

Economic aspects of chronic diseases in Vietnam

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Introduction: There remains a lack of information on economic aspects of chronic diseases. This paper, by gathering available and relevant research findings, aims to report and discuss current evidence on economic aspects of chronic diseases in Vietnam.

Methods: Data used in this paper were obtained from various information sources: international and national journal articles and studies, government documents and publications, web-based statistics and fact sheets.

Results: In Vietnam, chronic diseases were shown to be leading causes of deaths, accounting for 66% of all deaths in 2002. The burdens caused by chronic disease morbidity and risk factors are also substantial. Poorer people in Vietnam are more vulnerable to chronic diseases and their risk factors, other than being overweight. The estimated economic loss caused by chronic diseases for Vietnam in 2005 was about US\$20 million (0.033% of annual national GDP). Chronic diseases were also shown to cause economic losses for families and individuals in Vietnam. Both population-wide and high-risk individual interventions against chronic disease were shown to be cost-effective in Vietnam.

Conclusion: Given the evidence from this study, actions to prevent chronic diseases in Vietnam are clearly urgent. Further research findings are required to give greater insights into economic aspects of chronic diseases in Vietnam.

Keywords: *chronic disease; economic burden; Vietnam*

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Chronic diseases consist of a wide range of conditions of long duration and generally slow progression. Chronic diseases are well known as leading causes of mortality globally, representing 60% of all deaths. Out of the 35 million people who died from chronic diseases in 2005, more than 80% of these deaths occurred in low and middle-income countries (1). The number of deaths from chronic diseases will continue increasing rapidly in the next decade and the low and middle-income countries will carry the heaviest burden (1, 2). Chronic diseases not only cause premature death, but also have major adverse effects on the quality of life of affected individuals and create large adverse economic effects on families, communities and societies in general (1). Four of the most prominent chronic diseases – cardiovascular diseases, cancer, chronic obstructive pulmonary disease and diabetes – are linked to modifiable risk factors, notably high blood pressure, tobacco use, alcohol drinking, unhealthy diets and physical inactivity. Currently, the prevalence rates of these risk factors are accelerating globally, especially in developing countries

(3, 4). Actions to prevent these major chronic diseases should focus on controlling these and other key risk factors in a well-integrated manner. As many chronic disease interventions are effective and suitable for resource-constrained settings (1, 5), it is vitally important that action against the impending chronic disease pandemic is taken urgently.

Vietnam is located in Southeast Asia and shares borders with China to the north and Laos and Cambodia to the west. The country covers an area of area of 331,000 km² and has a population of 85 million, with 50.8% of the population estimated to be women and 49.2% men. GDP per capita in Vietnam in 2007 was approximately purchasing power parity dollars \$3,000 (PPP) (6). Life expectancy at birth (69 years for male and 74 years for female in 2005) (7) and adult literacy rate (90.3% in 2004) are high (8).

Like other developing countries, Vietnam is undergoing a rapid epidemiological transition resulting in an increasing burden of chronic diseases. Chronic diseases have been shown to be major causes of morbidity and

mortality in hospitals for the whole country. Hospital admissions due to chronic diseases increased from 39% in 1986 to 68% in 2002 and chronic diseases deaths rose from 42% in 1986 to 69% in 2002 (9). To respond to the problems of chronic diseases, the Vietnamese Prime Minister issued Decision No. 77/2002/QD-TTg on the Ratification of the Programme of Prevention and Control of Certain Non-Communicable Diseases for the period 2002–2010 (10). These documents highlight the importance of having comprehensive scientific evidence on different aspect of chronic diseases, especially their socio-economic patterning. This paper, by gathering available relevant research findings, therefore aims to report and discuss currently available evidence on economic aspects of chronic diseases in Vietnam. The evidence on the economic characteristics of this growing disease burden is believed to be a firm background for justifying stronger actions against chronic disease epidemics in Vietnam and elsewhere.

Methods

Data used in this paper were obtained from the different information sources: international and national journal articles and studies, government documents and publications, web-based statistics and fact sheets. We used both online and manual search methods to gather the information.

The online search was performed in multiple electronic bibliographic databases, including: Ovid MEDLINE, PubMed and EMBASE. The following main key search terms were used: chronic disease, non-communicable disease, cardiovascular disease, cancer, diabetes or chronic obstructive pulmonary disease) and economic, cost, price, expenditure, expenses or spending and Vietnam; hypertension, high blood pressure, tobacco use, smoking, alcohol use, drinking, diet, overweight, obesity or physical activity and economic, cost, price, expenditure, expenses or spending and Vietnam. In addition, search engines such as Google and Google Scholar were also used.

Manual searches were done in the Vietnam National Library as well as in libraries of different institutions, such as the Ministry of Health, Hanoi Medical University, Hanoi School of Public Health, Health Strategy and Policy Institute of Vietnam and other Non-Governmental Organisations in Vietnam. Both English and Vietnamese research reports conducted in Vietnam within the last 10 years were included.

Results

Burden of chronic diseases and their related risk factors in Vietnam

Table 1 presents the information on the burden of chronic diseases and their related risk factors in Vietnam.

Chronic diseases were shown to be leading causes of deaths. An estimate by WHO showed that, out of 516,000 deaths which occurred in 2002 in Vietnam, 341,000 (66%) were attributable to chronic diseases (mainly ischaemic heart disease, cerebrovascular disease and chronic obstructive pulmonary disease). The age-standardised mortality rate from chronic diseases was 664.1 per 100,000 population (11).

The burden of morbidity from chronic diseases in Vietnam was also substantial. According to national statistics, from 1986 to 2003, the proportion of all hospital admissions attributable to chronic diseases increased from 39 to 68% (12, 13). Data from cancer registries in Vietnam showed that, in 2000, the total number of cancer cases in the whole country was 68,810 (36,024 men and 32,786 women). The crude prevalence of cancer was 91.5 per 100,000 in men and 81.5 per 100,000 in women. These figures are similar to those in other developing countries and lower than those of developed countries (14). The National Diabetes Survey, conducted in 2002, showed a prevalence of 2.7% for the whole country, ranging from a lower rate of 2.1% in more remote mountainous areas to 4.4% in the major cities. The survey also revealed prevalence of impaired glucose tolerance of 7.3%, indicating the potential for sharp future increases in diabetes prevalence (15). A population-based study in rural Vietnam found that 39% of people aged 25–74 years old reported at least one chronic disease. More than 10% of them reported having two or more chronic conditions (16).

Risk factors for chronic diseases were also common in Vietnam. In 2002, 16.8% of Vietnamese aged 25–64 years old were shown to be afflicted by hypertension (17).¹ The prevalence of cigarette smoking in men and women in 2002 was 56.1 and 1.8%, respectively (18). In 2004, data from WHO showed that the prevalence of heavy and hazardous alcohol drinking² among men and women was 5.7 and 0.6%, respectively (19). A recent study reported that the prevalence of overweight in Vietnam has increased sharply during 1992 and 2002 (from 2.0 to 5.7%). Significant increases were observed for men and women, in urban and rural areas, and for all age groups (20).

Economic determinants of chronic diseases and their related risk factors in Vietnam

There are several methods for assessing economic status of households in Vietnam, such as official economic classification, household income, household expenditure, housing condition and assets. The association between

¹Hypertension was defined as systolic blood pressure (SBP) equal to or more than 140 mmHg or diastolic blood pressure (DBP) equal to or more than 90 mmHg or being treated for hypertension (I, IV).

²Heavy and hazardous alcohol drinking was defined as average consumption of 40 g or more of pure alcohol a day for men and 20 g or more of pure alcohol a day for women.

Table 1. Burden of chronic diseases and their related risk factors in Vietnam

Source	Method used	Data date	Key findings
World Health Organization (2002)	Modelling	2002	Number of deaths due to chronic diseases in 2002 was 341,000 (66% of total deaths). Age-standardised mortality rate from chronic diseases was 664.1 per 100,000 population
Ministry of Health of Vietnam (1987, 2003)	Hospital statistics	1996–2003	Proportion of all hospital admissions attributable to chronic diseases increased from 39% in 1986 to 68% in 2003
National Cancer Institute (2008)	Registry	2000	Number of cancer cases in the whole country was 68,810 (36,024 men, 32,786 women) Prevalence of cancer was 91.5 per 100,000 in men and 81.5 per 100,000 in women
Binh et al. (2002)	Cross-sectional survey	2002	Prevalence of diabetes was 2.7% (all ages)
Cockram et al. (2006)	Cross-sectional survey	2002	Prevalence of impaired glucose tolerance was 7.3% (all ages)
Ministry of Health of Vietnam (2003)	Cross-sectional survey	2002	Prevalence of hypertension among Vietnamese aged 25–64 years old was 16.8%
Ministry of Health of Vietnam (2003)	Cross-sectional survey	2003	Prevalence of cigarette smoking in 2002 was 56.1% in men and 1.8% in women (aged 25–64 years old)
World Health Organization (2004)	Review	2004	Prevalence of heavy alcohol drinking was 5.7% in men and 0.6% in women (aged 25–64 years old)
Nguyen et al. (2007)	Cross-sectional survey	1992–2002	Prevalence of overweight increased from 2.0% in 1992 to 5.7% in 2002 (all ages)
Minh et al. (2008)	Cross-sectional survey	2005	Prevalence of self-reported chronic illness among people aged 25–74 years was 9%

economic status and chronic disease mortality, morbidity and risk factors has been examined in a few studies in Vietnam.

Table 2 shows information on the economic determinants of chronic diseases and their related risk factors in Vietnam. Regarding mortality data, applying verbal autopsy methods (21)³ enabled the assessment of cause-specific mortality (22). Minh et al. previously demonstrated a possibly rising burden of mortality from cardiovascular disease among the worse-off (23, 24).⁴ This finding is contrary to the frequent supposition that chronic diseases mainly affect rich people. International literature has also shown that, in almost all countries, it is the poorest people who are most at risk of developing chronic diseases and dying prematurely from them (1).

³The method uses information obtained from close relatives or caretakers of a deceased person about the circumstances, signs and symptoms during the terminal illness in order to assign the most likely cause of death.

⁴Economic status was assessed by local authorities based on income per person per month. The poor were defined to have an average income per person per month of less than 15 kg rice or about 3.3 USD (according to Decision number 59 – Ministry of Labour, Invalids and Social Affairs).

Little research has been conducted in Vietnam on associations between economic status and morbidity from chronic diseases. In a study in rural Vietnam, economic status was found to be inversely correlated with the probability of having at least one chronic disease among women only (i.e. the poorest women had a significantly higher probability of having at least one chronic disease than better-off women) (16). A complex relationship between hypertension and economic status was also revealed by other studies in the same study setting, reporting that richer men and poorer women had increased risks of being hypertensive as compared with people of the same gender in the average living standard group (25, 26). A relatively higher prevalence of self-reported chronic disease and hypertension among poor women could possibly be explained by Barker's hypothesis about infant origins of chronic adult diseases (27–29).

In term of relationships between risk factors for chronic diseases and economic status, findings from the Vietnam National Health Survey in 2002 indicated that tobacco smoking and alcohol drinking were more prevalent among the poor people than among the better-off (10). Similarly, another Vietnamese research showed a significantly lower risk of becoming a regular smoker and the higher chance for cessation among the high-income

Table 2. Economic determinants of chronic diseases and their related risk factors in Vietnam

Source	Method used	Data date	Key findings
Minh et al. (2003, 2006)	Longitudinal study	1999–2000 1999–2003	No significant difference in mortality rates from cardiovascular disease by economic status
Minh et al. (2008)	Cross-sectional survey	2005	The poorest women had a significantly higher probability of having at least one chronic disease than better-off women
Ministry of Health of Vietnam (2003)	Cross-sectional survey	2002	Tobacco smoking and alcohol drinking were more prevalent among the poor people than among the better-off
Minh et al. (2005)	Cross-sectional survey	2002	Significantly lower risk of becoming a regular smoker and the higher chance for cessation among the high-income group compared to lower-income group
Anil et al. (2000) and Bales et al. (2003)	Cross-sectional survey	2000 and 2002	Income appears to exert strong effect on the decision to both initiate and to cease smoking
Nguyen et al. (2007)	Cross-sectional survey	1992–2002	Higher rates of overweight among the higher-income people

group compared to lower-income group (30). Some other studies have shown that income appears to exert strong effects on the decision to both initiate and to cease smoking (31, 32).

A recent study by Nguyen et al. (20), based on three national surveys of socio-economic factors and health conducted over 10 years in Vietnam, reported higher rates of overweight among people with higher incomes. However, this study also showed that as the national income rose, higher rates of overweight began to be observed even among lower-income women. These observations are consistent with the international literature on obesity and inequities in health in the developing world (33).

In summary, our available research findings illustrate the fact that chronic diseases are no longer to be considered as ‘diseases of affluence’. These results demonstrate the shift from ‘early to later adopter’ of cardiovascular diseases (CVD) epidemic (34). Poorer people in Vietnam are more vulnerable to chronic diseases and their risk factors, except overweight. The poor are more likely to be afflicted by chronic diseases because of material deprivation and psychosocial stress, higher levels of risky behaviour, unhealthy living conditions and limited access to good-quality health care, etc. (1).

Economic costs of chronic diseases and their related risk factors in Vietnam

Table 3 summarises research findings on the costs of chronic diseases and their related risk factors in Vietnam. Chronic diseases are a major cost and a profound economic burden to societies. The macroeconomic costs due to chronic diseases include direct costs (costs of medical care in relation to prevention, diagnosis and

treatment of disease), indirect costs (loss of human resources caused by morbidity or premature death) and intangible costs (pain, stress, anxiety and suffering, etc.). These costs are usually estimated using accounting or cost-of-illness methods. The total cost is equal to the total time lost through premature death and illness multiplied by a wage rate, and sometimes accounting for unemployment. The sums of direct and indirect costs are then assumed to amount to a loss of GDP (1).

Abegunde et al. (35), employing a modelling approach, have estimated macroeconomic losses attributable to coronary heart disease, stroke and diabetes in 23 countries in 2005. The estimated figure for Vietnam was about US\$20 million (accounting for 0.033% of annual national GDP). The estimate would almost double by 2015 if no intervention were made. The accumulated losses in GDP due to chronic diseases in Vietnam between 2006 and 2015 could therefore be as much as US\$270 million. The figure for Vietnam was lower than that of other developing countries in the region like Indonesia (cumulative losses of US\$4.18 billion), Thailand (US\$1.49 billion) and the Philippines (US\$620 million) (35). The modelling approach might be expected to yield lower results than the cost-of-illness method (35).

A recent empirical cost-of-illness study on the costs of smoking in Vietnam reported that the total cost of inpatient health care caused by smoking in Vietnam reached at least as much as US\$77.5 million in 2005. This represents about 0.22% of Vietnam’s GDP and 4.3% of total healthcare expenditure. The majority of these expenses are related to chronic obstructive pulmonary disease (COPD) treatment (US\$68.9 million per year) followed by lung cancer (US\$5.2 million per year) and

Table 3. Economic costs of chronic diseases and their related risk factors in Vietnam

Source	Method used	Data date	Key findings
Abegunde et al. (2007)	Modelling	2005	Losses because of coronary heart disease, stroke and diabetes were about US\$20 million (0.033% of annual national GDP). This figure would almost doubled by 2015. The accumulated losses in GDP due to chronic diseases in Vietnam between 2006 and 2015 could be as much as US\$270 million
Ross et al. (2007)	Cross-sectional survey	2005	Cost of inpatient health care caused by smoking was US\$77.5 million (0.22% of Vietnam GDP and 4.3% of total healthcare expenditure) including COPD treatment (US\$68.9 million per year), lung cancer (US\$5.2 million per year) and ischaemic disease (US\$3.3 million per year)
Hien (2004)	Cross-sectional survey	2003	19% of rural dwellers with diabetes had to sell assets, using savings or borrowing from neighbours to pay for health care costs
Thuan et al. (2006)	Longitudinal study	2003	Household expenditures on treatment of chronic disease illness were also considerable and even reached 'catastrophic' levels
Wagstaff et al. (2007)	Cross-sectional survey	2002	Vietnamese households have not been able to hold their food and non-food consumption constant in the face of income reductions and extra medical care spending because of chronic illness
General Statistics Office of Vietnam (2006)	Cross-sectional survey	2004	The expenditure on smoking and drinking of a household in Vietnam made up 3–4% of total recurrent expenditure of that household
Van Kinh et al. (2006)	Cross-sectional survey	2002	Tobacco spending of low-income households represents a larger proportion of their expenditure than for higher-income households
Hoang M et al. (2004)	Cross-sectional survey	2003	Average annual household expenditure on tobacco of US\$39.8. The ratio of tobacco spending to education expenditure was 228% in the poorest households. 11.3% of poor households would escaped from food poverty situation if they had spent their available money on food instead of on tobacco

ischemic disease (US\$3.3 million per year). The government directly finances about 51% of these costs. The rest is financed either by households (34%) or by the insurance sector (15%). The true costs would be substantially higher if all smoking-related diseases, outpatient care and mortality-related costs were included (36).

Chronic diseases were also shown to cause economic losses for families and individuals in Vietnam. A study from Northern Vietnam reported that 19% of rural dwellers with diabetes had to sell assets, use savings or borrow from neighbours to pay for health care costs (37). Another study reported that household expenditures on treatment of chronic disease illness were also considerable and even reached 'catastrophic' levels (38).⁵ Wagstaff found that Vietnamese households have not been able to hold their food and non-food consumption constant in the face of income reduction and extra medical care expenditure due to chronic illness (39).

Consumption of tobacco and alcohol, two established chronic disease risk factors, were also shown to have negative impacts on Vietnamese households' economies. Vietnam Living Standard Surveys found that, on average, the expenditure on smoking and drinking of a household in Vietnam made up 3–4% of total recurrent expenditure

of that household (i.e. expenditures on food, electricity, water, telephone, fuel, health care and education) (40–42). Kinh et al. found that the tobacco spending of low-income households represents a larger proportion of their expenditure than for higher-income households. Low-income households' tobacco spending is equal to one-and-a-half times their educational spending and is equivalent to health care spending. By contrast, tobacco expenditures for higher-income households are 46 and 69%, of educational and health expenditures, respectively (43). Another household survey, conducted in five provinces in Vietnam in 2003, reported an average annual household expenditure on tobacco of US\$39.8. The ratio of tobacco spending to education expenditure was 228% in the poorest households. The study also analysed the influence of cigarette smoking on poverty by estimating the potential reduction in the percentage of poor households if money spent on tobacco was used instead to buy food. According to this study, 11.3% of poor households could escape from food poverty situations if they spent their available money on food instead of on tobacco (44).

Economic aspects of interventions against chronic diseases

Table 4 presents evidence on the economic aspects of interventions against chronic diseases. Available evidence

⁵Catastrophic spending occurs when health care expenditure for a household exceeds 40% of the households' capacity to pay.

Table 4. Economic aspects of interventions against chronic diseases

Source	Method used	Key findings
Levy et al. (2006)	Modelling	The effect of a combination of policies (100% tobacco tax increase; comprehensive worksite and restaurant smoking bans with enforcement and publicity; a high-intensity media campaign; higher enforcement and publicity of the total ban on cigarette advertisements and strong health warnings; and strict youth access controls) would result in a reduction in smoking of about 29.6% in males and 22.4% in females in the immediate future
Asaria et al. (2007)	Modelling	Reducing salt intake and implementing 4 key elements of the WHO Framework Convention on Tobacco Control would reduce 40–80 deaths per 100,000 populations older than 30 years. The cost of the two approaches separately and combined would be \$0.04, \$0.11 and \$0.16 per person per year, respectively
Lim et al. (2007)	Modelling	Treatment of high-risk individuals with aspirin, blood pressure-lowering drugs and cholesterol-lowering drugs would be estimated to avert 266,000 deaths over the period 2006–2015. The average cost per treated individual per year would be \$0.60

shows that there is a full range of cost-effective interventions against chronic diseases (1, 34, 45, 46). However, little is known about the effects and cost-effectiveness of different types of interventions against chronic diseases in Vietnam. Recent work by Levy et al. (47), using the SimSmoke model, showed that the overall effect of a combination of policies, representing a 100% tobacco tax increase; comprehensive workplace and restaurant smoking bans with enforcement and publicity; a high-intensity media campaign; higher enforcement and publicity for the total ban on cigarette advertising and strong health warnings; and strict youth access controls would result in a reduction in smoking of about 29.6% in males and 22.4% in females in the immediate future. By 2033, smoking prevalence is projected to drop by 38.5% for males and 31.8% for females. Between 231,500 and 325,000 lives would be saved by 2033.

Asaria et al. (48), using a modelling approach, have provided estimates on cost-effectiveness of two population-wide interventions (reducing salt intake and implementing four key elements of the WHO Framework Convention on Tobacco Control) in 23 countries. The intervention strategies would be cost-effective and have substantial impacts in reducing the burden of chronic diseases. For Vietnam, during 2006–2015, expected deaths averted, as a result of these two interventions, would be about 40–80 per 100,000 populations older than 30 years. Total expenditure for implementing the salt intervention, tobacco interventions,⁶ and combination of the two approaches would be \$0.04, \$0.11, and \$0.16 per person per year, respectively. Total costs of the two

interventions would therefore account for about 0.5% of government health spending. According to this study, the implementation of these interventions would be more cost-effective in Vietnam than in other neighbouring countries like China (the corresponding figures are \$0.05, \$0.14 and \$0.20, respectively), the Philippines (\$0.05, \$0.13 and \$0.18) and Thailand (\$0.06, \$0.17 and \$0.23) (48).

Information on the cost-effectiveness of preventing cardiovascular diseases in high-risk individuals have also been shown in a simulation model by Lim et al. (49). The exercise showed that treatment of high-risk individuals with aspirin, blood pressure-lowering drugs and cholesterol-lowering drugs, to prevent cardiovascular disease, would be effective and cost-effective in developing countries. For Vietnam, a programme scaled-up up to the target coverage of 80% would be estimated to avert 266,000 deaths over the period 2006–2015. The average cost per treated individual per year would be \$0.66. This cost includes resources for drugs, health service delivery, screening and treatment, laboratories, administration, monitoring and assessment of the programme. This high-risk individual intervention was shown to be potentially more cost-effective in Vietnam than in other neighbouring countries like Thailand and Indonesia (49).

In 2005, to encourage action for preventing chronic diseases, WHO proposed a global goal of a 2% yearly decrease in projected age-specific death rates from chronic diseases worldwide (2). In Vietnam, achievement of the global goal would result in additional gains in healthy life expectancy of 1.7 years and in healthy life expectancy of 1.5 years (18).

⁶Tobacco interventions include: increased taxes on tobacco products; enforcement of smoke-free workplaces; requirements for FCTC-compliant packaging and labelling of tobacco products combined with public awareness campaigns about the health risks of smoking; and a comprehensive ban on tobacco advertising, promotion and sponsorship.

Discussion

We have shown that, at current stage of epidemiological transition, Vietnam is heavily burdened by chronic diseases, epidemiologically and economically. Existing

evidence indicates that prevention and control of chronic diseases are feasible and cost-effective in Vietnam. Given the evidence from this study, interventions against chronic diseases in Vietnam should be comprehensive and integrated, including both primary and secondary approaches, as well as policy-level involvements. Primary prevention towards increasing the population proportion at low risk of developing chronic diseases (i.e. population-wide approach to reduce salt intake and tobacco use) should be a priority. The aim should be to make small improvements in a large proportion of the population. Secondary prevention for early treatment of individuals with established chronic diseases is also an important component. This will help to reduce complication rates and improve their quality of life. Cost-effective medication (aspirin, low-cost diuretics and beta-blockers, etc.) need to be available for use at all health care levels (50).

Policy-level interventions have a crucial role in the prevention and control of chronic diseases in any country. In Vietnam, concrete policy frameworks should be put in place to strengthen the National Programme of Prevention and Control of Certain Non-communicable Diseases. The programme should be integrated into the primary health care system and other existing well-established health programmes such as the Primary Health Care Programme and Nutrition Programme, etc. This will help reduce costs of prevention as well as taking full advantage of existing capacity. Importantly, central and local Governments and Health Authorities should provide timely special protection for vulnerable groups. These include children, women, less educated people and the poor, who usually have limited choices about the food they eat, their living conditions, and access to education and health care. There is also a need to increase the share of financial resources allocated to prevention, which is currently very limited. The Framework Convention on Tobacco Control, which was ratified in Vietnam, should be further promoted by passing laws against smoking.

This is a preliminary review of economic aspects of chronic diseases in Vietnam. The evidence documented in this paper may not yet be compelling. Further empirical research findings are required to give greater insights into the issues.

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