through participation in strategic projects and the CARMEN Network, communities and countries can gain instant access to innovative design, implementation, and evaluation tools, as well as share successes to assist in the growth of other programs. The CARMEN Network is truly an arena where directions, innovations, and strategic plans are created, and where constant improvements in integrated NCD prevention can be achieved.





# Selected Abstracts

## **Community-Based Intervention Research: Coping with the "Noise" of Real Life in Study Design**

Hohmann AA, Shear MK

Am J Psychiatry 2002 Feb;159(2):201-7

The ultimate goal of clinical intervention research is to find a way to improve the care and lives of people suffering from specific psychiatric symptoms, illnesses, and/or disabilities. This article provides to clinical researchers a set of issues to consider and steps to follow in making the transition to more public-health-oriented, community-based research. Traditional, academically based, randomized clinical trials test an intervention against a placebo or alternate treatment control condition, focusing on a single, specific main outcome. Community-based intervention trials also test a treatment intervention but in the context of the community environment. These trials, in order to provide meaningful information for community clinical practice, must take into account many factors that are controlled or are not considered in traditional clinical trials. Investigators need to be clear about the goal of community-based interventions; they need to determine the social and cultural norms, expectations, and conflicts of the community and of the setting, and they need to work collaboratively with experts in both qualitative and quantitative design.

## **Community-Based Noncommunicable Disease Interventions: Lessons from Developed Countries for Developing Ones**

Nissinen A, Berrios X, Puska P

Bull World Health Organ 2001;79(10):963-70

Community-based programmes for prevention and control of cardiovascular diseases (CVD) started in Europe and the USA in the early 1970s. High mortality from CVD in Finland led to the start of the North Karelia Project. Since then, a vast amount of scientific literature has accumulated to present results and discuss experience. The results indicate that heart health programmes have a high degree of generalizability, are cost-effective and can influence health policy. In the 1980s the focus of programmes expanded from CVD to non-communicable diseases (NCD), mainly because of the common risk factors. Attention has now turned to promoting this approach in developing countries, where the prevalence of NCD is growing. Theory and experience show that community-based NCD programmes should be planned, run and evaluated according to clear principles and rules, collaborate with all sectors of the community, and maintain close contact with the national authorities. In view of the burden of disease they represent and of globalization, there is a great need for international collaboration. Practical networks with common guidelines but adaptable to local cultures in a flexible way have proved to be very useful.

## Systematic Review of Randomized Controlled Trials of Multiple-Risk Factor Interventions for Preventing Coronary Heart Disease

Ebrahim S, Smith GD

BMJ 1997 Jun 7; 314(7095): 1666-74

**Objective:** To assess the effectiveness of multiple risk factor intervention in reducing cardiovascular risk factors, total mortality, and mortality from coronary heart disease among adults.

**Design:** Systematic review and meta-analysis of randomised controlled trials in workforces and in primary care in which subjects were randomly allocated to more than one of six interventions (stopping smoking, exercise, dietary advice, weight control, antihypertensive drugs, and cholesterol lowering drugs) and followed up for at least six months.

**Subjects:** Adults aged 17-73 years, 903000 person years of observation were included in nine trials with clinical event outcomes and 303000 person years in five trials with risk factor outcomes alone.

**Main outcome measures:** Changes in systolic and diastolic blood pressure, smoking rates, blood cholesterol concentrations, total mortality, and mortality from coronary heart disease. **RESULTS:** Net decreases in systolic and diastolic blood pressure, smoking prevalence, and blood cholesterol were 4.2 mm Hg (SE 0.19 mm Hg), 2.7 mm Hg (0.09 mm Hg), 4.2% (0.3%), and 0.14 mmol/l (0.01 mmol/l) respectively. In the nine trials with clinical event end points the pooled odds ratios for total and coronary heart disease mortality were 0.97 (95% confidence interval 0.92 to 1.02) and 0.96 (0.88 to 1.04) respectively. Statistical heterogeneity between the studies with respect to changes in mortality and risk factors was due to trials focusing on hypertensive participants and those using considerable amounts of drug treatment, with only these trials showing significant reductions in mortality.

**Conclusions:** The pooled effects of multiple risk factor intervention on mortality were insignificant and a small, but potentially important, benefit of treatment (about a 10% reduction in mortality) may have been missed. Changes in risk factors were modest, were related to the amount of pharmacological treatment used, and in some cases may have been overestimated because of regression to the mean, lack of intention to treat analyses, habituation to blood pressure measurement, and use of self reports of smoking. Interventions using personal or family counseling and education with or without pharmacological treatments seem to be more effective at reducing risk factors and therefore mortality in high risk hypertensive populations. The evidence suggests that such interventions implemented through standard health education methods have limited use in the general population. Health protection through fiscal and legislative measure may be more effective.



## **Community Intervention Programs to Prevent Cardiovascular Disease— A Systematic Review of the Literature (1997)**

Lundvall O, Asplund K, Cohen D, Emmelin M, Eriksson C, Janlert U, Jonsson E, Klepp K-I, Lindholm L, Marshall D, Råstam L, Weinehall L, Werkö L.  
SBU (The Swedish Council on Technology Assessment in Health care). Stockholm; 1997  
(SBU report No. 134)

**Purpose:** The primary purpose of this investigation is to: systematically review, compile, and assess community intervention programs aimed at preventing cardiovascular diseases, describe and analyze trends concerning the occurrence and progression of cardiovascular diseases in Sweden, develop recommendations on community intervention programs for decision makers and staff involved with public health issues.

**Methods:** Systematic review of the literature and cost analysis.

**Collection of Primary Data:** Questionnaire survey of experts in the field of cardiovascular disease prevention to identify preventive programs that meet the inclusion criteria. Reports acquired directly from project representatives and via an on-line search of the literature.

**Review of the Reports:** Internal review by project group, SBU Board and SBU Expert Group. Additional external review by experts in the field.

**Inclusion Criteria:** The following inclusion criteria were used: the program must cover the entire population within a geographically defined area, the program must be aimed at multiple risk factors, the program must have a controlled design, i.e. a reference population must be included, the outcomes, reported as changes in cardiovascular risk factors or changes in cardiovascular disease, just be published. Certain projects which did not fulfill the criteria listed above were briefly reviewed.

**Conclusions and Recommendations:** Eight projects that met the above criteria were reviewed. Cardiovascular risk factors had been reduced in several of these projects, but not substantially more in the intervention population than in the control populations. Likewise, morbidity and mortality did not decline more in the intervention populations than in the control populations. Hence, there is no scientific evidence to support the start-up of new, large scale projects similar to the ones assessed. Certain programs which did not meet the inclusion criteria are addressed briefly. Several of these programs reported a decline in risk factor levels, but adequate control populations are lacking. In randomized projects that addressed risk factors in high-risk individuals, the outcomes reported in the intervention groups were not generally superior to the outcomes in the control groups. However, it is evident that risk factors such as smoking, high blood pressure, unhealthy diet, sedentary life style, and social factors play a major role in the incidence of myocardial infarction and stroke, and these diseases can, to some extent, be prevented if such risk factors are eliminated. There is a major need to further develop methodology in this field. Experience suggests that smaller, local projects may offer a better foundation for studies on how to more effectively prevent cardiovascular disease

in the population. Numerous projects aimed at preventing cardiovascular disease are underway in Sweden. Scientific expertise must be strengthened so the outcomes of preventive interventions can be more accurately assessed.

### **Synthesis of Findings and Issues from Community Prevention Trials**

Schooler C, Farquhar J, Fortman S, and Flora J  
Annals of Epidemiology 1997; S54-S68.

**Purpose:** Lessons from three decades of community prevention trials are discussed to provide directions for the future of community health promotion efforts.

**Methods:** The rationale for and characteristics of community prevention trials for cardiovascular disease (CVD) risk reduction are presented. Published articles regarding the main effects and component studies of community prevention trials regarding CVD were reviewed.

**Results:** All early and most recent community prevention trials carried out in diverse populations demonstrated population-wide effects on CVD wide risk factors, particularly blood pressure levels and smoking prevalence. Moreover, subgroup component studies (e.g., schools, worksites, events) demonstrate the efficacy of many risk reduction strategies. These results support a dose-response relationship by evidence of stronger effects where adequate exposure to the intervention was achieved.

**Conclusions:** Although much remains untested in theory and practice, data indicate that community-based efforts to reduce the risk of CVD can influence behavior. Additional research is needed to increase understanding of the optimal mix and sequencing of components of these programs. In addition, this review indicates the importance of incorporating strategies to influence environmental change. Recommendations for the future include research regarding evaluation methods and concurrent international technology transfer of the vast number of lessons learned and the many widely accepted practice principles of community-based interventions.

### **Understanding the Variability in the Effectiveness of Community Heart-Health Programs: A Meta-Analysis**

Sellers DE, Crawford SL, Bullock K, McKinlay JB  
Soc.Sci. Med Vol. 44. No.9, pp.1325-1339, 1997

Over the past 25 years, community interventions to reduce cardiovascular disease (CVD) have been conducted around the world with very mixed results. This study uses meta-analysis to assess whether the variation in the observed effectiveness of community heart health programs (CHHP) is related to characteristics of the intervention program, the population under study, or the evaluation methods. A CHHP is defined as any

primary prevention program that attempted to reduce the population burden of CVD by shifting the distribution of risk factors in a general population. To be included in the meta-analysis, a study must have utilized a reference group in the evaluation, employed a repeated independent cross-sectional measurement design, and reported sufficient outcome information for at least one of four major risk factors: smoking, total cholesterol, blood pressure, and body weight. Results of these studies are summarized with the effect size measure  $(Y_i1 - Y_i2) / (Y_r1 - Y_r2) / S_r1$  where Y = outcome measure, S = standard deviation of the outcome measure, 1 = baseline, 2 = follow-up, i = intervention, and r = reference community. This measure, which reports the net change in the intervention group in terms of the variability in the reference population before the start of the intervention, permits comparison across different outcome measures and facilitates the aggregation of effects across studies. Generalized least squares regression, which permits the incorporation of multiple, dependent effect sizes from a single study, was used to assess the impact of characteristics of the intervention (prevention strategy, type of mass communication, community organization, and environmental change), the population (setting, gender, year of follow-up measurement), and the evaluation design and implementation (the number of communities, matching of communities, the follow-up time, the response rate, and covariate adjustment in the analysis) on the effect sizes. The results of this analysis suggest that the characteristics of the evaluation method account for much of the heterogeneity in the outcome of CHHPs, though some intervention characteristics also play a role.

### **Realistic Outcomes: Lessons from Community-Based Research and Demonstration Programs for the Prevention of Cardiovascular Diseases**

Mittelmark MB, Hunt MK, Heath GW, Schmid TL.

J Public Health Policy 1993 Winter;14(4):437-62

Public health departments nation-wide are implementing community-based cardiovascular disease (CVD) prevention programs. Many such programs are turning for guidance to three research and demonstration projects: the Stanford Five City Project, the Pawtucket Heart Health Program, and the Minnesota Heart Health Program. This article summarizes some of the lessons learned in these projects and recommends strategies for the new generation of CVD prevention programs. The core of a successful program is the community organization process. This involves identification and activation of key community leaders, stimulation of citizens and organizations to volunteer time and offer resources to CVD prevention, and the promotion of prevention as a community theme. A wide range of intervention settings are available for health promotion. As is true for the workplace, places of worship are receptive to health promotion programs and have access to large numbers of people. Mass media are effective when used in conjunction with complementary messages delivered through other channels, such as school programs, adult education programs, and self-help programs. Community health professionals play a vital role in providing program endorsement and stimulating the participation of other community leaders. School-based programs promote long-term behavior change and reach beyond the school to actively involve parents. Innovative health promotion contests have wide-

spread appeal and promote participation in other community interventions. In the area of evaluation, health program participation rates are appropriate primary outcome measures in most community-oriented prevention programs. Other program evaluation priorities include community analysis and formative evaluation, providing data to fine-tune interventions and define the needs and preferences of the community. It is premature to comment conclusively on the effectiveness of community-based CVD prevention programs in reducing population risk factor levels. However, it has been demonstrated that a broad range of intervention strategies can favorably modify the health behaviors of specific groups in communities such as employees and school children.

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