

(see authors' website www.zynx.com/research/disease_management.htm).

Our study has several limitations, most importantly the quality, quantity, and heterogeneity of the original studies. The studies included great variation in interventions used, patient populations, provider populations, and measured processes and outcomes of care. Many provided insufficient detail in the methods section for us to understand the quality of the interventions and the intensity or duration of each intervention. For example, a study might report that provider education was used, but provide insufficient information for readers to understand how the educational process was performed and how to replicate the process.

The clinical significance of effect sizes may be unclear and need to be interpreted with caution and related to the measured clinical effects reported in the trials.¹² Few studies directly compared the effectiveness of different interventions, and without direct comparisons of interventions in trials it is difficult to evaluate each intervention's relative effectiveness.

Conclusions

The available published literature shows that most disease management programmes directed at providers and patients are associated with improvements in care. However, little is known about the relative effectiveness and costs associated with different implementation strategies, and few studies have directly compared intervention strategies. Further research is needed to determine the effectiveness and costs of different implementation strategies that could be used in disease management programmes. These studies should adhere to methodological standards and be described in peer reviewed literature in sufficient detail to enable

What is already known on this topic

Disease management programmes have gained popularity in recent years as a means of improving the quality and efficiency of care of patients with chronic diseases

A limited number of trials have documented the effectiveness of disease management in specific situations, but uncertainty remains about its overall value and which interventions are most effective

What this study adds

Programmes using education, feedback, or reminders for healthcare providers produced significant improvements in provider adherence to care guidelines

Programmes using the provider strategies or education, reminders, or financial incentives for patients improved disease control

Further study is needed to assess the relative effectiveness of the different strategies

others to understand and reproduce the results in different patient populations, and to understand the relative effectiveness of different disease management interventions for improving the care of patients with chronic diseases.

Contributors: see bmj.com

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Competing interests: SRW has been reimbursed for speaking at conferences on the topic of disease management and was a member of the NCQA Disease Management Advisory Committee. At the time of the study Zynx Health was owned by Cedars-Sinai Health System and affiliated with the UCLA School of Medicine; it is now a subsidiary of Cerner Corporation. At no time has it derived revenue from selling or providing services for disease management programmes.

The burden of disease
Global burden of disease and injury attributable to selected risk factors, 1990

Risk factor	Deaths (thousands)	As % of total deaths	YLLs (thousands)	As % of total YLLs	YLDs (thousands)	As % of total YLDs	DALYs (thousands)	As % of total DALYs
Malnutrition	5881	11.7	199 486	22.0	20 089	4.2	219 575	15.9
Poor water supply, sanitation, and personal and domestic hygiene	2668	5.3	85 520	9.4	7 872	1.7	93 392	6.8
Unsafe sex	1095	2.2	27 602	3.0	21 100	4.5	48 702	3.5
Tobacco	3038	6.0	26 217	2.9	9 965	2.1	36 182	2.6
Alcohol	774	1.5	19 287	2.1	28 400	6.0	47 687	3.5
Occupation	1129	2.2	22 493	2.5	15 394	3.3	37 887	2.7
Hypertension	2918	5.8	17 665	1.9	1 411	0.3	19 076	1.4
Physical inactivity	1991	3.9	11 353	1.3	2 300	0.5	13 653	1.0
Illicit drugs	100	0.2	2 634	0.3	5 834	1.2	8 467	0.6
Air pollution	568	1.1	5 625	0.6	1 630	0.3	7 254	0.5

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In 1990 the main avoidable hazards to health worldwide were malnutrition, poor water supply and sanitation, unsafe sex, and tobacco and alcohol use. This table shows how these and other important risk factors contributed to overall deaths, premature deaths in years of life lost (YLLs), years of life lived with a disability (YLDs), and—as a combined measure or premature death and disability—disability adjusted life years (DALYs). The global burden caused by tobacco and alcohol will almost certainly increase rapidly as their use spreads throughout less developed countries.

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