

REPORT ON THE RAPID ASSESSMENT PROTOCOL FOR INSULIN ACCESS IN VIETNAM 2009



Overall Report

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
CAH	Congenital Adrenal Hyperplasia
CD	Communicable Disease
CLAN	Caring & Living As Neighbours
GDP	Gross Domestic Product
HbA1c	Glycosylated Haemoglobin
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
IDDM	Insulin Dependent Diabetes Mellitus (Type 1 diabetes)
IDF	International Diabetes Federation
IfL	Insulin for Life
IIF	International Insulin Foundation
NCD	Non Communicable Disease
NIDDM	Non Insulin Dependent Diabetes Mellitus (Type 2 diabetes)
OTC	Over The Counter
PPP	Purchasing Power Parity
RAPIA	Rapid Assessment Protocol for Insulin Access
RCHI	Royal Children’s Hospital International
SARS	Severe Acute Respiratory Syndrome
VHI	Vietnam Health Insurance
WDF	World Diabetes Foundation
WHO	World Health Organization

1. Executive Summary

Implementing the Rapid Assessment Protocol for Insulin Access in Vietnam had as its aim to clearly identify the barriers to medicines and care that people with diabetes in Vietnam face in order to affect sustainable change in addition to increasing the data on diabetes and its financial impact on the health system and people with this condition.

There is a need for the Vietnamese health system to develop models for managing chronic disease in order to address the potential human and economic impact of the rising trend of chronic diseases, which may overburden both the health system and households and therefore impact development.

The Rapid Assessment Protocol for Insulin Access is not a statistical assessment of the health system, but has as its aim to assess in a short time the situation with regards to diabetes care in a given country. Its aim is to get a picture of the health system in order to provide different stakeholders involved in diabetes in a given country recommendations for action.

This protocol was carried out in Hanoi, Ho Chi Minh City, Thai Nguyen Province and Dong Nai Province. The information presented in this report in no means presents the actual situation of diabetes throughout Vietnam. It however illustrates that even in the two main urban areas as well as two relatively wealthy and urban provinces many challenges exist.

One of these challenges is the increasing burden of Non Communicable Diseases which represents 62.2% of the total disease burden in Vietnam. In parallel the risk factors for diabetes such as obesity are increasing throughout the population.

Current estimates are 2.5% of the population aged over 20 in Vietnam have Type 2 diabetes, with an expected increase to 3.5% by 2025. Through reviewing statistics and reports high levels of complications exist even in children with Type 1 diabetes. There are an estimated 430 prevalent cases of Type 1 diabetes in Vietnam.

During the implementation of the RAPIA all the people described the financial burden of accessing proper care for diabetes, especially Type 1 diabetes, as the main barrier to proper care. Current estimates for Vietnam in International US dollars show an expenditure on diabetes of US\$ 606,251,000 expected to increase to US \$1,114,430,000 by 2025. The cost of diabetes is passed on to the individual or Health Insurance in Vietnam, but many provinces and hospitals of the country are already spending high proportions of their health budgets on diabetes, showing the increasing financial burden this condition places on Vietnam as a whole.

A large reason for the financial burden of diabetes in Vietnam is the cost of medicines both to the individual and the Health Insurance. There is no centralised purchasing of medicines in Vietnam and as each hospital prepares its own tender this limits the bargaining power it can have with distributors and wholesalers.

In looking at the prices of medicines in Vietnam and comparing them to prices quoted on the International Drug Price Indicator most prices are substantially higher than those from the International Market. On average a unit of insulin cost US\$ 0.014, equivalent to US\$ 13.56 for a 10ml vial of 100 IU insulin (total of 1,000 units). For oral medicines the issue is also that of using branded versions of medicines. In some cases this meant that facilities were paying 2 to 5 times more per tablet just because they are buying the branded version.

Care in specialised hospitals and units is of good quality, but most care is focused on hospitals. Management of Type 1 diabetes is problematic due to lack of knowledge away from specialised centres. Overall diabetes care is not standardised in Vietnam and problems exist with regards to patient load and referrals. This has an impact on increased cost of transportation for patients and resulted in lack of time for healthcare workers to spend with individual patients for education. To help with patient education some facilities had diabetes clubs that provided some education. Education will be variable depending on the facility mainly due to the dedication and importance placed on patient education by staff. In addition there was the issue of the relevance to the socio-cultural situation in Vietnam of some of the materials provided

Adherence to treatment was often poor due to lack of knowledge and cost of treatment including transportation. Estimates from this project found that care for a child with Type 1 diabetes equalled US\$ 876 per annum.

In order to address the challenge of diabetes the government has taken some steps with the Prime Minister's Decision No77/2002/QD-TTý (17 June 2002) which approved a programme to control NCDs for the period of 2002-2010. Based on this decision a preliminary National Plan for Diabetes was prepared for the years 2006-2010. This has led to the development of a National target programme for diabetes and hypertension.

In the past the RAPIA has served as a catalyst for change and raised the profile of diabetes with government authorities, clinicians and people with diabetes. Many existing initiatives and collaborations in Vietnam can be built on in order to improve the management of diabetes in Vietnam. It is hoped that the following recommendations will permit improvements in care in Vietnam. Specific action plans developed after the presentation of the results in Vietnam are also included and focus on one of the main findings of poor adherence and how improving patient education and affordability of treatment is necessary to achieve this.

1.1. Key Findings

In Vietnam a high level of care was found at specialised hospitals. These hospitals are often overburdened with a large number of patients present who could be managed at lower levels of the health system. Foot complications are seen as one of the main complications of diabetes in health facilities, yet the tools for the early detection of neuropathy were missing. The level of knowledge of diabetes by health professionals and administrators at specialised facilities was extremely high. Nurses at these facilities also played a more active role in care than at non-specialised facilities. Training programmes are in place in both the North and South of Vietnam to train healthcare workers in diabetes management.

In looking at the reason for complications one problem identified was poor adherence due to the cost of treatment for those who do not have health insurance, those with other co-morbidities and those who live away from the main urban areas.

As few facilities provide care for Type 1 diabetes this burden is exacerbated for families with children who have Type 1 diabetes.

This high cost of treatment has many factors, but the main contributing factor is the price of medicines. These prices were found to be quite high due to many factors including:

- Guidance prices from Ministry of Health are quite high compared to international guide prices
- Each facility responsible for their own purchasing of medicines

- Branded versions are widely used and expensive
- Import Duty and VAT
- Mark-ups along the supply chain

One other issue with regards to poor adherence is lack of patient knowledge about diabetes. This is due to a lack of adequate education materials, lack of time for patient education by healthcare workers, due to patient load and lack of training of healthcare workers in patient education. In some facilities patient clubs exist and provide this education and information role, but this is not standardised.

The Prime Minister's Decision No77/2002/QĐ-TTý (17 June 2002) approved a programme to control NCDs for the period of 2002-2010. Based on this decision a preliminary National Plan for Diabetes was prepared for the years 2006-2010. A National Target Programme for diabetes and hypertension was in the process of being developed at the time of this report's preparation.

1.2. Main recommendations

The main recommendations from this report focus on factors that may impact adherence to treatment in order to decrease the development complications. In looking at the organisation of care and the current patient load of specialised facilities it is important to try to devolve care to lower levels of the health system and to the provinces through training and providing necessary resources to facilities. To facilitate this, specialised chronic consultations could be established, clear paths for referrals and counter-referrals would need to be developed, improve the training of healthcare workers, involve nurses more actively in diabetes care and ensure that facilities had the appropriate tools available.

This development of healthcare delivery would also important for children with Type 1 diabetes.

Besides these improvements in the delivery of care, ways need to be found to lower the cost of medicines both for the health system and the person with diabetes. These could be to remove VAT and duties, rules surrounding the use of generics, regulations around mark-ups and increase use of health insurance schemes.

The last key recommendation in order to improve adherence would be to improve patient education. This needs to focus on improving initial education following diagnosis, develop training for healthcare workers on how to educate patients and develop socio-culturally adapted materials. In addition involving nurses and expert patients in delivering regular education sessions during clinics would help in increasing education and information to patients.

These recommendations are presented in the form of specific action plans for different levels of the health system in "Section 23. Action Plans for Vietnam" of this report.

2. Background Information

2.1. Diabetes

Diabetes is a chronic disease defined by high blood glucose levels. This high level of glucose is because people with diabetes cannot use the glucose from digested food as energy for their cells. Insulin is the key molecule allowing glucose to be used by the body's cells.

Type 1 diabetes (formerly Insulin Dependent Diabetes Mellitus, IDDM or child onset diabetes) is a life-long condition, affecting children, young people and adults worldwide. The disease is

recognised by a loss of control over the use of the body's glucose and other fuels and is due to the destruction of insulin producing cells in the pancreas (pancreatic islet beta cells).

Insulin is vital for the survival of people suffering from Type 1 diabetes and in some people suffering from Type 2 (formerly Non Insulin Dependent Diabetes Mellitus, NIDDM). Type 2 diabetes can be managed with a combination of diet and lifestyle modifications, as well as oral medications and in some cases insulin. However, also of central importance for the management of diabetes are the means to administer insulin (syringe/needles), the means to monitor the effectiveness of insulin (blood/urine tests) and an understanding of the interaction between insulin and life and work of the individual and vice-versa (training of healthcare workers and patient education).

In both Type 1 and Type 2 diabetes the result of inadequate care (elevated levels of blood glucose) lead to serious health complications such as blindness, kidney failure, nerve disease, limb amputation, heart attacks, strokes and premature death.

In Type 2 diabetes the pancreas does not produce enough insulin or peripheral organs do not use the insulin properly. Type 2 diabetes is closely linked with a sedentary lifestyle and obesity. This form of diabetes once referred to as adult onset diabetes, as it appeared in people above the age of 40, has now been found to occur in extremely obese children and young adults.

Due to the increase in “Western” lifestyles the prevalence of Type 2 diabetes is becoming a major Public Health concern in many developed and developing countries. “Diabetes is a major threat to global public health that is rapidly getting worse, and the biggest impact is on adults of working age in developing countries. At least 171 million people worldwide have diabetes. This figure is likely to more than double by 2030 to reach 366 million.” (1) On the 20th of December 2006, the United Nations’ General Assembly passed a Resolution recognising diabetes as a chronic, debilitating and costly disease associated with major complications that pose severe risks for families, countries and the entire world and calls on Member states to “develop national policies for the prevention, treatment and care of diabetes in line with the sustainable development of their health-care systems, taking into account the internationally agreed development goals including the Millennium Development Goals”. (2)

2.2. Insulin

Insulin is a hormone, normally made by the pancreas, which regulates glucose metabolism. Insulin is a treatment for diabetes and not a cure and is administered by daily injections throughout the life of the patient. Dosage of insulin injected by the patient varies from person to person based on, age, nutritional status and activity.

Without insulin, people with Type 1 diabetes die very quickly; meaning multiple daily injections of insulin are necessary for life. Some people with Type 2 diabetes need insulin for good metabolic control, but there is not the same urgency.

Insulin can be produced through the extraction and purification of animal pancreases or nowadays through bioengineering.

By different chemical preparations or genetic engineering, four basic types of insulin with their respective onset, peak and duration of action, are currently produced. These are:

- Rapid-acting (Rapid insulin analogs): begins to work after 15 minutes, peaks in 30 to 90 minutes, and has a duration of three to four hours.

- Short-acting (Regular insulin): begins to work in 30 to 60 minutes, peaks in two to three hours, and has a duration of three to six hours.
- Intermediate-acting (NPH): begins to work in 90 minutes to six hours, peaks in four to 14 hours, and has a duration of up to 24 hours.
- Long-acting: begins to work after 1 hour, has no peak, and remains effective for 24 to 36 hours.

Many people with diabetes use combinations of these different types of insulin to better control and manage their condition. (3)

2.3. International Diabetes Federation

The International Diabetes Federation (IDF) is a worldwide alliance of over 200 diabetes associations in more than 160 countries, who have come together to enhance the lives of people with diabetes everywhere. The Federation is committed to raising global awareness of diabetes, promoting appropriate diabetes care and prevention, and encouraging activities towards finding a cure for the different types of diabetes. It is the mission of IDF to promote diabetes care, prevention and a cure worldwide.

IDF's working bodies bring together the most important stakeholders from the global diabetes community in a collaborative effort to set common goals and co-ordinate activities towards the attainment of these goals. These stakeholders include: people with diabetes and their families; professionals involved in diabetes healthcare and related fields; diabetes representative organizations, and partners from commercial organizations with concerns which align with our mission. IDF is associated with the Department of Public Information of the United Nations and is in official relations with the World Health Organization (WHO) and the Pan American Health Organization (PAHO).

The Task Force on Insulin, Test Strips and Other Diabetes Supplies was set up by IDF to meet the challenges posed by the lack of access to and availability of insulin and diabetes supplies in many countries of the world. The remit of the Task Force is to provide support to member associations with regard to access, affordability and other issues relating to insulin, test strips and other diabetes supplies at national and international levels. To fulfil its remit, the Task Force is working with the International Insulin Foundation (IIF) to carry out country assessments in order to identify the challenges, recommend targeted solutions and seek sustainable ways of implementing these solutions.

2.4. International Insulin Foundation

The International Insulin Foundation (IIF) was established by leading academics and physicians in the field of diabetes with the aim of prolonging the life and promoting the health of people with diabetes in resource poor countries by improving the supply of insulin and education in its use.

In order to achieve these objectives, a clear analysis of the constraints to insulin access and diabetes care is needed. The IIF's view is that increasing the supply of insulin through donations or other means, however generous, offers only temporary relief and that the root of the problems of insulin supply and diabetes care need to be identified and tackled. This led the IIF to develop the Rapid Assessment Protocol for Insulin Access (RAPIA). (4)

Past implementations of the RAPIA have led to improved supplies of insulin, development of diabetes associations, improved education and development of Non Communicable Disease (NCD) policies.

2.5. Rapid Assessment Protocol for Insulin Access – method of assessment

Vietnam's economic development means that in the future more children with Type 1 diabetes will be surviving, in parallel to increasing numbers of people with Type 2 diabetes and other chronic conditions.

Chuang et al. (23) in the Diabcare Asia study found that more than half of Asian diabetes patients treated at diabetes centres were not well controlled. The economic burden of diabetes and its impact on life expectancy has been studied in other settings (23; 24; 25; 26; 27; 28; 29) and Beran et al. (28) found that in rural Mozambique life expectancy was 7 months in comparison to close to normal life expectancy in developed countries due to problems accessing medicines and care.

The RAPIA (4) is structured as a multi-level assessment of the different elements that influence the access to insulin and care for people with diabetes in a given country.

The RAPIA is divided into 3 components:

- Macro – aimed at the Ministerial levels, Private Sector, National Diabetes Association, Central Medical Store and Educators
- Meso – Provincial Health Officers, "Health Care Settings" (Hospitals, Clinics, Health Centres, etc.) and Pharmacies/Dispensaries
- Micro – Carers (Healthcare Workers and Traditional Healers) and people with diabetes.

The RAPIA provides information in the categories of:

- Health service structure and functioning with regards to procurement of medicines, diabetes management
- Diabetes policies written and enacted
- Reported and observed practice for diabetes management
- Availability of insulin, syringes and monitoring equipment
- Existence of distribution networks for insulin
- Insulin supply-related knowledge and attitudes amongst people with diabetes and their carers.
- Other problems that hamper the access to proper insulin and care

The RAPIA is not a statistical assessment of the health system, but has as its aim to assess in a short time the situation with regards to diabetes care in a given country. Its aim is to get a picture of the health system in order to provide different stakeholders involved in diabetes in a given country recommendations for action.

In Vietnam the RAPIA was carried out in Hanoi, Ho Chi Minh City, Thai Nguyen Province and Dong Nai Province. Socio-economic data on these areas can be found in Appendix 1.

A total of 190 interviews (detail can be found in Appendix 2) were carried out in Vietnam in addition to reviewing government and facility statistics, publications and reports.

This report in no means presents the actual situation of diabetes of the whole country. It however illustrates that even in the two main urban areas as well as two relatively wealthy and urban provinces many challenges exist.

2.6. Vietnam

Vietnam is located in South-East Asia and borders Laos, Cambodia and China. (See map in Appendix 3) Its capital is Hanoi and is divided into 59 provinces, which are then divided into districts and communes. (5)

Vietnam has a population of 84.1 million people of which 72.9% live in rural areas. (6) Gross Domestic Product (GDP) per capita at Purchasing Power Parity (PPP) is US\$ 2,600 (2007 estimate) (5) or US\$ 638 (2005) in real terms. (6) The Government Statistics Office defined the official poverty rate at VND 213,000 (US\$ 13.00¹) per month based on data from 2006.

Over the next few years Vietnam will see an ageing of its population. In 2000 more than half the population was under 25 and it is estimated that by 2020 40% of population will be under 25 and 10% over 60 (7).

Vietnam is ranked 105 out of 177 on the Human Development Index² (HDI). (12) In the late 1980s Vietnam initiated pro-poor economic policies called “Doi Moi.” In parallel there has been rapid economic growth which has led to a sizeable decrease in poverty levels, with a decrease in the number of people living below the international poverty line from 58% in 1993 to 16% in 2004. (7) Poverty mainly affects rural population and minority groups. (7) Included in the Doi Moi policy was the aim to find alternative sources to government funding, including for the health sector. (10)

Many people are considered to be living just above the poverty line and are therefore at risk of falling below this level. (6) In Vietnam poverty affects rural areas to a larger extent than urban dwellers, with 90% of the poor living in rural areas. (6)

Life expectancy at birth is overall 71.07 years (68.27 for males and 74.08 for females). (5)

Economic and agricultural development in Vietnam has meant that from the 1980's to 1990's Vietnam experienced a significant change in food availability. From a recipient of food aid, Vietnam became a net exporter with surplus food and also a shift from staple based diets to more Western diets. From 1990 to 2000 consumption of both meat and fat doubled, consumption of eggs tripled and fruit consumption increased by a factor of 10. (11) This has led to an increase in risk factors for many NCDs even in rural areas. (12)

2.7. Vietnam's healthcare system

The Ministry of Health is the national authority with regards to the provision of health services. Provincial and District Health authorities and the Commune People's Committee are responsible for the development and implementation of health strategies in Vietnam. (13)

Despite having a strong central level, local government plays an important role in the provision of many services including health. Administration of health services is the responsibility of a health bureau at provincial and district level. The provincial health bureau administers provincial facilities and oversees the delivery of healthcare through district hospitals and communal health centres.

¹ For the purpose of this report the exchange rate of US\$ 1.00 = VND 16,333 will be used

² A combined measure of income, education and health

The structure of the health system mirrors the administrative structure of the country as detailed in Figure 1.

Figure 1 – Structure of the Health System in Vietnam



Over the past few decades Vietnam’s health system has tried to move away from one that was centralised to a more decentralised model.

The Ministry of Health is responsible for developing national strategies and programmes as well as for the functioning (budget and manpower allocation) for the national institutions. The Central level also plays a supervisory role for the national institutions and the Provincial level.

At the Provincial level the Provincial People’s Committee is responsible for manpower, budgeting and policy and planning. At the provincial level there are services for prevention, maternal and child health, family planning and control of communicable diseases (Tuberculosis, Leprosy, Trachoma). Management at the two lower levels is done by the District and Commune People’s Committees. At the District levels similar preventative services are offered. In addition mobile units may exist for delivery of healthcare in remote areas. At the Commune level, healthcare delivered by the Commune Health Station is focused on hygiene, vaccinations, antenatal care, safe delivery and health education.

Despite trying to devolve care to lower levels of the health system, care is mainly provided in hospitals. In Hanoi National Hospitals exist for each type of condition, e.g. National Cancer Hospital, National Hospital of Endocrinology, etc. In cities health care is delivered mainly through hospitals (specialised or general) in the public sector or private clinics. Each Province has a Provincial hospital and the level of facility below this is a Health Centre in the Districts. There are a total of 903 Hospitals in Vietnam and 6.2 doctors per 100,000 population. (14) More details on facilities and human resources can be found in Appendix 4.

The referral system has many problems with patients jumping to higher levels without being directly referred. Patients with insurance are controlled with referral letters. Patients without insurance, as long as they pay there is no problem where they seek their healthcare. Children are often not cared for at Health Centres due to staff anxiety regarding treating children, and they will often go straight to hospital.

Hospitals have 3 main sources of income:

- Government budget
- Fee income directly from patients
- Fee income from Health Insurance

Therefore hospitals actually are keen to attract and keep patients as this is an important source of income.

By 2000 around 60% of health spending was undertaken by provinces. Out of pocket expenditure is still the main source of income for the health system. 30% of this is paid in the form of user fees and the remainder being spent on medicines and medical supplies. The share of income from Health Insurance has progressively been increasing.

The driving force behind Vietnam's health strategy has been prevention, delivering health services to the community, involving all of society in improving healthcare, expanding coverage of health insurance system, adding value to the role of traditional medicine and involving the private sector. (9)

Following the health reforms the Vietnamese government implemented 3 broad based measures to reduce the cost of care. (15) The first of these in 1994 was the introduction of user fees at commune health centres. Following this the government introduced a series of exemption criteria aimed at the poor. The final measure was the introduction of a social health insurance scheme in 1993. This scheme, funded by the government, provided cover for Civil servants, state enterprise workers, the military and Communist party officials, and private firms with more than 10 employees who were required to enrol their workers. To date the majority of subscribers to this scheme are school children who are enrolled by their school, with the children's parents paying the cost of the contribution.

Different health insurance schemes are present in Vietnam. Care and medicines for children under the age of 6 are free and children attending school are covered through one insurance scheme. Other sections of the population, retired government employees, members of farmers groups, etc. are also covered through other schemes.

2.7.1. Health Financing

In 2004 Vietnam spent 5.5% of its GDP on health care which was equivalent to US\$ 49.8 at PPP (16) and it is estimated that in 2006 the WHO benchmark of US\$ 45 (in real terms) was attained. (7)

More information on healthcare spending in Vietnam can be found in Appendix 5. This data from the WHO shows that 72.9% of health expenditure is private expenditure and of this 88% is out-of-pocket expenditure.

Funding for health services has been devolved to the provinces. The State Budget Law of 2004 increased this budgetary autonomy and provides the provinces with two types of grants - "salaries and wages" and "all other operations and maintenance". These grants are determined based on population size, disease burden and needs. (9) User fees are determined by each Province. Decrees 10 (2002) and 43 (2006) set about creating a structure whereby hospitals became operated like state operated companies. (7) In order to assist health facilities, especially hospitals to increase revenue, Decree 10 was implemented by allowing them to save resources and also by expand their elective health services. For example, government budget and user fees

contributed respectively 42 percent and 36 percent to the funding sources for hospitals in 2005, while the Health Insurance contributed only 16 percent.

The Vietnamese government launched compulsory and voluntary health insurance schemes. These are administered by Vietnam Health Insurance (VHI) under the authority of the Ministry of Health. The VHI is the coordinating organisation with regards to the compulsory and voluntary health insurance schemes. It is managed by different government institutions: (10)

- Ministry of Health
- The ministries responsible transport, communications, oil and coal
- 61 provincial people's committees

The government in its strategy of managing the health system combines reliance on market mechanisms in parallel to government intervention through subsidies to specific target groups. The three schemes that currently exist are: (9)

1. Compulsory coverage: this scheme insures all active and retired workers from the public sector and salaried workers in the private sector (for companies of 10 or more workers).
2. Voluntary coverage: This is the scheme that covers school children (per capita contribution collected by schools) and the Farmer Voluntary Insurance Scheme where farmers pay 30% of their premium and the provincial government covers the remainder
3. Full subsidies by the government: Under this scheme there are reward schemes for merit, and free health cards for the poor.

Under the current regulations, compulsory participation is applied to all active workers and retired people in the public sector, as well as salaried workers in the private sector regardless the size of enterprises. In addition, some groups of people, such as foreign students in Vietnam, advanced aged people (90 years old and over), and veterans and dioxin victims, are also included in this scheme. In particular, the poor have also been included to the compulsory scheme since 2005. (17)

In order to increase access to healthcare for the poor the Vietnamese Government passed Decision 139 (2002) for a Health Care Fund for the poor due to the failure of fee waiver programmes. (7) This fund covers 14.3 million people and has increased utilisation of Healthcare for the poor, but some problems exist with its deployment. (7) For people covered by this scheme the government pays the insurance contribution of VND 50,000 (US\$ 3.06) per person per year. In addition for children under 6 the government reimburses the cost of care to the facility and Primary Healthcare services free for the elderly. For those contributing to the Insurance scheme contributions will vary from a minimum of VND 30,000 (US\$ 1.84) to VND 160,000 (US\$ 9.80) per year and are based on the province where they live. For those who have their Health Insurance paid for from their salary 3% is taken as their contribution with employers paying 2% and employees paying 1%.

People using Health Insurance will register at a given hospital. Some schemes have Health Insurance covering everything up to VND 100,000 (US\$ 6.12) anything above that patient has to pay 20% of total.

Table 1 and Table 2 detail the different contributions to the Health Insurance Schemes.

Table 1 – Average contribution to compulsory Health Insurance Scheme (17)

VND (US\$) per year	2000	2001	2002	2003	2004	2005
Compulsory participants	135,570 (8.30)	150,451 (9.21)	162,964 (9.98)	217,214 (13.30)	227,589 (13.93)	286,354 (17.53)
The poor	30,916 (1.98)	20,161 (1.23)	21,752 (1.33)	30,741 (1.88)	43,907 (2.69)	42,366 (2.59)

Table 2 – Current required contributions to the voluntary Health Insurance Scheme (17)

Participants	VND (US\$)	
	Urban	Rural
Location or association-based	160,000 - 320,000 (9.80 - 19.59)	120,000 - 240,000 (7.35 - 14.69)
Pupils and students	60,000 - 120,000 (3.67 - 7.35)	50,000 - 100,000 (3.06 - 6.12)

Members of the voluntary Health Insurance are also entitled to both inpatient and outpatient cares at all health care levels. For the outpatients, VHI will cover 100 percent of medical cost of less than VND 100,000 (US\$ 6.12), and only 80 percent of medical cost of more than VND 100,000 (US\$ 6.12). The reimbursement rate for inpatients is 80 percent for the cost of less than VND 20 million (US\$ 1,224.52) per case. In addition students will also receive 17.4% of the total collected premium for health promotion and first-aid activities.

The benefit packages provided to the participants of the compulsory Health Insurance Scheme include inpatient and outpatient services at all health care levels, laboratory exams, x-ray, and other diagnostic imaging procedures. Some expensive high-tech health services, such as open-heart surgery, are also covered by the compulsory Health Insurance Scheme.

There is also a list of reimbursable drugs, which is comparable with those in some developed countries.

At the end of 2004, about 18 million people were covered by VHI. After the issuance of the Decree 63/2005 and supplementary regulations, the number of participants in the VHI substantially increased to 23.4 million (or equivalently the coverage rate increased from 22 percent to 28 percent of the whole population). In 2006, the total number of VHI members reached 30.5 million, in which 11.2 million (or about 37 percent) were poor people (17) The government aims to have universal Health Insurance coverage by 2010. (18)

Sometimes people with Health Insurance still incur costs that need to be paid. Health Insurance has been found to decrease out-of-pocket expenditure by only 30-60% depending on type and level of care. (18)

Preventive care services, however, are not covered in the Health Insurance benefit packages, and they are paid by either government budget via national preventive care programs or by out-of-pocket money of the beneficiaries.

Wagstaff (15) in looking at the economic consequences of health shocks in Vietnam found that urban households were more negatively impacted than rural households. Even households with health insurance experienced increased expenditure on health costs following a health shock.

Other studies on the impact of Health Insurance on out of pocket payments have shown no effect. In 1998 it was estimated that out of pocket expenditure in Vietnam represented 80.5% of total health expenditure. Of this the largest item of expenditure was medicines. Out of pocket expenditure represented 12.6% of non-food expenditure in Vietnam. (19) (7) (See Appendix 6 for more details)

2.7.2. Health Indicators

Vietnam's health indicators, such as life expectancy and infant mortality, are comparable to countries considered middle income countries such as Brazil (HDI = 70), Turkey (HDI = 84) and Algeria (HDI = 104). Vietnam has also been successful in implementing preventive programmes, control of communicable diseases and reaching good health outcomes for its population. (20) For example under 5 mortality rate declined from 42% in 1999 to 27.5% in 2005 (7)

To date Vietnam has not been affected to a large scale by HIV/AIDS with the epidemic being confined to certain specific groups such as injecting drug users where the prevalence was 32.2%. Vietnam's health system is facing an increasing challenge from HIV/AIDS with more than 100 new infections per day and a doubling of the number of people living with HIV between 2000 and 2005 from about 122,000 to 263,000. (6) Together with HIV/AIDS, Severe Acute Respiratory Syndrome (SARS) and Avian Flu present new challenges to the Vietnamese health system. In parallel there has been a re-emergence of certain Communicable Diseases such as Japanese Encephalitis, Dengue Fever and Tuberculosis. (7) NCDs are also emerging as a challenge to Vietnam's health system.

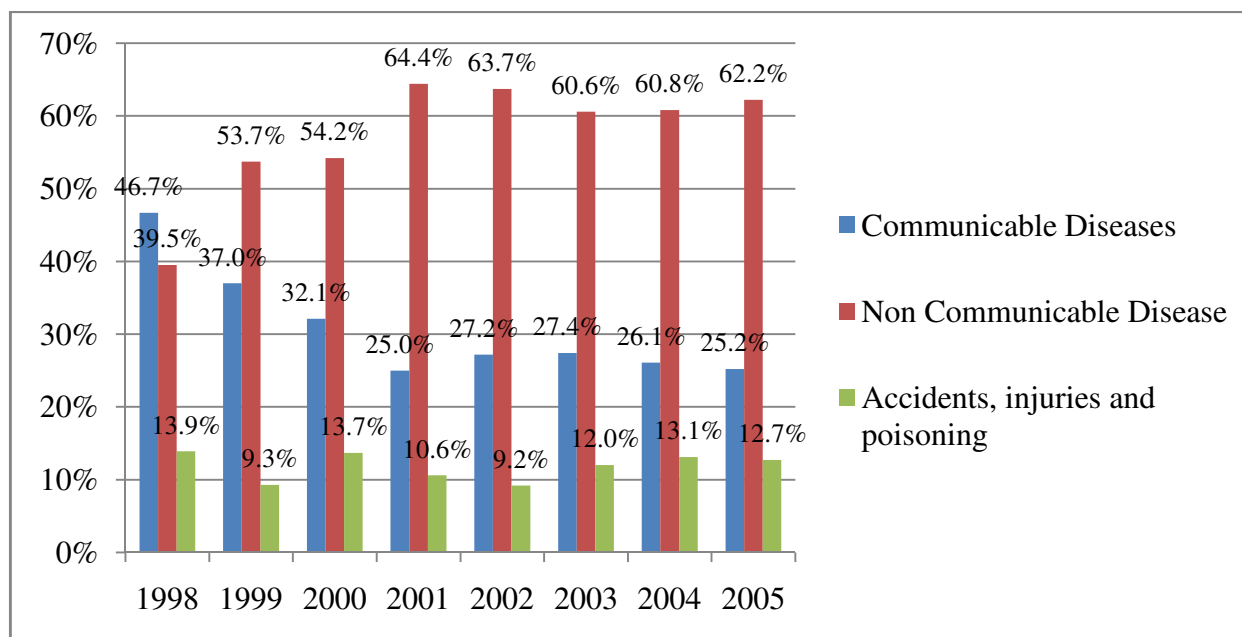
2.7.3. The Challenge of Non Communicable Diseases in Vietnam

"The Vietnamese health system with its vast experience and ability to effectively deal with communicable disease is still limited in its capacity and experience to prevent Non Communicable Diseases" (7)

Vietnam faces a double burden of disease and the challenge of malnutrition and over nutrition. For example in 2005 malnutrition in children under the age of 5 was 25.2% in parallel to 1.3% of children under 5 being overweight. (7) Rates of NCDs are increasing in both adults and children. For example asthma affects 10% of children in Hanoi and 16.7% in Ho Chi Minh City (7)

As can be seen in Figure 2 the burden of NCDs in Vietnam has been increasing steadily and in 2005 represented 62.2% of the total disease burden. (21)

Figure 2 – Increasing burden of NCDs in Vietnam 1998-2005, deaths by type of condition (21)



Besides an increasing burden of disease due to NCDs, these conditions also represent a large cause of mortality with 47.1% of all deaths in 2002 caused by a NCD. In looking at causes of death by age group, excluding Trauma, the burden of NCD deaths is the highest in all age categories except for children under 4 years of age, as detailed in Table 3. (21)

Table 3 – Causes of death in 2002 (21)

Causes of death (2002)	Perinatal	CD	NCD	Trauma	Elderly 70+	Other
Overall	2.8%	12.4%	47.1%	10.8%	23.3%	3.8%
Male	2.6%	14.7%	50.2%	13.7%	15.2%	3.6%
Female	3.1%	9.7%	43.2%	7.1%	32.9%	4.1%
Less than 1	58.2%	18.1%	14.6%	2.5%		6.7%
1-4		38.5%	22.4%	25.8%		13.4%
5-9		29.6%	29.9%	39.4%		1.2%
10-24		9.9%	24.9%	56.5%		8.7%
25-59		16.2%	59.0%	19.5%		5.2%
60+		9.5%	48.8%	3.2%	36.1%	2.4%
Poor	5.0%	19.9%	34.6%	12.2%	20.4%	7.8%
Middle	2.4%	11.6%	49.8%	9.5%	23.0%	3.8%
Rich	2.1%	9.2%	51.1%	11.0%	24.9%	1.8%

The WHO estimates that diabetes represented 2% of total deaths in 2002 with NCDs accounting for 66%. (22) More details of this data can be found in Appendix 7.

2.8. Implementation of RAPIA in Vietnam

Implementing the RAPIA in Vietnam had as its aim to clearly identify the barriers to medicines and care that people with diabetes in Vietnam face in order to affect sustainable change in addition to increasing the data on diabetes and its financial impact on the health system and people with this condition. Following this initial assessment the information provided will allow specific projects to be developed to address problems identified in order to improve diabetes care and access to medicines for this condition in a sustainable manner. It will also help develop a health system capable of tackling the growing challenge of chronic diseases.

Past implementations of the RAPIA have lead to:

- Improved access to insulin and other medicines for diabetes
- Improved purchasing measures and decreased prices for insulin and medicines for diabetes
- Development of diabetes associations
- Development of national policies for diabetes and non communicable diseases
- Funding for diabetes projects
- Improvement in care for people with diabetes
- Increased awareness within the country where the RAPIA was implemented and internationally about the problems of diabetes

This is the first implementation of the RAPIA in Asia and this will help to see if the lessons learned from implementations in sub-Saharan Africa and Latin America are valid in the Asian context.

It has been proposed (30; 31) that Type 1 diabetes can be used as a tracer condition to measure the ability of a health system to provide care for all chronic conditions. This would mean that this research would also have an impact for all chronic conditions and on the large and increasing burden of people with Type 2 diabetes.

There is a need for the Vietnamese health system to develop models for managing chronic disease in order to address the potential human and economic impact of the rising trend of chronic diseases, which may overburden both the health system and households and therefore impact development. The implementation of the RAPIA will result in concrete recommendations for the health system in Vietnam to ensure that the negative effects of globalisation and economic development are not jeopardized by increasing levels of chronic conditions. (32)

3. Type 1 and Type 2 Diabetes in Vietnam

Diabetes is known as “Dai Thao Duong” in the North and “Tieu Duong” in the South of Vietnam. The literal translation of both these terms means “sweet urine”.

In 2002 the first national study on the prevalence of diabetes was carried out by the National Hospital of Endocrinology. This study found that the prevalence of diabetes, at a country level was 2.7% and 4.4% in urban areas. (33) Current estimates are 2.5% of the population aged over 20 in Vietnam have Type 2 diabetes, with an expected increase to 3.5% by 2025. (34) Adjusted prevalence for whole country was found to be 2.6% in a study carried out in 2006. (33) The same study found the prevalence of Impaired Glucose Tolerance to be 7.3% countrywide. The projected prevalence of diabetes in the adult aged above 30 will be 5.8% in the next 5 years.

In a study carried out in 1990 the prevalence of diabetes was found to be 1.8% in Hanoi. (35) This study also found that only 14.3% of people with diabetes knew they had it. The authors

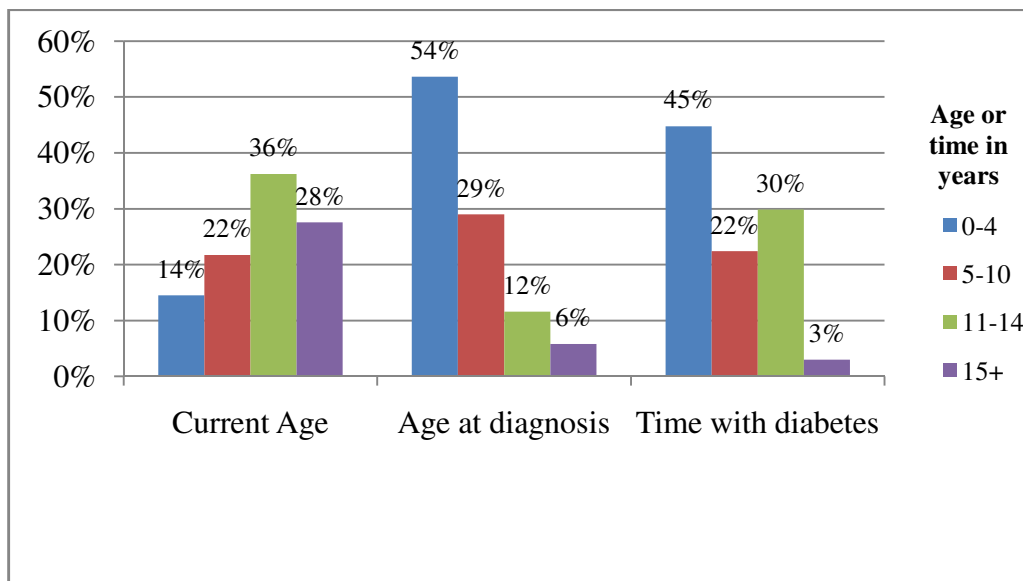
argue that this low level of detection highlighted the lack of facilities capable of detecting diabetes. They also add that the prevalence of Type 1 diabetes is extremely low and the explanation they give for this is the lack of insulin supplies leading to high rates of mortality because of high numbers of undiagnosed and untreated people with Type 1 diabetes.

Binh (36) in a study carried out in 2006 found that 36% of subjects had previously detected diabetes and 64% had undetected diabetes. This situation of a high rate of undetected diabetes is common in many countries with some estimates stating that some countries have only 1 of every 8 people with diabetes diagnosed. (37) In addition to this it was noted that many people were diagnosed late with diabetes. To address this the VHI is now paying for people aged 40 or above to have a check-up once a year. It is not clear how developed this programme currently is.

The IDF estimates that the incidence of Type 1 diabetes in Vietnam is 0.3 per 100,000 children aged 0-14. (34) According to this figure it is estimated that there would be an estimated 430 prevalent cases of Type 1 diabetes in Vietnam. There are a total of 198 children with Type 1 diabetes followed at the National Hospital of Paediatrics in Hanoi. Of these only 24 are from Hanoi ($\approx 2.43/100,000$ children under 15 years of age). At the National Hospital of Paediatrics there were 12, 9, 16 and 23 new cases of Type 1 diabetes reported from 2004 to 2007. (38) The children followed at the National Hospital of Paediatrics came from 26 of the 64 provinces in Vietnam. In Ho Chi Minh City a total of 43 children (10 from Ho Chi Minh City) with Type 1 diabetes are cared for at Children's Hospital No. 1 and 10 children (all from Ho Chi Minh City) from Children's Hospital No. 2. This equals 20 cases of Type 1 diabetes in Ho Chi Minh City ($\approx 1.0/100,000$ children under 15 years of age) the remainder coming from other provinces in the South of Vietnam.

The total number of people with Type 1 diabetes registered in the three paediatric hospitals equals 251 cases. The average age of these people was 12.3 years (Minimum less than 1 year of age, Maximum 30 years of age). On average the duration of diabetes was 6.4 years of age (Minimum less than 1 year, Maximum 22 years) with age at diagnosis being on average at 5.3 years of age (Minimum less than 1 year of age, Maximum 23 years of age). This data is presented in the graph below.

Figure 3 – Current age, age at diagnosis and time with diabetes for cohort of registered people with Type 1 diabetes



Ranges of what percentage of the total estimated number of people with Type 1 diabetes this cohort represented varied from 70-90%. In looking at the IDF estimate of 430 this cohort would represent 58% of the total. The table below looks at the Prevalence of Type 1 diabetes assuming the cohort of registered patients represents different proportions of the total.

Table 4 – Percentage of total Type 1 diabetes population the cohort from the 3 paediatric hospitals represents

	Percentage of total Type 1 diabetes population the cohort from the 3 paediatric hospitals represents				
	58%	70%	80%	90%	100%
Total number of people with Type 1 diabetes	430*	359	314	279	251
Prevalence per 100,000 population	1.7	1.4	1.2	1.1	1.0
Life Expectancy	7.2	6.0	5.3	4.7	4.2

Assumptions:

- * Number estimated by IDF
- Uses population data under the age of 14 even though some people are over the age of 14 (see Figure 3)

A study carried out in 1995 study at the National Hospital of Paediatrics found that mean age at diagnosis was 6.2 years \pm 5.1 years. 75.9% of children had HbA1c³ over 9%. In this same study, children with Type 1 diabetes for 1-5 years represented 52% of total patients with Type 1 diabetes and 3.2% of children in this category already had eye and/or kidney complications. Overall 38.7% of children followed in this study had complications. The main reason identified for these complications was missing insulin injections or not taking the full insulin dosage.

³ Glycosylated Haemoglobin – a measure of average levels of Blood Glucose over a period of 8-12 weeks

During discussions for this project the main symptoms at presentation for Type 1 diabetes were polyuria and weight loss.

3.1. Increases in Overweight and Obesity

Worrying increases in obesity, the main risk factor for Type 2 diabetes, have been observed in Vietnam. From 1992 to 2002 minimal changes in overweight and obesity were observed in the 2-17 years old age group overweight from 1.4% to 1.8%. During the same period in the 18-65 year age group overweight and obesity increased from 2.0% to 5.2%. Urban populations increased more than rural populations. Underweight still exists in parallel to this with rates of 33.5% (2-17 years of age) and 24.8% (18-65 years of age) in 2002. (11) Doak et al. (39) describe that in some households there is actually the coexistence of under and overweight and this was found in 3.7% of Vietnamese households in their study.

In Hanoi in 2001, Pham et al. (40) found that in the population aged 25 years of age or more in 12 urban communes 1.1% of the population was obese⁴ and 15% were overweight. The same study with the same study population found the prevalence of diabetes to be 4.1% in males and 5.3% in females.

A study in Ho Chi Minh City found that Body Mass Index (BMI) between people with diabetes and control subjects was similar. (41) The differences were with regards to percent body fat and Waist Hip Ratio. This study also noted the worrying evolution of dietary patterns with increasing protein and meat consumption, which the authors describe as a potential reason for the deterioration of glucose metabolism among Vietnamese people.

In a cross-sectional study of children aged 4-5 years of age in Ho Chi Minh City it was found that overweight and obesity were present in both boys and girls at quite high levels as well as in all socio-economic strata. (42) See

Table 5 for a synthesis of results. This study only found 2.7% of children were underweight.

Table 5 – Prevalence of overweight and obesity in Ho Chi Minh City

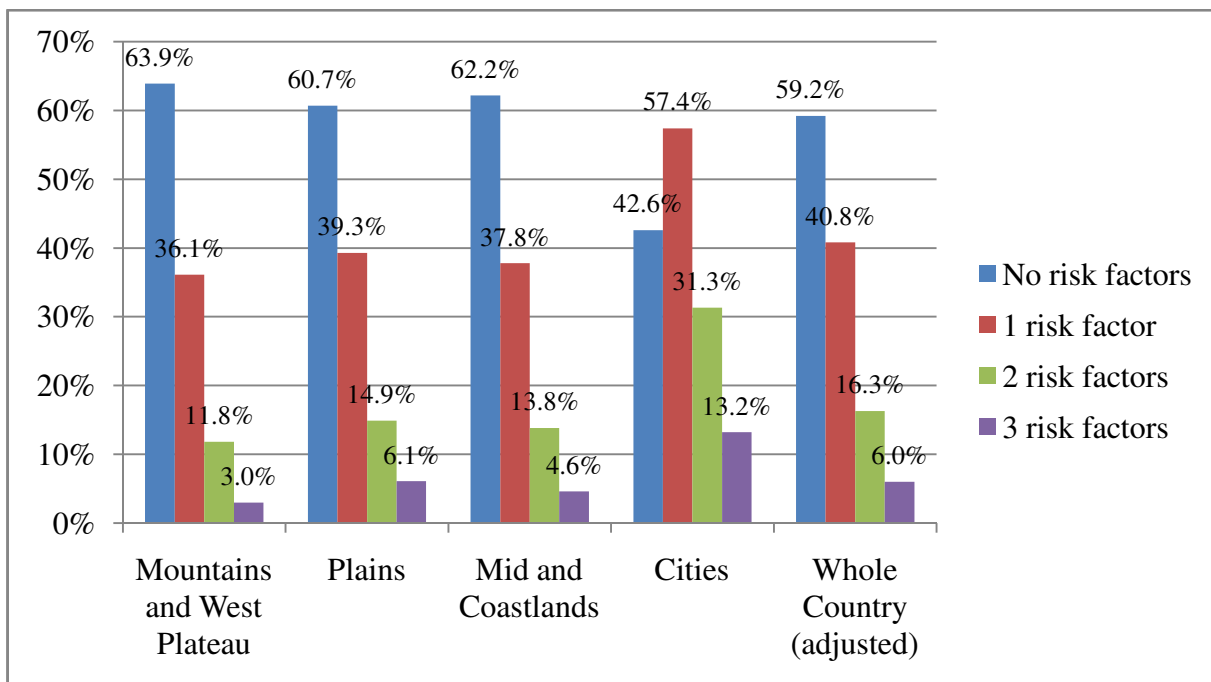
Characteristic	Overweight (%)		Obesity (%)	
All	20.5		16.3	
	Boys	Girls	Boys	Girls
Overall	19.1	21.8	21.7	11.0
Ethnicity				
• Vietnamese	19.7	23.7	22.5	11.2
• Chinese	16.0	12.6	17.2	10.5
Districts				
• Wealthy districts	19.5	25.3	20.1	12.1
• Less wealthy districts	18.9	19.9	22.5	10.5
Household wealth				
• Poorest	14.3	16.5	21.5	8.8
• Middle	21.1	19.4	15.9	10.3
• Wealthiest	22.1	30.5	26.7	14.6

⁴ The thresholds for BMI used in Asian populations is: $\leq 25\text{kg/m}^2$ for men and $\leq 24\text{ kg/m}^2$ for women is considered ideal; $25\text{-}27\text{ kg/m}^2$ for men and $24\text{-}26\text{ kg/m}^2$ for women is considered overweight; and more than 27 kg/m^2 for men and 26 kg/m^2 for women is considered obese

The WHO estimates that between 2005 and 2015 the percentage of overweight males and females in Vietnam will increase from 5% to 16% and 13% to 24% respectively. (43)

Binh (33) in a study on diabetes found the following rates of risk factors of diabetes in different regions of Vietnam. The risk factors were high BMI and waist circumference, family history of diabetes, hypertension and physical inactivity. Most worrying from this data is that a majority of people living in cities have more than 2 risk factors for diabetes.

Figure 4 – Number of risk factors for diabetes in different regions of Vietnam (33)



3.2. Morbidity

The DiabCare Asia study (23) found that HbA1c values in people with diabetes in Vietnam were extremely high with the mean being 8.9 (SD ± 2.2) with 18% of subjects having an HbA1c measure under 7 (an ideal target), 22% a measure from 7-8 and 59% a measure over 8.

Binh (36) in a follow-up study on diabetic complications, in a relatively short-duration cohort of patients, that the majority of people with diabetes were diagnosed due to diabetes symptoms (84.5%), followed by detection during a health check-up (8.7%) and accidental detection (5.6%). (36)

In looking at diabetes complications, Table 6 summarises the prevalence of different complications found in different studies. It is important to note that there is a high prevalence of hypertension in people with diabetes. Estimates are that 20% of adults in Vietnam have hypertension and that 50-60% of people with Type 2 diabetes also have hypertension.

Table 6 – Diabetes Complications in Vietnam

Type of complication	Prevalence	Population	Source
Elevated Blood Glucose (HbA1c > 9.0)	75.9%	Children	(38)
Eye complications			
- Retinopathy	23.9%	Adults	(36)
- Cataract	5.7%		
- Glaucoma	0.5%		
Eye complications (only)	17.2%	Children	(38)
Renal complications			
- Microalbuminuria	13.8%	Adults	(36)
- Macroalbuminuria	6.1%		
- Renal Failure	2.1%		
Renal complications (only)	20.7%	Children	(38)
Eye and Renal complications	36.2%	Children	(38)
Peripheral Neuropathy	53.2%	Adults	(36)

The main reason identified for admission in a General Hospital in Ho Chi Minh were foot infections and other infections both representing 11% of admissions for people with diabetes.

In a small study carried out in a General Hospital in Hanoi with 80 patients found that only 37 (46%) patients had an HbA1c less than 7%. The reasons for this were found to be: (Personal Communication)

- High knowledge of diabetes and its management
- Patient doing exercise
- Patient follows doctor's prescription and recommendation
- Patients were more wealthy than those with poor HbA1c readings

A larger study found that of patients undergoing treatment for diabetes 60.2% had Fasting Blood Glucose (FBG) above 7 mmol/l, 10.7% were between 6.1 and 7 mmol/l and 29.1% between , 4.4 and 6.1 mmol/l. (33) The mean FBG was 8.9 mmol/l.

3.3. Mortality

Diabetes represented the 8th cause of death in 2002 (12,000 deaths, 2% of total). It is important to note that the first and second cause of death were Ischaemic Heart Disease (66,000 deaths, 13% of total) and Cerebrovascular Disease (58,000 deaths, 11% of total), which diabetes can be a contributing factor. Of the top 10 causes of death 6 are due to NCDs and these represented 39% of all cause mortality. (22) A detailed table of causes of death can be found in Appendix 7.

At the National Hospital of Paediatrics in a cohort of 180 patients there have been 7 deaths due to diabetes from 2000 until present. (38) The age distribution of these patients is detailed in Appendix 8.

3.4. Costs

Chronic conditions place a large financial burden on both health systems and individuals. Current estimates for Vietnam in International US dollars show an expenditure on diabetes of US\$ 606,251,000 expected to increase to US \$1,114,430,000 by 2025. (34) Overall data from Vietnam has shown that 60% of indebted poor had gone into debt to pay for inpatient care. (7)

Armstrong et al. (44) found that chronic medical conditions of childhood such as Type 1 diabetes placed an extreme financial burden on families in Vietnam. In many discussions with health professionals and people with diabetes the cost of diabetes (medicines, consultation, transportation, etc.) was a major burden and a large contributor to poor adherence. A report by Caring & Living as Neighbours (CLAN) from 2008 highlighted also that many families with children with Type 1 diabetes had to have at least one parent miss substantial amounts of work due to the child's illness. (45) Data in Table 7 below shows some of this data collected by CLAN in Hanoi.

Table 7 – Mean cost of care for a person with Type 1 diabetes in Hanoi (45)

Cost VND (US\$)	Cost per month	Cost per year	As % age of total diabetes care cost	Cost per year as % age of GDP per capita*****
Insulin	277,661 (17.0)	3,331,932 (204.0)	23%	28%
Syringe*	97,998 (6.0)	1,175,976 (72.0)	8%	10%
Testing (Hospital)	65,332 (4.0)	783,984 (48.0)	5%	7%
Testing per test** (Home)	440,991 (27.0)	529,189 (32.4)	37%	45%
Transportation	179,663 (11.0)	2,155,956 (132.0)	15%	18%
Cost check-ups	81,665 (5.0)	979,980 (60.0)	7%	8%
Other costs - going to Pagoda to pray for child's health	48,999 (3.0)	587,988 (36.0)	4%	5%
Total costs	1,192,309 (73.0)	9,545,005 (584.4)	100%	121%
<i>Hospitalisation (per hospitalisation)</i>	<i>702,319 (43.0)</i>		<i>7%*****</i>	<i>6%</i>

* - assuming 1 syringe per day

** - includes strip and lancet and assumes 1 test per day

*** - Table assumes 1 consultation per month

**** - Hospitalisation as percentage of total cost of diabetes

***** - \$723 in real terms

Similar data for Ho Chi Minh City is presented in Figure 8 in Section 5 and shows that total average costs per month for children with Type 1 diabetes is US\$ 55.0.

Many patients with Type 2 diabetes who reported having insurance stated that cost of treatment was not a barrier, but other costs such as transportation were sometimes a barrier. Those without insurance described the financial burden of accessing proper care for diabetes, especially Type 1 diabetes, as the main barrier to proper care in Vietnam. This was especially true for people living away from major conurbations. People interviewed in cities or at the National Hospitals had longer travel times than those interviewed in lower levels of the health system. Certain groups such as the poor can be reimbursed for medical transportation (7), however this did not happen due to lack of knowledge and bureaucratic hurdles.

Average consultation fees based on the interviews for the RAPIA were US\$ 8.41. Some of this cost would be paid by the health insurance. Of the patients interviewed during the RAPIA 44% had some form of health insurance compared to a reported coverage of 36% of the overall population.

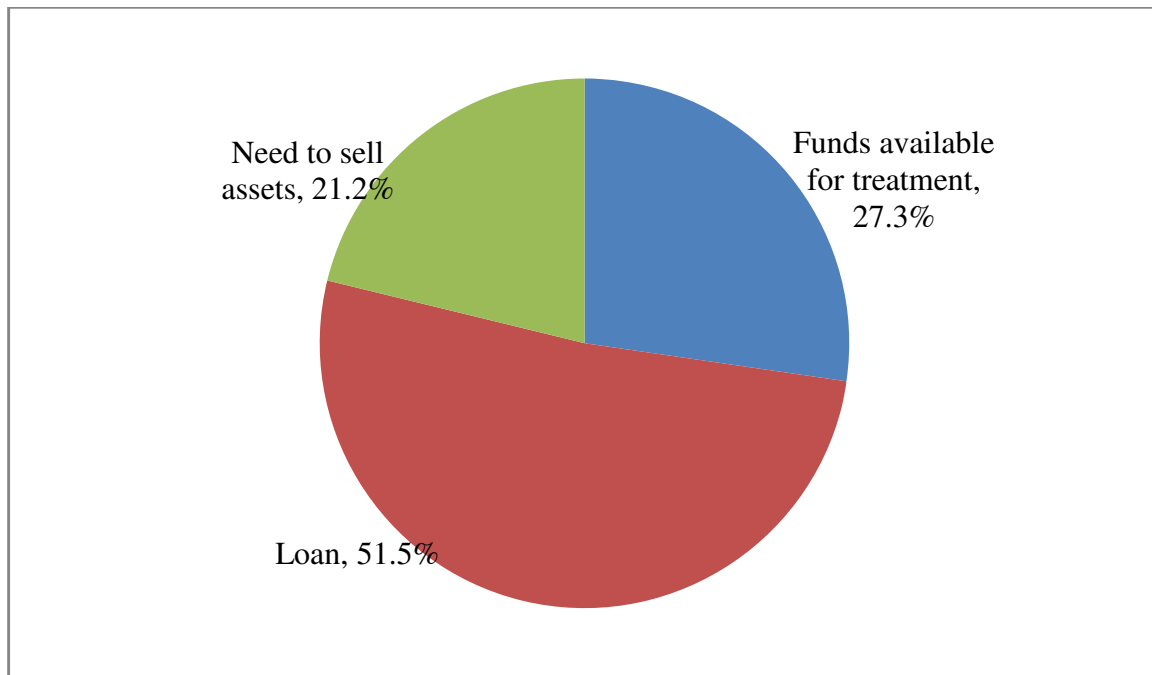
The table below describes the different costs per item of diabetes care as described during the RAPIA interviews.

Table 8 – Minimum, Maximum and Average costs for different aspects of diabetes care

Aspect of diabetes care VND (US\$)	Consultation fees or payment for care, including inpatient costs	Insulin (per vial)	Medicines (per month)	Travel (per visit)	Syringe (unit)	HbA1c (per test)	Blood Glucose (per test)	Blood Glucose Meter (unit)	Strips (unit)	Lancet (unit)
Minimum	0 (0.00)	0 (0.00)	59,942 (3.67)	0 (0.00)	490 (0.03)	89,995 (5.51)	15026 (0.92)	799,990 (48.98)	5,063 (0.31)	1,960 (0.12)
Maximum	16,333,000 (1,000.00)	424,985 (26.02)	700,032 (42.86)	799,990 (48.98)	2,450 (0.15)	120,048 (7.35)	49,979 (3.06)	1,699,939 (104.08)	14,046 (0.86)	2,940 (0.18)
Mean	813,710 (49.82)	160,063 (9.80)	402,935 (24.67)	159,083 (9.74)	1470 (0.09)	99,958 (6.12)	27,439 (1.68)	1,421,461 (87.03)	8,003 (0.49)	2,450 (0.15)

Data from Professor Binh detailed on the Diabetic Network Vietnam highlights the financial impact of diabetes and is detailed in Figure 5 below. (46)

Figure 5 – Sources of funding for diabetes care



From discussions with patients, especially children with diabetes, it is not always clear for them what they do and do not need to pay for. Also some patients, even if they have or are eligible for insurance, are willing to pay for care as they feel that by paying they have more rights to demand certain things.

Studies have shown that in resource poor setting high cost of treatment can lead to poorer adherence. (47)

The cost of diabetes is passed on to the individual or Health Insurance in Vietnam, but many areas of the country are already spending high proportions of their health budgets on diabetes, showing the increasing burden this condition places on Vietnam as a whole. For example one rural province with a relatively young population and low rate of urbanisation already spent 1% of its total medicines budget on diabetes.

Inpatient costs can vary from VND 50,000 (US\$ 3.06) to VND 200,000 (US\$ 12.25) per day. Data from the Ministry of Health shows that inpatient care for all conditions can place a heavy burden on patients and their families with average overall expenditure being as high as VND 1,265,000 (US\$ 77.45) when fully paid for by the patient. (21) More details can be found in Appendix 6..

In addition for those patients who have health insurance the costs of diabetes are a burden to the system as a whole. In large hospitals expenditure on diabetes related medicines and insulin represents more than 20% of their medicines budget.

4. Vietnam's medicine supply

The annual Vietnamese pharmaceutical market was estimated at about VND 5,526 billion (US\$ 425 million) in 1997 or about US\$ 5.20 per capita in sales. Of this, only VND 1,385 billion or 25% represents the market for locally produced drugs, the remaining 75% of the market is accounted for by imports. It is estimated that essential drugs account for 60% of total sales of medicines. (13) In 2000 expenditure on medicines increased to US\$ 9 per person and as a total represented 41% of expenditure on health. (7) Current estimates show the market to be worth US\$ 1.15 billion with double digit growth from 2008-2012. (48) By 2012 Vietnam's Pharmaceutical Market will have reached US\$ 1.85 billion (1.05% of GDP).

Of the total market 40% of sales are for hospitals with the remainder at pharmacies in the private sector. Of this 60% of sales at pharmacies 80% of this is for Over the Counter (OTC) medicines.

Purchase of medicines does not only represent a financial burden for individuals, but also for facilities. For example a General Hospital in Hanoi with a total had a total budget 100 billion VND (US\$ 6,122,574) medicines represented the largest item of expenditure representing 38% of total budget followed by 18% on Human Resources. (Personal Communication)

All medicines registered in Vietnam will not necessarily be present in the Public Sector. The Ministry of Health has developed lists of medicines available at the different levels of the health system. This list is also used for the Health Insurance to reimburse these medicines. The list for diabetes is included as Appendix 9. This means that some facilities will have different medicines for insured and uninsured.

There is no centralised purchasing of medicines in Vietnam. Selection of medicines is decided at a facility level by a Medicines Board and is based on recommendations by doctors in collaboration with pharmacists. Facilities in planning their needs will use historical orders from the previous year and plan 10-15% more. This plan is submitted to the managing health authority (Ministry of Health or Provincial Health Authorities) for approval. Following this the tender is advertised. As each hospital prepares its own tender this limits the bargaining power it can have with distributors and wholesalers. Decisions on which medicines to purchase are made based on a grading scale that takes into account the price of the medicine versus its source and perceived quality. Hospitals will plan tenders every 6 months to 1 year. The Ministry of Health sets out the regulations for the tendering process, but does not intervene in these.

In assisting with tenders the Ministry of Health prepares a guide price list for most medicines. Vietnam uses reference prices from Thailand, Malaysia, Cambodia and Laos and also the CIF price from the medicines registration file as indicator for this price. For insulin the average equivalent price⁵ per 10 ml vial of 100 IU insulin was US\$ 12.00 (Maximum price: US\$ 17.00, Minimum Price:US\$ 6.0). The full list of prices for medicines for diabetes is included as Appendix 10. This price list is only used as a reference by facilities when preparing their tenders.

In looking at these prices and comparing them to prices quoted on the International Drug Price Indicator most prices quoted by the Ministry of Health are substantially higher than those from the International Market. (49)

⁵ All prices for different formulations of insulin 10 ml 40 IU and 100 IU vials and 3 ml 100 IU cartridges were all converted to price per unit of insulin and then multiplied by 1,000 for a 10 ml vial of 100 IU for comparison purposes throughout this report unless otherwise mentioned.

Table 9 – Comparison of suggested tender price from Ministry of Health in Vietnam and International Price

Name	Suggested tender price from Ministry of Health in Vietnam	International Price (International Drug Price Indicator) Median Price	Ratio
	Price per unit (tablet or unit of insulin) US\$		
Glicazide 80mg	0.0625	0.0448	1.40
Insulatard Novolet 3ml cartridges	0.0169	0.0150	1.12
Metformin 500mg	0.0624	0.0180	3.47
Metformin 850mg	0.1387	0.0210	6.60
Mixtard 30 Novolet 3ml cartridges	0.0169	0.0150	1.12
Mixtard 30 Penfill 3ml cartridges	0.0153	0.0150	1.02
SciLinM 30/70 40IU 10ml	0.0110	0.0088	1.25
SciLinN 40IU 10ml	0.0110	0.0081	1.35
SciLinR 40IU 10ml	0.0110	0.0088	1.25

The reform of the health system led to increasing the role of private pharmacies in drug distribution. In addition in Vietnam self-medication is extremely high, especially in uninsured (7), with 90% of drug dispensing found to be without prescription and the customer deciding themselves which drug to buy. This same work found that most medicines are sold under their trade names and not generic versions. (50)

Discussions with Clinicians, Pharmacists and patients revealed a low level of confidence in generic medicines.

5. Vietnam's insulin and oral medications supply, quantification and price

The value of the diabetes market in Vietnam is about US\$ 19,000,000.⁶ Of this 83% is for oral medicines, 15% for insulin (human) and 1% animal insulin. It is interesting to note that Diamicon (branded Glicazide) is the fifth most sold medicine in Vietnam with sales of US\$ 4,149,000.⁷

The total value of the insulin market is US\$ 2.9 million.⁸ The insulin market is divided as follows⁹:

- 40% (all types of hospitals)
- 20% Pharmacies
- 30% Private Clinics (mainly in South)
- 10% Wholesalers

In terms of US\$ value of market the following companies divide the total market in Vietnam as follows:¹⁰

- Novo Nordisk ≈ 75-80% of market

⁶ IMS data provided by Pharmalink

⁷ IMS data provided by Pharmalink

⁸ IMS data provided by Pharmalink

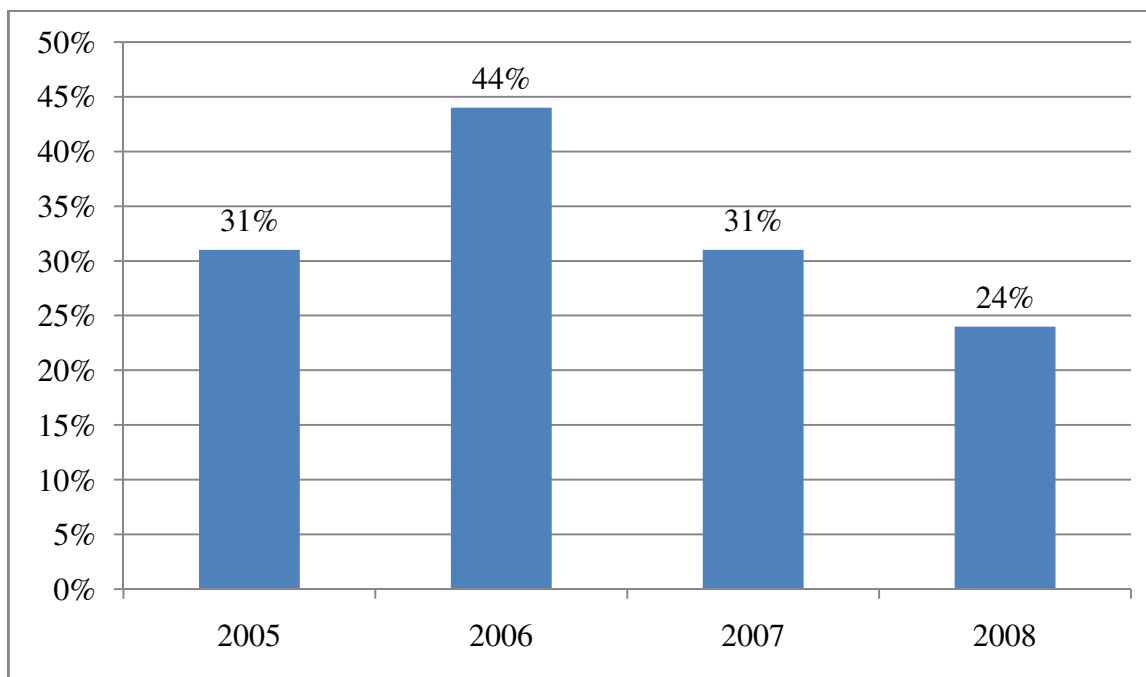
⁹ IMS data provided by Diethelm

¹⁰ IMS data provided by Diethelm

- SciLin ≈ 10%
- Lilly ≈ 7%
- Polfa ≈ 5-6%

Over the past few years the insulin market has grown extremely rapidly in Vietnam as is shown in Figure 6.

Figure 6 – Percentage yearly growth of insulin market in Vietnam 2005-2008



Insulin and oral medicines for diabetes are subject to 5% import duty and 5% VAT. (51)

National guidance states that insulin should not be given at the level of districts. (See Appendix 9) Vietnam has on its Essential Drug List Rapid, Intermediate and Mixed insulin.

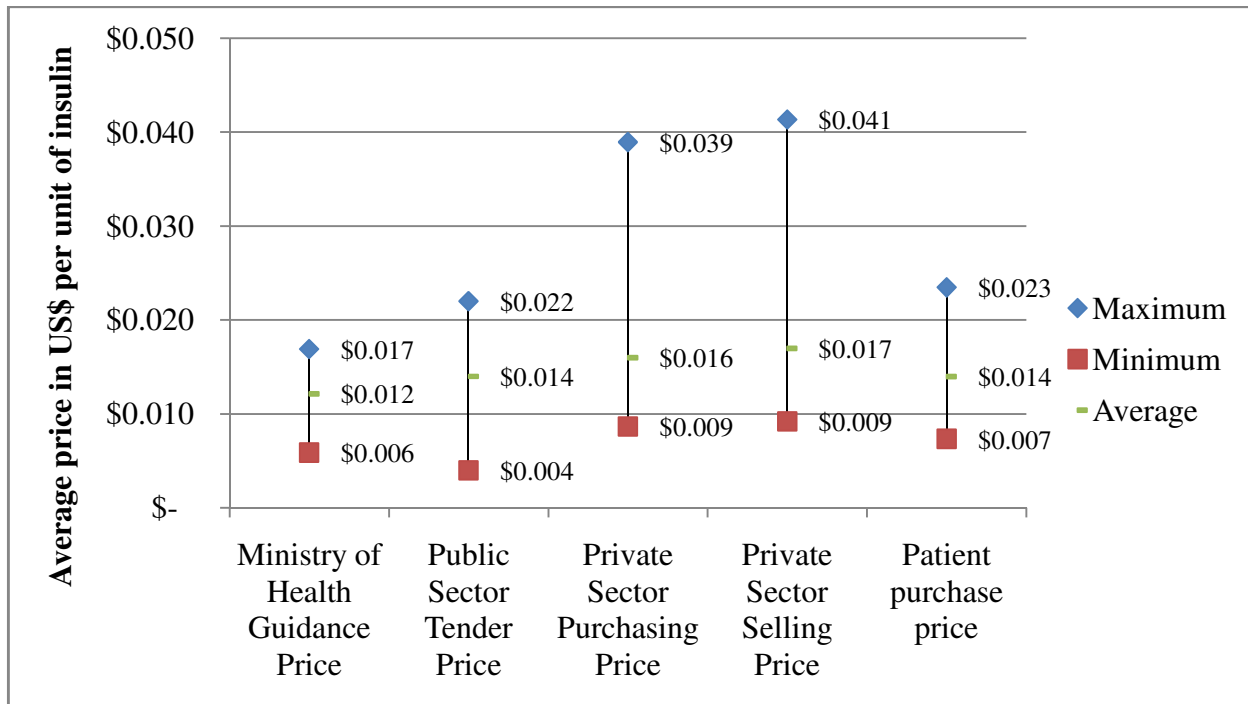
During the RAPIA no problems were reported or observed with regards to supplying medicines or the cold chain for insulin except concerns raised about the donated insulin received at different paediatric hospitals.

In the public sector looking at tenders for different facilities Bioton (Neutral, Fast Acting and Mixed), Lilly (Neutral, Fast Acting and Mixed), Novo Nordisk (Slow Acting, Fast Acting and Mixed) and Polfa (Slow and Fast Acting) insulin was purchased. Both 100 IU and 40 IU vials were purchased. On average a unit of insulin cost US\$ 0.014, equivalent to US\$ 13.56 for a 10ml vial of 100 IU insulin (total of 1,000 units). The graph below shows the different price ranges per unit of insulin for the different manufacturers. Many hospitals reported using about 50% of generic medicines and 50% brand names. For diabetes however this was often 30% generic medicines and 70% brand name. Also some facilities had a mix of 40IU and 100IU and animal and human insulin this varied from facility to facility.

91% of facilities public facilities visited had insulin.

Insulin is readily available in the private sector. 49% of private pharmacies visited sold insulin. It should be noted that some pharmacies targeted outside paediatric hospitals did not sell insulin due to low demand. Taking these facilities out of the total sample close to 60% had insulin available.

Figure 7 – Minimum, Maximum and Average prices per unit of insulin at different levels of the health system

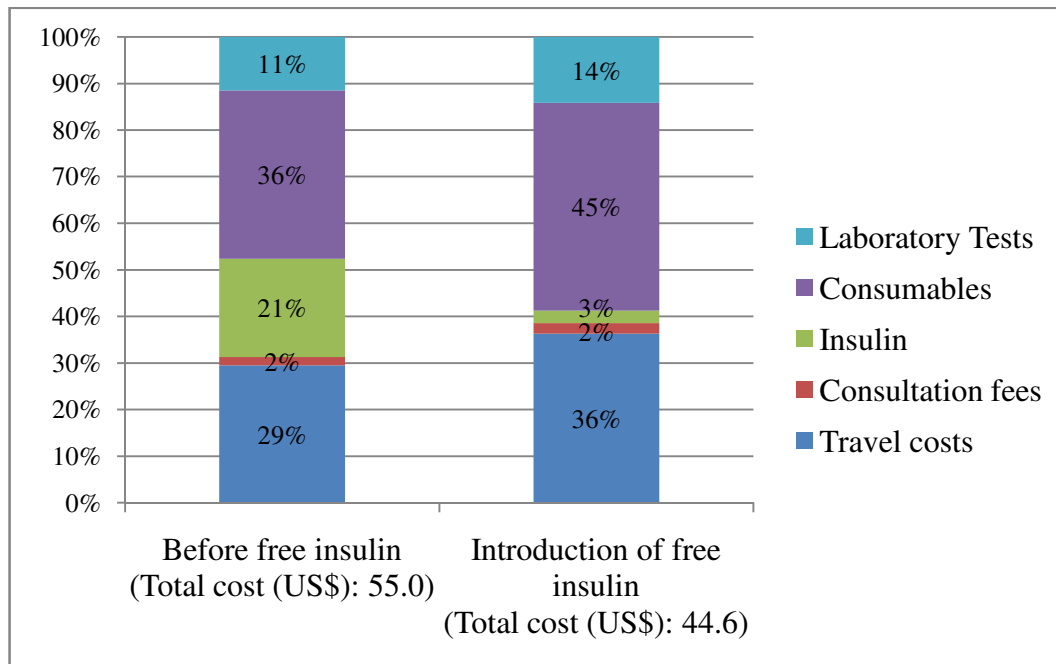


34% of patients interviewed did not have to pay anything for insulin and/or medicines due to their belonging to an insurance scheme that covered 100% of these costs or were children who had access to insulin from Insulin for Life (IfL).

IfL provided free insulin to children at both the National Hospital of Paediatrics in Hanoi and Children’s Hospital No. 1 in Ho Chi Minh City.

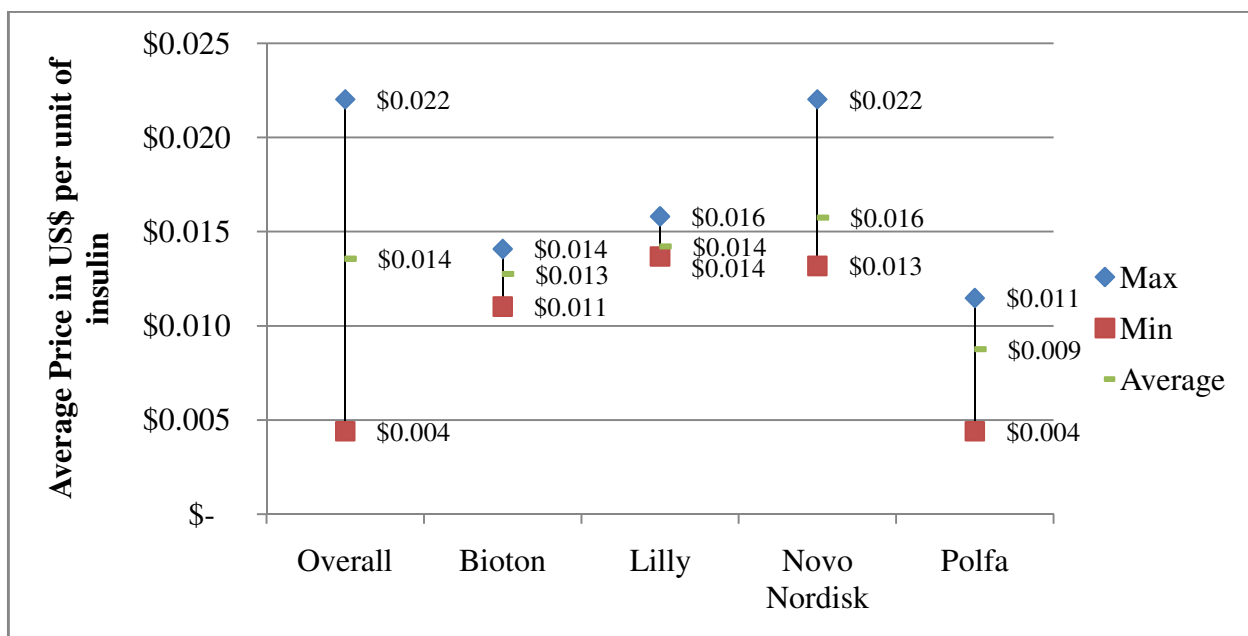
In looking at the impact of donations on the overall cost of diabetes care, 8 children with Type 1 diabetes from Children’s Hospital No. 1 were interviewed. Of these 2 had been diagnosed after the introduction of free insulin from CLAN and IfL and therefore had never had to pay for insulin. The others on average previously had to pay an average of VND 190,000 (US\$ 11.60) per vial of 10 ml 100 IU. At the time of the interviews all children except one accessed the free insulin. Total average costs per month for these children before the introduction of free insulin were US\$ 55.0 and with the introduction of free insulin was US\$ 44.6. The graph below details the breakdown of these overall costs and impact on these of the introduction of free insulin.

Figure 8 – Costs of diabetes care for children with Type 1 diabetes before and after the introduction of free insulin



The Assemblies of God also provide insulin for the poorest children at the National Hospital of Paediatrics. They have provided this support since 1998 and their donation helps 42 children.

Figure 9 – Price per unit of insulin based on Public Sector Tenders



In looking at oral medicines for diabetes it was variable as to whether facilities bought branded or generic versions of the medicines. The table below presents the highest, lowest and average prices found from Public Sector tenders, as well as the brand premium which was calculated by taking the highest price of a branded medicine and dividing it by the lowest price for a generic version of the same medicine.

Table 10 – Price per tablet based on Public Sector Tenders and brand premium

Medicine and Strength	Price in US\$			Brand Premium
	High	Low	Mean	
Glibenclamide 5mg	0.03	0.02	0.02	*
Glimepride 2mg	0.21	0.04	0.14	5.1
Glimepride 4mg	0.29	0.15	0.23	2.0
Metformin 500mg	0.08	0.02	0.05	3.5
Metformin 850mg	0.14	0.03	0.08	4.7
Metformin 1,000mg	0.16	0.08	0.13	2.0
Rosiglitazone 2mg and Metformin 500mg	0.50	0.22	0.32	2.3
Glicazide 30mg	0.12	0.04	0.08	3.0
Glicazide 80mg	0.12	0.04	0.07	3.0
Metformin 500mg and Glibenclamide 2.5mg	0.18	0.08	0.13	2.3
Metformin 500mg and Glibenclamide 5mg	0.44	0.09	0.24	4.9
Rosiglitazone 4mg	0.96	0.96	0.96	**

* - Only generic versions

** - Only branded versions

This table shows that some facilities in Vietnam are paying from 2 to 5 times more per tablet just because they are buying the branded version.

Based on discussions with different stakeholders the following path and increases in price were seen overall between the different levels of distribution of medicine. This is detailed as a diagram in Figure 10.

Figure 10 – Path of medicines in Vietnam and increases in prices at different levels of the system

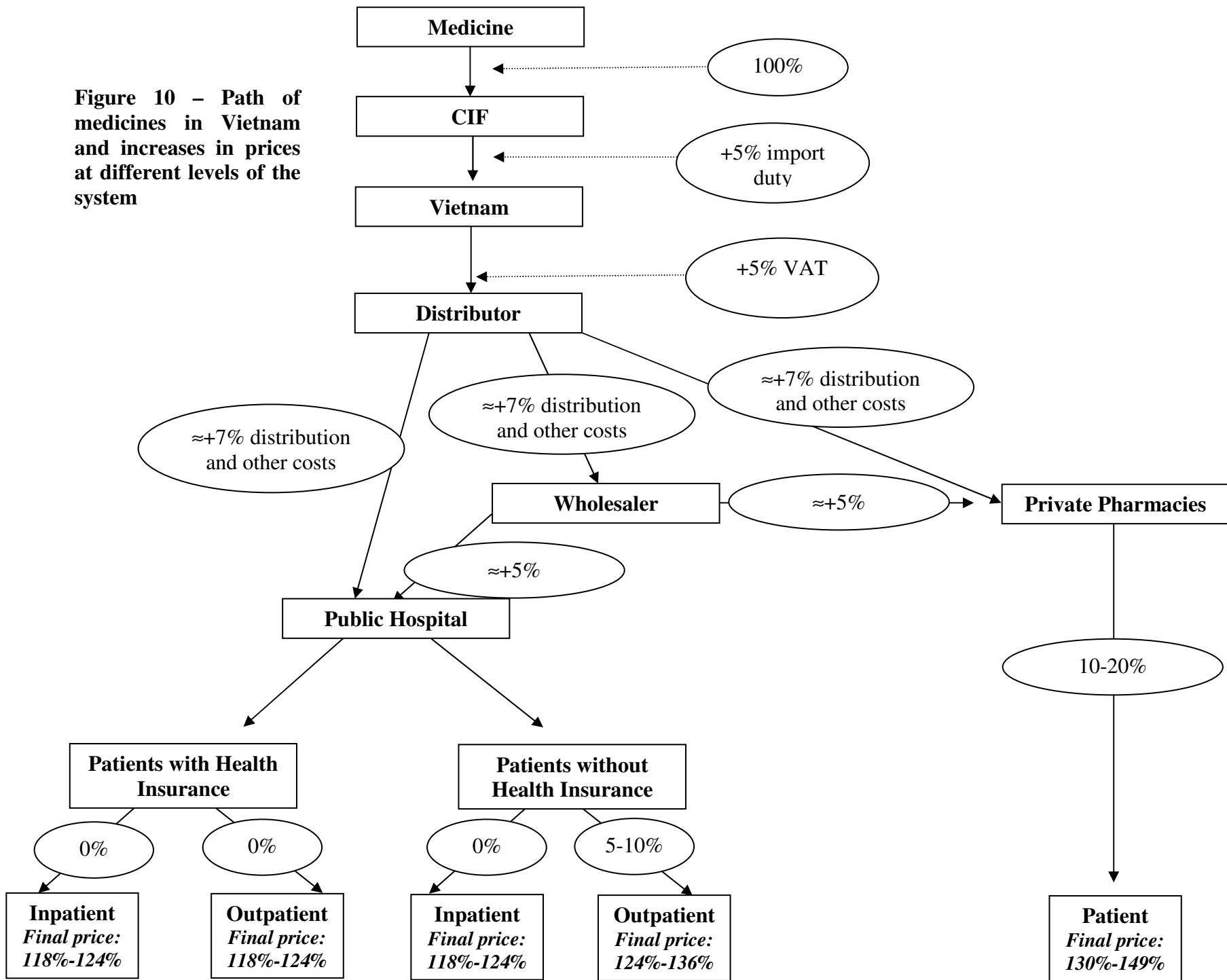


Figure 10 presents an overall picture of the situation with regards to increases in the price of medicines along the distribution chain. Many people interviewed stated that one of the reasons leading to high prices was the number of intermediaries in Vietnam.

Some examples from different private pharmacies showed the following mark-ups between purchase price and selling price to patients.

Table 11 – Examples of mark-ups from the Private Sector

Medicine	Pharmacy purchase price	Pharmacy Selling Price	Mark-up
	VND (US\$)		
Metformin 850mg	1,143 (0.070)	2,000 (0.122)	75.0%
Metformin 500mg	686 (0.042)	1,000 (0.061)	45.8%
Diamicon MR30	1,970 (0.121)	2,200 (0.135)	11.7%
Avondent	8,142 (0.498)	8,955 (0.548)	10.0%
Avandia	15,624 (0.957)	17,000 (1.041)	8.8%
Porcine Lente Insulin 40IU	72,000 (4.408)	78,000 (4.776)	8.3%
Glucobay	2,509 (0.154)	2,700 (0.165)	7.6%
Glucovance	3,067 (0.188)	3,300 (0.202)	7.6%
Diamicon MR	1,958 (0.120)	2,100 (0.129)	7.3%
Glucophage	2,341 (0.143)	2,500 (0.153)	6.8%
Glicazide 80mg	1,260 (0.077)	1,330 (0.081)	5.6%
Human Regular Insulin 100IU	248,000 (15.184)	260,000 (15.919)	4.8%
Porcine Lente Insulin 40IU	71,000 (4.347)	74,000 (4.531)	4.2%
Diamicon	3,799 (0.233)	3,900 (0.239)	2.7%

The average selling prices of different oral medicines in private pharmacies are presented in the table below and also shows the brand premiums for equivalent medicines.

Table 12 – Average selling prices in private pharmacies for oral medicines for diabetes

Medicine	Metformin				Glimepride		Glicazide	
	500mg Generic	500mg Brand	850mg Generic	850mg Brand	2mg Brand	4mg Brand	40mg Brand	60mg Brand
Average Price VND (US \$)	877 (0.054)	1,417 (0.087)	1,419 (0.087)	2,458 (0.150)	3,500 (0.214)	5,300 (0.324)	2,329 (0.143)	2,747 (0.168)
Brand Premium	1.6		1.7					

Besides the cost of medicines other problems with medicines in Vietnam were found to be:

- Higher level hospitals will sometimes prescribe medicines to patients referred to them from lower levels of the health system that are not available at these levels. This means that when patients are sent back they need to buy these in the private sector.

- Many people with diabetes are elderly and/or have many other diseases (for example hypertension and dyslipidemia) and therefore using multiple pills is difficult and also a financial burden.

6. Access to Syringes

Syringes are subject to import duty of 5% for Most Favoured Nation or 7.5% for other countries and also 5% VAT. (51)

They are readily available in the private sector with 70% of private pharmacies visited having syringes for insulin delivery. In the public sector depending on the facility they were only available for inpatients or patients with health insurance.

On average the purchase price of syringes for the public sector was US\$ 0.04. Selling price in the private sector was the same price and on average people with diabetes bought syringes for US\$ 0.09. People on average used 1.2 syringes per day.

7. Diabetes Care

From a study carried out in Vietnam in 2006 only 10.5% of those with diabetes did not receive any form of treatment. Of those treated 2.9% were on diet and exercise 29.1% on diet exercise and drugs 70.9% on only drugs. (36)

The theoretical paths of people with Type 1 and Type 2 diabetes are described in the diagrams below.

Figure 11 – Theoretical path of a person with Type 1 diabetes

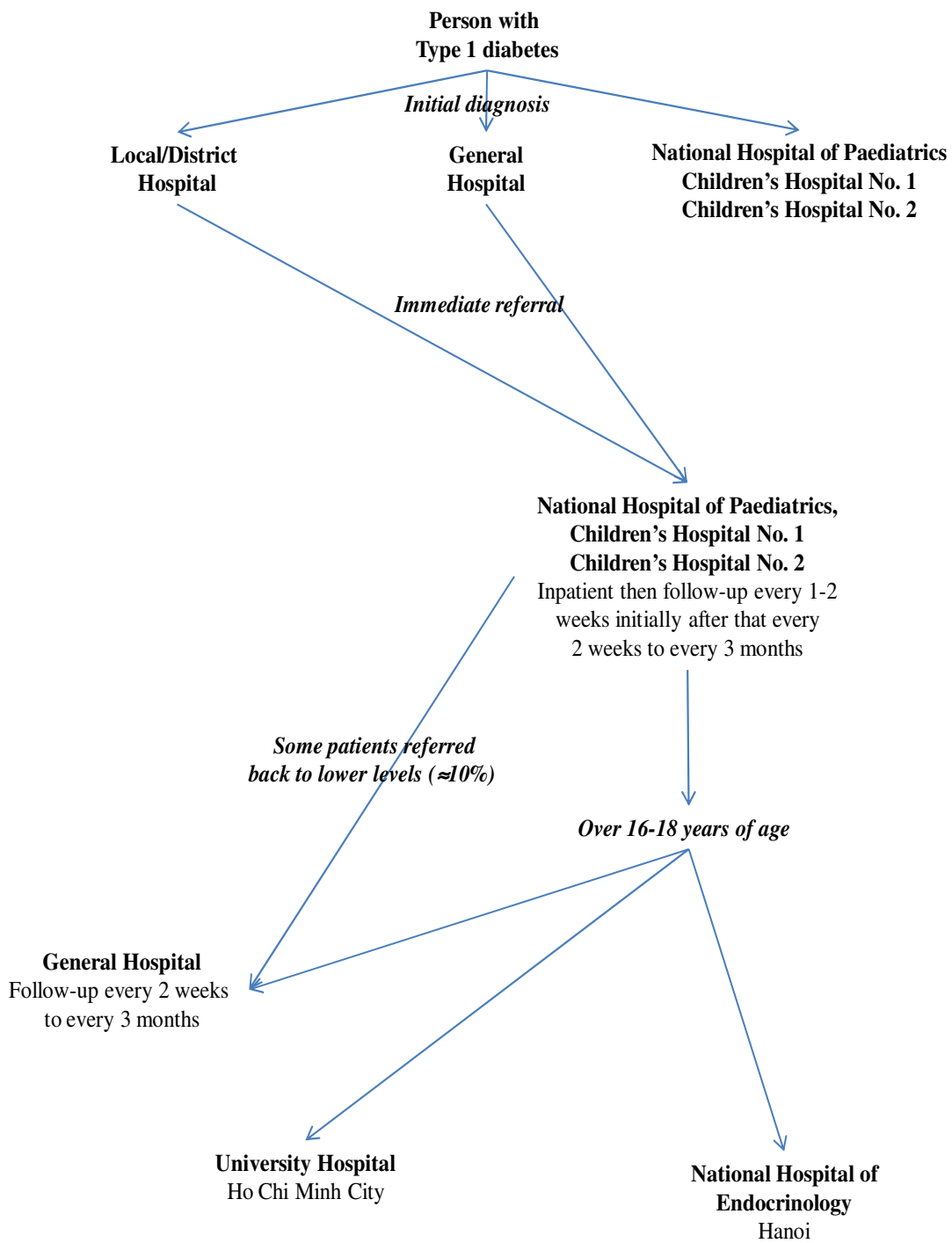
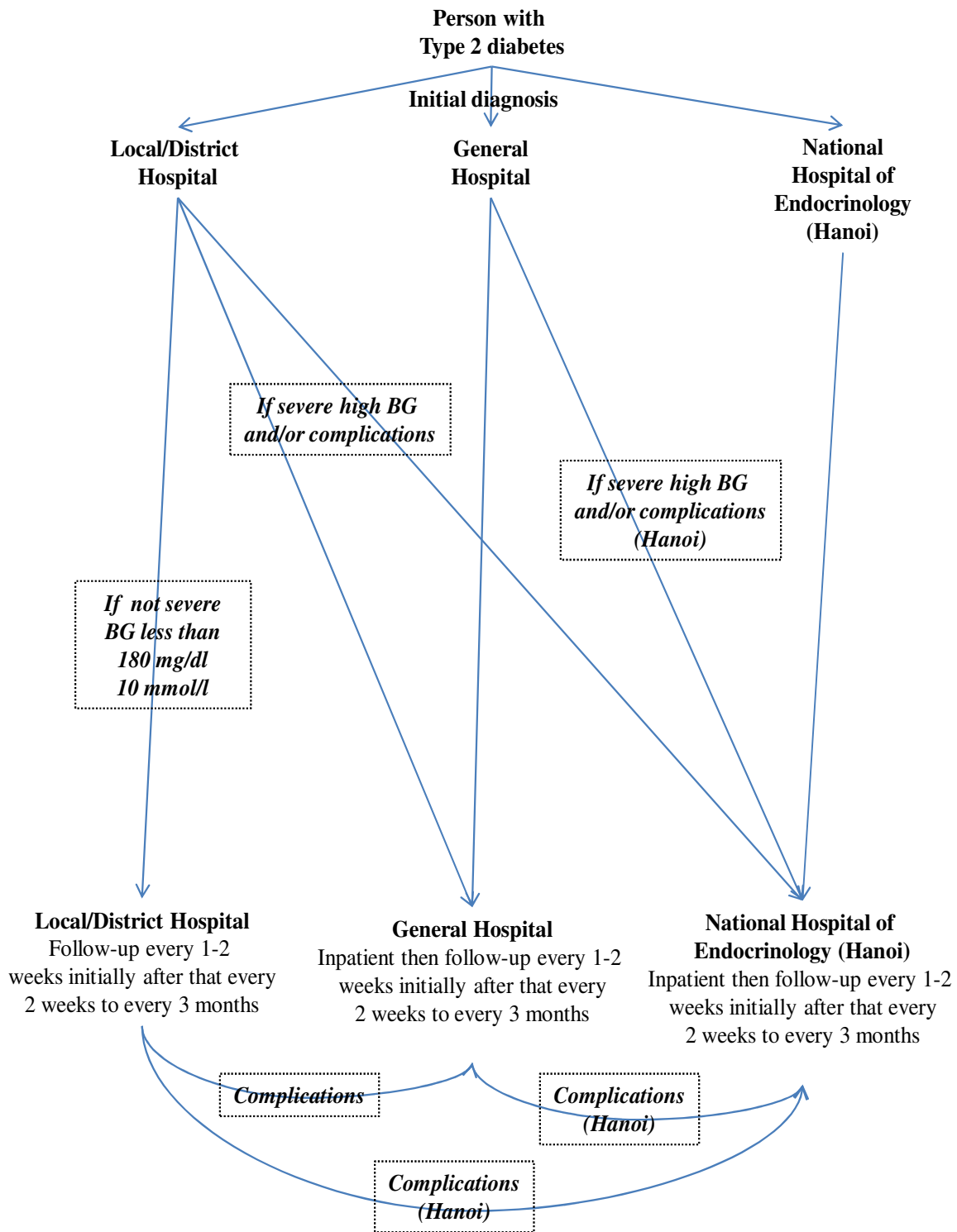


Figure 12 – Theoretical path of a person with Type 2 diabetes



In looking at the mode of presentation for people with Type 1 and Type 2 diabetes during the RAPIA 28% reported having one of the classical symptoms of diabetes (polyuria, polydipsia and weight loss). 40% had two or more of these symptoms and 24% reported that their diabetes was diagnosed during a random health check or because of another illness or operation.

From the patients interviewed 32% were being followed at the same hospital where they were initially diagnosed, 8% reported no regular follow-up and all of these were in patients with serious complications. 61% reported at least one referral. On average patients will go to a diabetes consultation 9 times per year. During discussions it is clear that the number of consultations will vary based on if the patient is new or not, how well their blood glucose levels are managed are and also the distance and cost of travel to go the consultation. Two of these can be described as dependent on the doctor's indications and the other is purely logistical and financial.

Endocrinology Departments are present in Hospitals in the main cities such as Hanoi, Ho Chi Minh City and Hai Phong. Thanh Hoa is the only province to have an Endocrinology Hospital. (52) The lowest level of the health system that should manage diabetes is the District level. Most endocrinology departments for adults reported that diabetes represented at least 40% of their patient load.

Most care is provided in Hospitals despite the existence of Health Centres. Health Centres are under-utilised as patients view them as low quality. Different "National Hospitals" (e.g. Cancer, Endocrinology, etc.) exist in Hanoi. These are supposed to be tertiary referral facilities for the whole country, but often see patients for routine care.

Management of Type 1 diabetes is problematic due to lack of knowledge. For parents with children with Type 1 diabetes they often stated that they had to see many doctors or visit many health facilities before their child was diagnosed with diabetes. For children with Type 1 diabetes, their families sought care at the Paediatric Hospitals in large urban areas (Hanoi or Ho Chi Minh City) or in some cases at Provincial Central Hospitals which means that they have long distances to travel adding to the overall burden and cost of care. The average distance travelled by patients with Type 1 diabetes in the South of Vietnam was 109km with the maximum distance being over 400km. Overall looking at all people interviewed the maximum time travelled was over 12 hours with an overall average of 2.2 hours. Also despite insurance schemes and exemptions families were found to be paying various fees for their children. Often this was due to the fact that the families had brought their child directly to the main paediatric hospital without going through the proper referral channels.

No national guidelines or guidance exist. Some hospitals have developed their own guidelines based on clinical practice or guidelines from other countries. Once the National Strategy Programme (See Section 13) is in place national guidelines and guidance for treatment and management of diabetes should be in place.

Inpatient records are kept within each department where a given patient is admitted. When the patient receives care as an outpatient they are issued an outpatient record book that they keep and bring to each consultation. There is often no link between these two patient records.

Nurses only play an ancillary role in diabetes care except for specialised units or where they have received specialised training and there they play a key role in patient education.

High numbers of patients and not enough healthcare workers mean that patients need to wait a long time and doctors do not have enough time to spend with patients.

The number of patients with Type 2 diabetes on insulin varied from 10-33% with more specialised hospitals having a higher proportion.

7.1. Hanoi

In Hanoi the National Hospital of Endocrinology provides tertiary care for diabetes for the North of the country. 50% of patients attending the hospital do so for diabetes. The hospital sees 700 outpatients per day (on the day of 21 July 2008 813 patients were seen as outpatients) and regularly has 350 inpatients. Most inpatients are admitted for high levels of blood glucose.

The outpatient department is run by 6 to 9 physicians and 2 nurses. They consult patients, prescribe tests and medicines and manage the patient's condition. Little time is left for education and there are no facilities for nutrition or dietary advice.

Even though the National Hospital of Endocrinology is the tertiary referral facility for diabetes there are no specialists, for example in podiatry or nutrition, just general doctors with interest in these different sub-specialities. Management of diabetes with other conditions and pregnancies can be done at the National Hospital of Endocrinology, but for certain conditions, such as Tuberculosis and surgery these patients will be referred to other specialised hospitals. In looking at statistics from the National Hospital of Endocrinology patients are seen from 55 of Vietnam's 64 Provinces. Most patients come once a month for consultation.

10% of people with Type 2 diabetes followed at the National Hospital of Endocrinology are actually diagnosed there. Based on discussions with doctors at the National Hospital of Endocrinology about 25% of patients cared for at the hospital could be managed at lower levels of Health System.

For children with Type 1 diabetes and now children with Type 2 diabetes (1-2 cases) in Hanoi and the North of Vietnam care is provided at the National Hospital of Paediatrics at the Department for Endocrinology, Metabolic and Genetic Disorders. This department has 20 beds, but frequently more than 30 patients. Staff includes 1 Associate Professor, 5 doctors and 10 nurses. 900-1,000 inpatients and 4,700 outpatients are seen every year. The National Hospital of Paediatrics serves a population of 23 million children and receives 28% of its referrals from Hanoi. Children with Type 1 diabetes often come once a month for consultation. 31% of children followed at the National Hospital of Paediatrics are actually diagnosed there. (45)

In Hanoi people with diabetes over the age of 18 will be cared for at the National Hospital of Endocrinology or at General Hospitals.

Some general hospitals do not have a specialised department for Endocrinology. People with diabetes were treated in the Internal Medicine Department. Care was therefore variable.

At General Hospitals in Hanoi people with Type 1 diabetes may be initially diagnosed at the Hospital and then be sent to the National Hospital of Endocrinology or National Hospital of Paediatrics. After this follow-up is sometimes done at the General Hospital. For complicated cases for both Type 1 and Type 2 diabetes the General Hospitals will refer to either of the National Hospitals.

7.2 Thai Nguyen Province and Phu Binh District

In Thai Nguyen Province there is a Central General Hospital, Provincial General Hospitals and District Hospitals. Central General Hospitals are supposed to be one level of referral below National Hospitals. However the level of care with regards to diabetes at this level was lower than General Hospitals in Hanoi which are supposed to be at the same level as Provincial General Hospitals.

At both the Provincial Hospital in Thai Nguyen and the District Hospital in Phu Binh there was no specialised diabetes consultation. In Thai Nguyen Province there is a Central Hospital where people with Type 1 and Type 2 diabetes will be referred to. After this referral should the cases be complicated they will be referred to the National Hospital of Endocrinology or National Hospital of Paediatrics for Type 1 diabetes. The main reason for lack of specialised attention for diabetes was lack of trained healthcare workers.

7.3 Ho Chi Minh City

In Ho Chi Minh City as there are no National Hospitals, some hospitals are seen as better capable of treating diabetes than others. Most General Hospitals will have an Endocrinology Department staffed by someone who has received training in diabetes. At District level care is not standardised and this will depend on the training of the doctor at the facility. At Ward level no care is provided.

At the level of District Hospitals care is variable. Some have developed very detailed guidelines detailing when a patient should have different examinations done.

For care of Type 1 diabetes the two Children's Hospitals in Ho Chi Minh City act as the two referral centres for the South of Vietnam. Both these hospital have a department that includes endocrinologists. These specialists will also work in outpatient consultations, but during these consultations they will see patients with all types of conditions. Specialised consultations for diabetes are held once a week.

30% of patients at Children's Hospital No. 1 will modify their insulin dosage using guidelines given to them by the doctor based on their blood glucose level. The criteria used by the doctor to choose these patients, is:

- Living in Ho Chi Minh City
- High understanding of diabetes
- Own a blood glucose meter

Once the children are aged above 15 years of age most will be sent to the University Hospital.

7.4. Dong Nai Province

The General Hospital provided a good level of care for diabetes with an organised consultation for diabetes. However there was a lack of specialists available. The diabetes consultation takes place everyday in the morning and afternoon. If they need to refer someone for specialised care they send them to Ho Chi Minh City (about 1 hour away). The main reasons for this are complicated foot problems (management of this has improved at the hospital), severe renal failure needing dialysis and complicated diabetes with other co-morbidities.

One main problem faced by the General Hospital is that only 5-10% of patients can be sent back to local hospital due to a of lack of training and patients not trusting local doctors to manage diabetes.

For children with Type 1 diabetes if possible they are sent to Children’s Hospital No. 1.

At local hospitals there is no real management of diabetes. This level of facility will be responsible for initial management of diabetes. Patients that cannot be controlled with the medicines available at the local hospitals will be referred to the Provincial Central Hospital. For example one hospital reported that they saw around 30 patients with diabetes per year. Of these 30 only 5 are followed regularly at the hospital with the other 25 buying health insurance at the Provincial Central Hospital and receiving their care there

Overall diabetes care is not standardised in Vietnam and problems exist with regards to patient load and referrals.

8. Diagnostic tools and infrastructure

Guidance exists from the Ministry of Health as to which types of test should be available to patients at different levels of the health system. Blood glucose meters should be available at District Level and HbA1c should be available at Central and Provincial level. Overall laboratory facilities in Vietnam are well developed and managed. No issues with supplies of reagents was reported.

96% of facilities visited had the means to measure blood glucose either with a blood glucose meter or biochemistry. 80% of facilities had the means to test urine glucose, but only 59% could measure urine ketones. In addition 47% of facilities had the means to carry out HbA1c.

HbA1c testing was not available at the two Children’s Hospitals in Ho Chi Minh City. Children will be sent to a private laboratory to have these tests done. Some of the poorest patients with Type 1 diabetes seen at Children’s Hospital No. 1 will be provided with exemption certificates to receive these tests for free.

Average reported costs for different laboratory tests from health facilities and what patients paid is detailed in Table 13.

Table 13 – Comparison of costs for laboratory tests

Average Cost VND (US\$)	Urine Glucose	Blood Glucose	HbA1c
Reported by health facilities	14,000 (0.86)	20,000 (1.22)	63,333 (3.88)
Reported by people with diabetes	*	27,500 (1.68)	100,000 (6.12)

* - no reported use of urine glucose tests by patients interviewed

Self-monitoring is still uncommon, mainly due to cost. 43% of people with diabetes interviewed stated they had a blood glucose meter. The average reported cost for a blood glucose meter from people interviewed was VND 1,421,460 (US\$ 87.03) compared to VND 1,268,257 (US\$ 77.65) reported as the average selling price from interviews in private pharmacies. Blood glucose meters in Vietnam are subject to 5% VAT (51) and on average the mark-up found in the private sector was 3%. With regards to strips 5% VAT is also applicable and on average there was an 8% mark-up on strips with average reported prices from pharmacies being VND 7,840 (US\$ 0.48) per strip. Reported average price from people with diabetes interviewed was VND 8,003 (US\$ 0.49). People with diabetes reported doing anywhere from 1 test per week to two tests per day.

Most patients will have an HbA1c every 3 months. However, if patients need to pay for this test and cannot afford it they may not have it as frequently.

In looking at tools for foot care only 35% of facilities had the tools to investigate foot complications. Very few facilities had ophthalmoscopes to test for visual complications.

The main issue many doctors mentioned for both in and outpatients was the facilities available (size of consultation room, number of beds, etc.) versus the numbers of patients seen.

9. Healthcare workers and training

Endocrinology and diabetology are relatively new specialities in Vietnam and therefore there are few doctors considered specialists in this field. 170 healthcare workers (mainly doctors) have graduate and post-graduate education with endocrinology as a speciality, of these only 43 have basic/foundation training in diabetes. (52) In their medical studies students will spend 2 weeks in getting very basic training in diabetes and endocrinology. Overall many healthcare workers stated they did not feel comfortable treating Type 1 diabetes or using insulin in patients with Type 2 diabetes.

At both the National Hospital of Endocrinology and National Hospital of Paediatrics all staff have received specialised training in different aspects of diabetes care. At these facilities nurses play a more active role in care and patient education because of this training.

At many of the hospitals in Ho Chi Minh City within the Endocrinology Departments there are doctors who are extremely well trained in the clinical management of diabetes. At both Paediatric Hospitals in Ho Chi Minh City some doctors have received specialised training in Endocrinology. Again at these hospitals some nurses have received training with regards to diabetes and play an active role in diabetes care, but this is not generalised.

Most healthcare workers at National and specialised Hospitals have a high level of knowledge of diabetes. However, the problem is that they are unable to take this complex knowledge and describe it in ways that people with diabetes can understand. At Provincial and General Hospitals some doctors will have had some training in diabetes either from abroad or from specialists from Hanoi or Ho Chi Minh City. There is the aim of devolving diabetes care to the District level. Currently the main barrier to this is lack of trained healthcare workers in diabetes at this level.

Also some training provided abroad or provided locally by foreign organisations is not adapted to the Vietnamese reality. In addition to the education practical aspects need to be addressed as to how to implement this new knowledge in Vietnam.

Courses to train doctors and nurses are organised by the Diabetes Association. In addition in different facilities courses have been organised, for example using case presentations and journal clubs as a way to increase knowledge of diabetes.

10. Community involvement

In Vietnam different organisations exist at different levels of the Health System that provide some form of Community support with regards to diabetes.

The Vietnam Diabetes Association is only for doctors and provides a chance for doctors to meet and discuss different issues surrounding diabetes. This organisation is a member of the IDF and has a branch in the North and South of Vietnam. The main activities of the association are:

- Training and information of healthcare workers and patients
- Studies with regards to diabetes

Both the associations have strong links to health authorities and the branch in Ho Chi Minh City has established links with other organisations.

There is also a Diabetes Educators Association open to everyone (doctors, nurses, etc.) and anyone can join who has an interest in diabetes. The aim is to extend this association to all provinces.

Diabetes Clubs exist at different facilities and in different provinces. Their aim is to provide support and education to people with diabetes. These are very dependent on healthcare workers at these facilities to manage their activities and there is no national organisation for patients.

For example two diabetes clubs were established in 2005 in Thai Binh and Thanh Hoa Provinces. On average 300 people attend the monthly or three-monthly club meetings. These meetings provide the opportunity for education sessions. (53)

One club visited at a District Hospital provided support to elderly patients for example those who were unable to inject insulin themselves.

At both the National Hospital of Paediatrics and Children's Hospital No. 1 in Ho Chi Minh City diabetes clubs have been established for children with Type 1 diabetes and their families. In July 2008 these meetings were attended by 80-100 families in Hanoi and 40 families in Ho Chi Minh City. At the meeting of this club in Ho Chi Minh City parents stated that they lacked support to help them manage their child's diabetes. (54) These meetings include education sessions and a chance for parents to share their experiences. In a less formal setting it is clear that people with diabetes and their families are keen to discuss a variety of issues that are of concern to them. However, these clubs only hold annual meetings.

The Diabetes Network Vietnam is a website created to develop a "virtual community" to connect people with diabetes in Vietnam. It provides information, different fora and news about diabetes. It was started about 2 years ago and is run by a group of volunteers. To date there are 35 active members in the discussion groups and over 7,000 page visits. It has been seen that most people visiting the site are not actual diabetes patients, but their children. 3 doctors volunteer to add information to the site. The Diabetes Network Vietnam has links with other organisations active in diabetes, such as the Vietnam Diabetes Association, Diabetes Educators Association and National Hospital of Endocrinology. Other websites exist that provide information for people with diabetes as well as books published in Vietnamese.

In parallel to these diabetes specific organisations, other civil society organisations exist that help support different communities or people in Vietnam with different forms of disability. At a National level there is the National Fund for Vietnamese Children, which funds health, education and social projects that help children. At a local level one example is the "The Sponsoring Association for Poor Patients". This association established in 1993 in Ho Chi Minh City has various activities aimed at poor patients. These include: (55)

- Smile for the young – providing surgery for children with harelips

- Eye surgery for poor patients
- Providing wheelchairs
- Providing hearing aids
- Free meals for inpatients
- Helping people get health insurance

11. Patient education

An article by Binh and Toan (53) stated that nearly 80% of people in Vietnam with diabetes did not follow a specific diet or carry out any form of exercise. This led to 60% having poor control over their blood glucose levels. They identify the reason for this as being a lack of appropriate education for people with diabetes. In order to address this, a community based education programme was established.

Education will be variable depending on the facility mainly due to the dedication and importance placed on patient education by staff. These education sessions will include presentations about complications, how to use medicines, diet, etc. If there is a nutrition department dietary education is organised in collaboration with this department.

In addition to oral information, written information was also available in Vietnam. This came in the form of pamphlets some having been developed by hospitals and others by pharmaceutical companies. Books about diabetes were available in many bookstores and pharmacies and many hospitals have websites with information about diabetes. Many people interviewed questioned the quality of the information, if it was easily comprehensible by patients and its relevance to the socio-cultural situation in Vietnam.

For Type 1 diabetes, parents often said they sought information from relatives and friends rather than doctors (54) and stated that they had a lack of information. Different materials have been collated from different sources, but it was questionable whether these are used, used properly and are culturally appropriate. In addition the National Hospital of Paediatrics had some visual aids, such as:

- Doll to show injection sites
- Board with body to show injection sites
- Pathophysiology using diagram
- DVD from Australia (this was also present at Children's Hospital No. 1 in Ho Chi Minh City)

Children's Hospital No. 1 has included counselling with the Department of Psychology for families with Type 1 diabetes.

Most of the education for both Type 1 and Type 2 diabetes seems to be focused on diet. For Type 1 diabetes injection techniques are also part of the training that patients get either when they are inpatients or put on insulin for the first time. From discussions with healthcare workers and patients what is apparent is a lack of knowledge as to what diabetes actually is.

The main factor leading to lack of patient education was mentioned as lack of time, with doctors needing to see many patients. Also the Health Insurance scheme does not cover patient education and counselling.

12. Adherence issues

The main reason found for complications in Hoan's study (38) was incorrect insulin dosage in 69% of the people followed in the study. The reasons for this were missing insulin injections and financial reasons.

As discussed in Section 3.4 one of the main factors for non-adherence can be cost of treatment. Another that was seen was lack of knowledge about diabetes and the need for continuous medical attention. Two extreme examples of this were two young men who had had Type 1 diabetes for more than 10 years, but had not seen a doctor in over 6 years. The reasons for this were lack of information at time of diagnosis and also the financial burden of care. Both were now hospitalised with serious complications.

13. Policy Framework

Prime Minister Decision No77/2002/QĐ-TTg (17 June 2002) approved a programme to control NCDs for the period of 2002-2010. Based on this decision a preliminary National Plan for Diabetes (52) was prepared for the years 2006-2010. The Plan highlighted the increasing burden of diabetes in Vietnam and the challenges that Vietnam will face because of this. The proposed areas of action were to:

- Strengthen diabetes prevention
- Develop education and advocacy
- Promote early detection and diagnosis
- Build up a monitoring and controlling system
- Take care and rehabilitate patients
- Improve and expand international cooperation

For diabetes this decision sets as its target to reduce the rate of people with diabetes and rates of complications and ensure that 100% of people who have diabetes have been diagnosed and can self-manage their condition.

This decision aims to add a component for NCDs to the Decision No. 35/2001/QĐ-TTg (2001) "Approving the strategy for protection and care of the people's health 2001-2010".

The general objective of the Strategy for people's Health Care and Protection being to ensure that the Vietnamese population has access primary health care services and live in safe communities, with the opportunity to develop physically and spiritually. Specific objectives of this plan can be found in Appendix 11. With regards to NCDs there is a specific mention "to prevent, control and manage NCDs such as cardiovascular diseases, cancer, accidents and injuries, diabetes, occupational diseases, mental diseases, poisoning, suicide and diseases caused by unhealthy lifestyles (drug addiction, alcoholism, obesity etc.)".

This Decision aims to do this through:

- Funding mechanisms for health
- Training
- Reorganisation of the health system
- Enhance preventative services
- Develop infrastructure available
- Increase social participation in health

Different government strategies have in some way addressed diabetes or obesity, such as the Strategy for people's Health Care and Protection 2001-2010 and National Nutrition Strategy 2001-2010.

In addition to the Strategy for protection and care of the people's health 2001-2010 Vietnam also has a National Strategy on Nutrition (Decision: No. 21/2001/QD-TTg). This strategy mainly focuses on under nutrition, but includes measures to prevent and combat nutrition related chronic diseases and aims to integrate nutrition activities into the primary health care.

In Vietnam certain National Target programmes exist. These receive special funding and attention from the Central Government. For the time being these are:

- Cancer
- Mental Health
- HIV/AIDS
- Vaccinations
- Malaria

The National target programme for diabetes and hypertension is currently being developed and will address issues around:

- Surveillance – risk factors and diseases
- Health Promotion
- Management and treatment

16. Traditional Medicine

In Vietnam there are two types of Traditional Medicine. One is based on University Education leading to a recognised medical degree and the other is more based on traditional values with little or no formal training. With the formal Traditional Medicine there are close links to “modern” medicine and often patients will be managed with both traditional and modern medicines.

In traditional medicine diabetes is referred to as “Chung Tieu Khat” which translated literally means the syndrome when patients lose weight and feel thirsty.

Based on discussions with patients and healthcare workers the use of Traditional Medicine outside of major conurbations seemed more common. Formal traditional medicine is fully integrated into the Health System.

17. Other Issues

Binh et al. (53) found a high lack of knowledge of general population with 78.8% knowing nothing about the risk factors causing diabetes and 76.5% knowing nothing about prevention methods of diabetes. That said television, radio and newspapers provide information about diabetes and its risk factors.

Even though 80.8% (5) of the Vietnamese population state they have no religion Buddhist beliefs still impact the way they lead their lives. There is a Buddhist saying that “sickness is taken in by the mouth”. This seems appropriate for addressing the issue of Type 2 diabetes and its link to diet and lifestyle. Buddhism also calls for moderation and a control over mind and body. One other aspect is that diseases in children can often be viewed as punishments on parents. This was found to be the case in discussions with parents who had children with Type 1

diabetes as many of them felt guilty about their child's condition. These socio-cultural and traditional values need to be incorporated and dealt with when addressing diabetes.

18. Existing initiatives and collaborations

Many existing initiatives and collaborations can be built on in order to improve the management of diabetes in Vietnam.

The WHO supports the Ministry of Health with regards to diabetes and NCDs in policy development, surveillance and development of disease specific capacity building through training courses, organisation of workshops and development of diabetes curriculum for healthcare workers at each level of the health system and the development of health education material.

The aim is to have an integrated model for the management of diabetes in the community using the experience for the National Hospital of Endocrinology. A pilot of this model is being funded by the World Diabetes Foundation (WDF). The aim of this project is to improve the quality of diabetes care in Vietnam through a community approach to prevention, control and management of diabetes in two pilot provinces, Thai Binh and Thanh Hoa. The main activities of this project are:

- Training of medical staff
- Educating people with diabetes
- Enhancing community awareness of diabetes, its prevention and complications
- Setting up a diabetes association nationally and locally
- Detecting new cases
- Establishing a system for managing diabetes systematically and effectively

Since 1995 the Royal Children's Hospital International (RCHI) has had links with the National Hospital Paediatrics in Hanoi. At the National Hospital of Paediatrics, RCHI, has helped develop the health services plan and staff training plan. This training plan includes:

- Training of multi-disciplinary teams
- Training for nurses
- Child protection
- Community links
- Parent and patient advocacy
- Counseling skills

Also active at the National Hospital of Paediatrics and at Children's Hospital No. 1 is CLAN. CLAN has been working in Vietnam since 2004 by improving the situation for families in Vietnam who are living with Congenital Adrenal Hyperplasia (CAH) by providing education, community support and free access to hydrocortisone and fludrocortisone tablets for all patients and the establishment of a CAH Support Group in Ho Chi Minh City and support for a similar club in Hanoi. In the past year CLAN has extended its work to include children with Type 1 diabetes and has an agreement with Insulin for Life to provide insulin in Hanoi and Ho Chi Minh City. In 2008 CLAN employed a Diabetes Specialist Nurse to train nurses in diabetes care and education at the National Hospital of Paediatrics.

In collaboration with the American Diabetes Association, European Association for the Study of Diabetes and IDF Vietnam also has organised training courses in different aspects of diabetes.

Vietnam has also received a grant from the IDF “Bridges” (Bringing Research in Diabetes to Global Environments and Systems). The aims of the project are to evaluate the measures that motivate people at risk of diabetes to go for screening tests. The project also aims to evaluate lifestyle intervention in people at high risk in the community of a medium size city in Vietnam.

20. Discussion

In the past the RAPIA has served as a catalyst for change and raised the profile of diabetes with government authorities, clinicians and people with diabetes. Through previous work of the IIF (56; 57) 11 key elements are needed to create an environment that is able to address diabetes.

These are:

1. Organisation of the Health System
2. Data Collection
3. Prevention
4. Diagnostic tools and infrastructure
5. Drug procurement and supply
6. Accessibility and affordability of medicines and care
7. Healthcare workers
8. Adherence issues
9. Patient education and empowerment
10. Community involvement and diabetes associations
11. Positive policy environment

The recommendations from the results presented above are presented within this framework. It is important to keep in mind that each of these recommendations cannot be implemented in isolation. For example, an increase in awareness of diabetes through a prevention campaign will inevitably lead to an increase in numbers of people diagnosed, which will have ramifications on the number of people attending consultations and needing medication. These recommendations are specific to diabetes, however for feasibility and rational use of the resources in Vietnam, these can and should be applied to all NCDs. In addition they can build on existing collaborations and develop new areas of cooperation.

21. Recommendations

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
1. Organisation of the Health System	Care is often focused on hospital care	<ul style="list-style-type: none"> • Devolve care to lower levels of the health system and to the provinces through training and providing necessary resources to facilities • Develop chronic consultations for outpatients throughout the health system • Have hospitals be the “sponsor” of different health centres in providing staff and resources for diabetes consultations in order to increase use of health centres by increasing the public’s trust in these facilities • Have a clear path developed for referrals and counter-referrals 	<ul style="list-style-type: none"> • Improved care • Less waiting time 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	Number of patients present at specialised hospitals that could be managed at lower levels			
	Problems with referrals			
	Problems with counter-referrals			
	No guidelines or guidance on: <ul style="list-style-type: none"> - Diabetes care - What tests should be carried out and how often - Referrals and counter-referrals (Link with Point 11) 			
	Long waiting times			
	No real specialised outpatient consultation for children	<ul style="list-style-type: none"> • Create a chronic outpatient consultation at the different paediatric hospitals to include diabetes and other chronic conditions with specialised staff and tools • Inclusion of education, psychological support and other special care in one place 	<ul style="list-style-type: none"> • Improved care • Less waiting time 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
	Availability of adequate care for Type 1 diabetes close to residence in provinces	<ul style="list-style-type: none"> • Improve training of healthcare workers, especially in large hospitals in the province, in the area of managing of Type 1 diabetes in both paediatric and department responsible for diabetes care 	<ul style="list-style-type: none"> • Improved care • Decrease in travel costs 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
2. Data Collection	No link between inpatient and outpatient records	<ul style="list-style-type: none"> • Develop a unique patient record system or include inpatient details in outpatient booklet 	<ul style="list-style-type: none"> • Healthcare worker caring for patient will have general overview of patient's condition 	<ul style="list-style-type: none"> • Improved care for patient as healthcare worker will have full history
	Data is not used in decision making and planning	<ul style="list-style-type: none"> • Data collected should be used in assisting with decisions making and planning (e.g. for needs, medicines, facilities, healthcare workers, etc.) 	<ul style="list-style-type: none"> • Improved care 	<ul style="list-style-type: none"> • Better use of resources
3. Prevention	No programmes for primary prevention	<ul style="list-style-type: none"> • Develop socially and culturally adapted information campaigns to address the risk factors of diabetes (Link with Point 11) 	<ul style="list-style-type: none"> • Preventing or delaying the onset of diabetes 	<ul style="list-style-type: none"> • Less people with diabetes

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
	No real focus on prevention	<ul style="list-style-type: none"> • Two key concepts in Buddhism are the idea of awareness (Chiem Tinh) and acceptance (Chap Nhan). Although the context and normal use of these terms is different these concepts could be applied to prevention of diabetes and its complications. Awareness with regards to the risk factors of diabetes (Primary Prevention) and its complications (Secondary Prevention). Acceptance is also a key issue in Secondary Prevention with people needing to accept that they have diabetes and changes that they need to make in their lifestyles 	<ul style="list-style-type: none"> • Preventing or delaying the onset of diabetes • Preventing or delaying the onset of diabetes related complications 	<ul style="list-style-type: none"> • Less people with diabetes • Less people with complications • Decreased burden on health system and healthcare workers • Decreased costs
	High numbers of complications especially foot problems and also high levels of complications in children	<ul style="list-style-type: none"> • Improve healthcare worker training • Increase inclusion of screening programmes by developing a list of tests and exams that should be provided at regular intervals • Improve availability of tools for foot screening , development of a tool kit for each level of the health system (Link with Point 4) • Increase patient adherence (Link with Point 8) • Improve patient care (Link with Point 1) 	<ul style="list-style-type: none"> • Preventing or delaying the onset of diabetes related complications • Improved outcomes if complication is detected early 	<ul style="list-style-type: none"> • Less people with complications • Decreased burden on health system and healthcare workers • Decreased costs

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
	Adherence is low due to cost of treatment	<ul style="list-style-type: none"> • Improve healthcare worker training in dealing with adherence issues (Link with Point 7 and 8) • Address the issue of cost of treatment especially insulin for children (Link with Point 6) 	<ul style="list-style-type: none"> • Decreased costs • Better adherence 	<ul style="list-style-type: none"> • Possible increase in cost for covering medicines, but this increase could be offset through less complications
4. Diagnostic tools and infrastructure	Low availability of tools for the diagnosis of foot complications	<ul style="list-style-type: none"> • Improve availability of tools for foot screening , development of a tool kit for each level of the health system 	<ul style="list-style-type: none"> • Preventing or delaying the onset of diabetes related complications • Improved outcomes if complication is detected early 	<ul style="list-style-type: none"> • Less people with complications • Decreased burden on health system and healthcare workers • Decreased costs
5. Drug procurement and supply	Guidance prices from Ministry of Health are quite high	<ul style="list-style-type: none"> • Review prices of medicines • Investigate ways of improving tenders in order to lower process (e.g. group tenders or centralised purchasing) • Remove import duties and VAT on medicines 	<ul style="list-style-type: none"> • Lower prices for patients • Improved adherence 	<ul style="list-style-type: none"> • Lower prices for health insurance • Better outcomes
	Each facility responsible for their own purchasing of medicines			
	Both 40 IU and 100 IU insulin present in Vietnam	<ul style="list-style-type: none"> • Standardise all insulin to 100 IU 	<ul style="list-style-type: none"> • Standardised treatment 	<ul style="list-style-type: none"> • Standardisation for the purposes of treatment and tendering
6. Accessibility and affordability of medicines and care	Health Insurance reimbursement schemes are not always clear	<ul style="list-style-type: none"> • Develop a guide/patient bill of rights highlighting what patients are entitled to • Information campaigns about health insurance and other laws that exist 	<ul style="list-style-type: none"> • Better understanding of health system 	<ul style="list-style-type: none"> • More people with health insurance
	Exemption schemes are not always clear			

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
	For uninsured diabetes medicines are very expensive and sometimes only available in the private sector (Link with Point 5)	<ul style="list-style-type: none"> • Assess possibility of hospitals providing all medicines for all patients • Remove import duties and VAT on medicines • Investigate mark-ups in the private sector • Ensure sustainable and regular supplies of insulin for Paediatric Hospitals 	<ul style="list-style-type: none"> • Cheaper medicines • Better adherence 	<ul style="list-style-type: none"> • Better adherence • Better patient outcomes
	Availability of all medicines at lower levels of the health system	<ul style="list-style-type: none"> • Develop a mechanism to ensure that patients are able to access all the medicines they are prescribed 	<ul style="list-style-type: none"> • Better adherence • No need for patients to purchase medicines 	<ul style="list-style-type: none"> • Better adherence • Better patient outcomes
	High cost of medicines due to: <ul style="list-style-type: none"> - Import Duty and VAT - Mark-ups along the supply chain - High proportion of branded medicines 	<ul style="list-style-type: none"> • Remove import duties and VAT on medicines • Investigate mark-ups in the private sector • Regulate mark-ups in the private sector • Regulate use of generic and branded versions • Information campaigns on generic medicines being safe and effective for healthcare workers and patients 	<ul style="list-style-type: none"> • Lower prices of medicines • Better adherence 	<ul style="list-style-type: none"> • Lower prices of medicines for health insurance • Better patient outcomes

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
7. Healthcare workers	Limited role of nurses	<ul style="list-style-type: none"> • Improve nurse training to include more on the management of diabetes • Develop specialised training for nurses especially in specialised hospitals and departments in diabetes especially education 	<ul style="list-style-type: none"> • Improved care and outcomes 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Better outcomes for patients
	Lack of trained healthcare workers in the provinces	<ul style="list-style-type: none"> • Continue and expand the training programmes already established 	<ul style="list-style-type: none"> • Improved care and outcomes 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	Involve other healthcare workers in diabetes care	<ul style="list-style-type: none"> • Develop a diabetes team including nutritionists, psychologists, etc. and include them in the diabetes consultations 	<ul style="list-style-type: none"> • Improved care and outcomes 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
8. Adherence issues	<ul style="list-style-type: none"> • Lack of knowledge about diabetes 	See Point 9	<ul style="list-style-type: none"> • Improved outcomes 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	<ul style="list-style-type: none"> • Cost of medicines 	See Points 5 and 6		
	<ul style="list-style-type: none"> • Cost of treatment including transportation 	See Points 1 and 6		

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
9. Patient education and empowerment	Lack of knowledge of patients with diabetes about their condition	<ul style="list-style-type: none"> • Improve post diagnosis education • Develop training for healthcare workers in patient education • Increase role of nurses (Link with Point 7) • Development of more socio-culturally adapted materials for patient education and information 	• Improved outcomes	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	Lack of adequate patient education and materials		• Improved outcomes	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	Patient clubs need to be more active in providing education	<ul style="list-style-type: none"> • Link with Point 10 • Develop “expert” patients and involve them in education • Have regular education sessions 	• Improved outcomes	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	Patient education is irregular	<ul style="list-style-type: none"> • Regular patient education involving nurses (Link with Point 7) • Develop education material and curriculum for in and out patients that can be delivered by nurses 	• Improved outcomes	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients

	Finding	Recommendation	Expected impact on person with diabetes	Expected impact on health system
10. Community involvement and diabetes associations	No patient representation in existing diabetes organisations and decision making process	<ul style="list-style-type: none"> • Use members of diabetes clubs in facilities and have a patient representative involved in discussions with healthcare workers and administration 	<ul style="list-style-type: none"> • “Voice” for patients needs • Link patients with health facilities and authorities 	<ul style="list-style-type: none"> • Patient perspective on issues • Link between health authorities and patient population
11. Positive policy environment	Health Insurance not adapted to the changing disease burden	<ul style="list-style-type: none"> • Adapt health insurance to the increasing burden of diabetes and other NCDs 	<ul style="list-style-type: none"> • Adequate financial coverage 	<ul style="list-style-type: none"> • Better use of resources • Better outcomes for patients
	Lack of guidelines and guidance for the management of diabetes at individual facilities and in the system as a whole	<ul style="list-style-type: none"> • Develop management guidelines for individual patients • Develop referral and counter-referral algorithms 	<ul style="list-style-type: none"> • Improved outcomes 	<ul style="list-style-type: none"> • Better use of resources • Less burden on health facilities and staff • Decrease in costs for health insurance • Better outcomes for patients
	Lack of overall strategy for NCDs and diabetes	<ul style="list-style-type: none"> • Address all 3 levels of prevention • Address financial issues for both the individual and the health system • Address changes in society at large that are impacting the increasing burden of diabetes 	<ul style="list-style-type: none"> • Preventing or delaying the onset of diabetes related complications • Improved outcomes 	<ul style="list-style-type: none"> • Better use of resources • Adapted response to NCDs and diabetes

22. Presentation of RAPIA Results

This section highlights the meetings held during the visit by David Beran (Project Coordinator International Insulin Foundation), Marg McGill (Senior Vice President IDF) and Valla Tantayotai (Dean, School of Nursing, Walailak University, Secretary, Thai Association of Diabetes Educators and Co-ordinator, Diabetes Care Knowledge Management Network). At each meeting David Beran presented the results of the Rapid Assessment Protocol and Marg McGill and Valla Tantayotai presented their experience.

Presentation at National Hospital of Endocrinology, Hanoi 14/4/09

Participants: a total 30 participants from the Ministry of Health (Therapy Department, Health Insurance), Hanoi Social Insurance, Vietnam Social Insurance and different departments from the National Hospital of Endocrinology

Main discussion points:

- National target programme for diabetes and hypertension was approved in December 2008
 - o The RAPIA and the report will most likely contribute to the ongoing development of this programme
- The role of health insurance and diabetes
- The cost of diabetes
- Supply and use of medicines for diabetes
- Need for health insurance to improve diabetes care
- Call from Professor Binh to access free insulin for children based on his attendance of the IDF October meeting in London

Presentation at National Hospital of Paediatrics 15/4/09

Participants: Dr. Hoan (Head of Endocrinology Department), Dr. Thao (Vice Head of Endocrinology Department), one other doctor from Endocrinology Department and Dr. Dung, Vice Director of National Hospital of Paediatrics

Main discussion points:

- Insulin – need for local solutions to be found due to problems with donations from abroad
 - o Government to provide insulin for children
- The need for more regular and active club meetings
- Need to improve education of patients and training of healthcare workers for this
- Need to develop chronic outpatient consultations for children

Visit to Nephrology, Endocrinology and Haematology Department, Children's Hospital No. 1, Ho Chi Minh City 16/4/09

Participants: Dr. Loan, Head of Department and Nurse Van, responsible for diabetes and CAH patients

Main discussion points:

- Problems with supply of insulin
 - o Donations are not regular
 - o Need for local solution
- Need to improve patient education
- Increase number of diabetes Club meetings
- Nurse Van will be going to Australia for training

- Need for her to come back with practical solutions
- Adapt knowledge to Vietnamese context
- Need to develop chronic outpatient consultations for children
 - Organisation of consultation and inclusion of more support and education
- Increase role of nurses in patient support and education

Presentation Ho Chi Minh City at Nguyen Tri Phuong Hospital, Ho Chi Minh City, 16/4/09

Participants: 30 doctors involved in diabetes management from different hospitals in Ho Chi Minh City and the South of Vietnam

Presentation Children's Hospital No. 1, Ho Chi Minh City, 17/4/09

Participants: Dr. Hung, Vice Director, Dr. Tuan, Director External and International Relations, Dr. Loan, Head of Department, Nephrology, Endocrinology and Haematology

Main discussion points:

- Problems with supply of insulin
- Need to improve patient education
 - Development of patient education materials adapted to Vietnamese context
- Increase number of diabetes Club meetings
- Need to develop chronic outpatient consultations for children
 - Organisation of consultation and inclusion of more support and education

Presentation Children's Hospital No. 2, Ho Chi Minh City, 17/4/09

Participants: Dr. Thuy, Head of Department, Nephrology, Endocrinology and Haematology, Dr. Dong, Doctor responsible for Endocrinology patients, 6 other doctors from the department and senior Nurse

Main discussion points:

- Problems with supply of insulin
- Need to improve patient education
 - Development of patient education materials adapted to Vietnamese context
- Increase number of diabetes Club meetings
- Need to develop chronic outpatient consultations for children
 - Organisation of consultation and inclusion of more support and education
- Need to improve nurse training and involve them more in patient support and education

Based on these meetings it was decided to develop specific action plans based on the findings and recommendations from the report. These will be for the National level, Hanoi and Ho Chi Minh City, facility level with specific recommendations made for the Paediatric facilities. These are detailed in the section below.

23. Action Plans for Vietnam

These plans present some recommendations that if implemented at different levels of the Vietnamese Health system could benefit the Health System and people with diabetes in Vietnam. These are based on the Report on the Rapid Assessment Protocol for Insulin Access which was presented in Vietnam from the 14-17 April 2009 and discussions with key partners and stakeholders.

National level action plan:

These recommendations should be taken into account when developing and implementing the recently approved Diabetes Strategic Target Programme.

One main recommendation is for the Ministry of Health to collaborate closely with the Health Insurance Scheme to adapt health insurance to the increasing burden of diabetes and other Non Communicable Diseases. This should lead to a collaborative approach in finding innovative ways of increasing prevention in order to avoid the future costs linked to an increasing burden of diabetes and its complications. The Health Insurance Scheme should move from being only involved in reimbursement to promoting prevention, therefore decreasing its present and future costs.

For diabetes and other Non Communicable Diseases any National Plan or Programme needs to include all 3 levels of prevention taking into account the changes in society at large that are impacting the increasing burden of diabetes. It also needs to address financial issues for both the individual and the health system.

In order to improve prevention socially and culturally adapted information campaigns to address the risk factors of diabetes need to be implemented (Primary Prevention) and the issue of adherence needs to be properly addressed (Secondary Prevention). To tackle the problem of adherence two key factors need to be dealt with:

- Patient education
- Cost of treatment

In looking at patient education, the following recommendations could help Vietnam address this:

- Increase role of nurses and improve nurse training to include more on the management of diabetes
- Develop specialised training for nurses especially in specialised hospitals and departments in diabetes especially in patient education
- Develop training for healthcare workers in patient education

With regards to the cost of treatment, different measures at different levels of the path of medicines could help lower the cost of medicines. These recommendations are presented below:

- Review prices of medicines
- Investigate ways of improving tenders in order to lower process (e.g. group tenders or centralised purchasing)
- Remove import duties and VAT on medicines
- Standardise all insulin to 100 IU
- Assess possibility of hospitals providing all medicines for all patients
- Investigate mark-ups in the private sector
- Ensure sustainable and regular supplies of insulin for Paediatric Hospitals for free or subsidised (development of an insurance scheme for children with chronic conditions)
- Develop a mechanism to ensure that patients are able to access all the medicines they are prescribed
- Regulate use of generic and branded versions
- Information campaigns on generic medicines being safe and effective for healthcare workers and patients

It is important to note that these measures benefit not only the person with diabetes, but also the Health System and Insurance Scheme by lowering the overall cost of treatment.

In looking at the current organisation of the Health System and its management of diabetes, this is focused on large hospitals in Vietnam's main urban areas. This increases the burden on the system (overburdened staff and facilities, etc.) and on the patient (travel costs, lost wages, etc.). Adherence is also impacted as healthcare professionals do not have enough time to carry out full patient examinations and education and people with diabetes face additional travel costs adding to the overall financial burden.

Based on the assessment in Vietnam the following recommendations could help address these problems:

- Devolve care to lower levels of the health system and to the provinces through training and providing necessary resources to facilities
- Develop chronic consultations for outpatients throughout the health system
- Have hospitals be the "sponsor" of different health centres in providing staff and resources for diabetes consultations in order to increase use of health centres by increasing the public's trust in these facilities
- Have a clear path developed for referrals and counter-referrals
- Improve training of healthcare workers, especially in large hospitals in the province, in the area of managing of Type 1 diabetes in both paediatric and department responsible for diabetes care

The final aspect is to ensure proper data collection and that this data collected should be used in assisting with decisions making and planning (e.g. for needs, medicines, facilities, healthcare workers, etc.)

Local action plan:

At a local level three main factors should be addressed in order to address the problem of patient adherence. These are healthcare worker training, patient education and the organisation of care.

In looking at healthcare worker training at specialised facilities doctors are extremely well trained and some nurses play a role in diabetes care. Existing training programmes should be expanded both in scale and scope and include training for nurses and also training in patient education. The role of nurses needs to be increased and all healthcare workers involved in diabetes care should receive training in patient education. In the first instance, before specialised courses can be developed for nurses, specialised training for nurses in hospitals can take place simply by involving nurses more in patient care and "shadowing" doctors.

In parallel to strengthening education in specialised centres in Vietnam's large urban areas, training of healthcare workers, especially in large hospitals in the provincial and district hospitals including the management of Type 1 diabetes, should be developed. This is a necessary step in ensuring that diabetes care can be devolved to lower levels of the health system.

These trained healthcare workers will then need to address the issue of patient education by improving post diagnosis education. This needs to be done by developing socio-culturally adapted materials for patient education and information. As well as these materials a

curriculum for in and out patients that can be delivered by nurses should be developed in order to ensure that a standard level of education is delivered to each patient.

This training needs to be included in a larger reorganisation of the health system to improve the management of diabetes from a clinical perspective in order to positively impact patient adherence and therefore decrease complications.

Reorganising the system needs to happen at a facility level, but also with regards to the relationship that different levels of the health system have with each other.

At each facility chronic consultations for outpatients should be developed. In some facilities these could be diseases specific, e.g. diabetes, but at others these may need to regroup several chronic conditions, e.g. diabetes, hypertension, etc.

Within this consultation education should play an important role and a team approach should be implemented. A diabetes team including nurses, nutritionists, psychologists, etc. should be created and they should actively be involved in diabetes care. In addition management guidelines for individual patients should be developed including screening programmes to be included by developing a list of tests and exams that should be provided at regular intervals. This should be linked to a unique patient record system which includes inpatient and outpatient details.

Care should be devolved to lower levels of the health system and to the provinces through training and providing necessary resources to facilities. This could also be done by having hospitals be the “sponsor” of facilities at lower levels of the health system providing staff and resources for diabetes consultations in order to increase use of health centres by increasing the public’s trust in these facilities. In looking at facilities and their links a clear path should be developed for referrals and counter-referrals.

As foot complications seem to place a large burden on the health system the availability of tools for foot screening should be improved. This could be done by developing a tool kit for each level of the health system with regards to foot screening.

Facility action plan:

At a facility level three main factors should be addressed in order to address the problem of patient adherence. These are healthcare worker training, patient education and the organisation of care.

In looking at healthcare worker training at specialised facilities doctors are extremely well trained and some nurses play a role in diabetes care. Existing training programmes should be expanded both in scale and scope and include training for nurses and also training in patient education. The role of nurses needs to be increased and all healthcare workers involved in diabetes care should receive training in patient education. In the first instance, before specialised courses can be developed for nurses, specialised training for nurses in hospitals can take place simply by involving nurses more in patient care and “shadowing” doctors.

These trained healthcare workers will then need to address the issue of patient education by improving post diagnosis education. This needs to be done by developing socio-culturally adapted materials for patient education and information. As well as these materials a curriculum for in and out patients that can be delivered by nurses should be developed in

order to ensure that a standard level of education is delivered to each patient. This education should be delivered regularly.

Expert patients could also be trained and involved in delivering education. This could serve as the building block for the development of a diabetes club in facilities where they do not currently exist. Where they do exist the role of diabetes clubs could be increased to also have a patient representative involved in discussions with healthcare workers and administration. At each facility chronic consultations for outpatients should be developed. In some facilities these could be diseases specific, e.g. diabetes, but at others these may need to regroup several chronic conditions, e.g. diabetes, hypertension, etc.

Within this consultation education should play an important role and a team approach should be implemented. A diabetes team including nurses, nutritionists, psychologists, etc. should be created and they should actively be involved in diabetes care. In addition management guidelines for individual patients should be developed including screening programmes to be included by developing a list of tests and exams that should be provided at regular intervals. This should be linked to a unique patient record system which includes inpatient and outpatient details. This data should then be used for monitoring and assisting with decisions making and planning (e.g. for needs, medicines, facilities, healthcare workers, etc.)

As foot complications seem to place a large burden on the health system the availability of tools for foot screening should be improved. This could be done by developing a tool kit for each level of the health system with regards to foot screening.

Paediatric facility action plan:

It is clear that the burden of Type 1 diabetes compared to all the conditions that paediatric facilities in Vietnam have to face is small. However, it is recommended that the management of Type 1 diabetes be included into the larger picture of management of chronic conditions at paediatric facilities. These conditions will not only represent a larger and larger burden, but also require special attention in order to avoid repeated admissions, which place an unnecessary burden on the hospital, its staff and the child with diabetes and their family.

The aim of any activity developed for Type 1 diabetes (and other chronic conditions) should be to prevent hospitalisation and long-term complications.

In looking at the present reasons for the high levels of readmissions and complications they are problems accessing insulin and low patient education both leading to poor adherence.

The cost of insulin and its availability need to seriously be addressed by paediatric facilities. At an overall cost of about US\$ 130 per year, to guarantee insulin for a child, local solutions need to be found.

Patient education and support should be present both for in and out patients. For inpatients a specific post diagnosis curriculum should be developed using socio-culturally adapted materials. Nurses should play the leading role in delivering this education and providing the initial support to families after diagnosis. Nurses should also form part of an outpatient team including nutritionists, psychologists, etc.

This consultation should be a specialised “chronic” consultation where children with chronic conditions (diabetes, asthma, Congenital Adrenal Hyperplasia, kidney disease, etc.) have

access to a doctor with more time for them, as well as a “team” to provide the child and his family with education and support.

A unique patient record system should be developed for Type 1 diabetes (and other chronic conditions) to include inpatient and outpatient information as the whole patient history is important in the management of paediatric chronic conditions.

The role of diabetes clubs and the frequency of their meetings should be increased if possible to add to the education and support provided by the hospital.

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Appendices

Appendix 1 – Socio-economic data on areas where RAPIA was implemented (58)

Area	Population				Prevalence of Poverty
	Total	0-14 years old	15+ years old	65+ years old	
Dong Nai	1,990,678	673,832 (34%)	1,316,846 (66%)	88,013 (4%)	11%
Hanoi	2,675,166	646,151 (24%)	2,029,015 (76%)	164,929 (6%)	16%
Ho Chi Minh	5,034,058	1,203,022 (24%)	3,831,036 (76%)	263,512 (5%)	5%
Thai Nguyen	1,045,906	330,974 (32%)	714,932 (68%)	51,167 (5%)	43%

Appendix 2 – Number of interviews carried out during the RAPIA

	Macro	Meso	Micro	Total
Hanoi and North	6	45	50	101
Ho Chi Minh City and South	4	31	54	89
Total	10	76	104	190

Appendix 3 – Map of Vietnam (5)



Appendix 4 – Facilities and healthcare workers in Vietnam (2006) (14)

Type of facility	Number of facilities	Number of beds
Hospitals	903	131,500
Regional Polyclinics	847	9,300
Medical facilities in communes and precincts	10,672	46,100
Healthcare workers	Number	Per 10,000 population
Doctors	52,800	6.2
Nurses	55,400	6.5
Midwives	19,000	2.2

Appendix 5 – Healthcare spending in Vietnam (16)

Indicator	Value (year)
Total expenditure on health as percentage of GDP	5.5 (2004)
General government expenditure on health as percentage of total expenditure on health	27.1 (2004)
Private expenditure on health as percentage of total expenditure on health	72.9 (2004)
General government expenditure on health as percentage of total government expenditure	5.0 (2004)
External resources for health as percentage of total expenditure on health	2.0 (2004)
Social security expenditure on health as percentage of general government expenditure on health	16.9 (2004)
Out-of-pocket expenditure as percentage of private expenditure on health	88.00 (2004)
Private prepaid plans as percentage of private expenditure on health	2.9 (2004)
Per capita total expenditure on health at average exchange rate (US\$)	30.0 (2004)
Per capita total expenditure on health at PPP	184.1 (2004)
Per capita government expenditure on health at average exchange rate (US\$)	8.1 (2004)
Per capita government expenditure on health at PPP	49.8 (2004)

Appendix 6 - Total household expenditure for an inpatient stay compared to monthly per capita non-food expenditure 2002 (21)

	Inpatient care spending insured person	Inpatient spending for patient with exemption or reduction in fees	Inpatient spending entirely out of pocket	Monthly non food expenditure
(VND, US\$ and % of GDP per capita at PPP)				
Overall	874,000 53.51 2.1%	631,000 38.63 1.5%	1,265,000 77.45 3.0%	128,000 7.84 0.3%
Poor	476,000 29.14 1.1%	438,000 26.82 1.0%	769,000 47.08 1.8%	44,000 2.69 0.1%
Middle	546,000 33.43 1.3%	542,000 33.18 1.3%	1,003,000 61.41 2.4%	77,000 4.71 0.2%
Rich	1,138,000 69.67 2.7%	1,194,000 73.10 2.8%	1,817,000 111.25 4.3%	219,000 13.41 0.5%
Ratio				
Overall	6.8	4.9	9.9	1.0
Poor	10.8	10.0	17.5	1.0
Middle	7.1	7.0	13.0	1.0
Rich	5.2	5.5	8.3	1.0

Appendix 7 – Top ten causes of death (all ages) (22)

Causes	Total deaths	Deaths as a percentage of total	Communicable (CD) or Non Communicable (NCD) Disease
<i>All causes</i>	515,000	100%	-
Ischaemic Heart Disease	66,000	13%	NCD
Cerebrovascular Disease	58,000	11%	NCD
Chronic Obstructive Pulmonary Disease	41,000	8%	NCD
Lower Respiratory Infections	26,000	5%	CD
Tuberculosis	19,000	4%	CD
Perinatal Conditions	18,000	4%	CD
Diabetes	12,000	2%	NCD
Road traffic accidents	12,000	2%	NCD
Stomach Cancer	12,000	2%	NCD
Diarrhoeal diseases	10,000	2%	CD
<i>Non Communicable Diseases (from Top 10 causes)</i>	201,000	39%	NCD

Appendix 8 – Age distribution of cohort of children with Type 1 diabetes followed at the National Hospital of Paediatrics (38)

Age range	Number	Percentage
0-5 years	12	6.7%
5-10 years	25	13.9%
11-15 years	17	9.4%
Over 15 years	126	70.0%
	180	

Appendix 9 – List of medicines and where they should be available (05 /2008/QD-BYT)

Medicine	Central, Provincial Central and General Hospitals	District Hospitals	Ward Hospitals and Health Centres
Glibenclamide (2.5mg, 5mg)	X	X	X
Gliclazide (30mg, 80mg)	X	X	X
Glimepiride (2mg, 4mg)	X		
Glipizide (2.5mg, 5mg, 10mg)	X		
Insulin Mixed (30/70, 40IU and 100IU 10ml)	X	X	
Insulin Rapid Acting (40IU and 100IU 10ml)	X	X	
Insulin Long Acting (40IU and 100IU 10ml)	X		
Metformin (500mg, 850mg, 1,000mg)	X	X	X
Metforming and Rosiglitazone (500mg/2mg, 500mg/4 mg)	X	X	X
Metformin and Glibenclamide (500mg/2.5mg, 500mg/5mg)	X	X	X
Pioglitazone (15mg)	X		
Repaglinide (1mg)	X		
Rosiglitazone maleate (4mg, 8mg)	X		

Appendix 10 – Price list from Ministry of Health

Name	Chemical Name	Strength /mg	Units	Price (US\$)	Price per unit
Diamicon	Glicazide	80mg	60	\$6.35	\$0.11
Diamicon MR	Glicazide	30mg	60	\$6.67	\$0.11
Metformin	Metformin	850mg	100	\$2.96	\$0.03
Glucophage	Metformin	1,000mg	30	\$4.34	\$0.14
Glucophage	Metformin	850mg	30	\$4.16	\$0.14
Glucophage	Metformin	850mg	100	\$12.94	\$0.13
Glucophage	Metformin	500mg	50	\$3.12	\$0.06
Glucovance	Glyburide and Metformin	500mg / 2.5mg	30	\$4.91	\$0.16
Glucovance	Glyburide and Metformin	500mg / 5mg	30	\$4.91	\$0.16
Glucovance	Glyburide and Metformin	500mg / 5mg	30	\$5.08	\$0.17
Mediator	Benfluorex HCl	150mg	30	\$2.45	\$0.08
Glucobay	Acarbose	100mg	100	\$23.07	\$0.23
Glucobay	Acarbose	50mg	100	\$13.44	\$0.13
Amaryl	Glimepiride	4mg	30	\$9.51	\$0.32
Avandia	Rosiglitazone	4mg	28	\$24.66	\$0.88
Avandia	Rosiglitazone	8mg	28	\$48.85	\$1.74
Navadiab	Glicazide	80mg	60	\$3.75	\$0.06
Insulinum Lente		10ml	40	\$2.35	\$0.0059
Insulatard Novolet		3ml cartridges	100	\$25.37	\$0.0169
Humulin		10ml	100	\$12.88	\$0.0129
Insulinum MaxiRapid		10ml	40	\$2.35	\$0.0059
SciLinM 30/70		10ml	40	\$4.40	\$0.0110
SciLinM 30/70		3ml cartridges	100	\$22.00	\$0.0147
SciLinN		10ml	40	\$4.40	\$0.0110
SciLinR		10ml	40	\$4.40	\$0.0110
Mixtard 30 Novolet		3ml cartridges	100	\$25.37	\$0.0169
Mixtard 30 Penfill		3ml cartridges	100	\$22.90	\$0.0153

Appendix 11 – Specific objectives of Decision No. 35/2001/QĐ-TTg (2001) “Approving the strategy for protection and care of the people’s health 2001-2010”.

- Health-related targets to be achieved by the year 2010:
 - The average life expectancy: 71 years
 - The ratio of maternal death reduced to 70/100,000 live births.
 - The mortality rate of children aged under 1 reduced to below 2.5% of live births.
 - The mortality rate of children under 5 children reduced to below 3.2% live births.
 - The percentage of newborns weighing under 2,500 grams reduced to below 6%.
 - The percentage of malnourished children under-5 reduced to below 20%.
 - The average height of adolescents to reach 1.60 meters or higher.
 - To have 4.5 medical doctors and 1 university pharmacist for every 10,000 people.
 - To reduce the morbidity and mortality rates due to epidemic diseases.
 - To eliminate widespread epidemics.
 - To minimize the morbidity and mortality rates due to cholera, typhoid, hemorrhagic fever, malaria, plague, Hepatitis B, encephalitis and sexually transmitted diseases
 - To maintain the results of the polio and infant tetanus eradication
 - To restrain the increasing rate of HIV/AIDS infection.
 - To prevent, control and manage NCDs such as cardiovascular diseases, cancer, accidents and injuries, diabetes, occupational diseases, mental diseases, poisoning, suicide and diseases caused by unhealthy lifestyles (drug addiction, alcoholism, obesity etc.)
- To enhance equity in the access to and use of health care services, particularly medical examination and treatment services.
- To improve the quality of medical examination and treatment, functional rehabilitation and health improvement at all medical levels.
- To apply all scientific and technical advances so as to develop the Vietnamese health system to the level of advanced countries in the region.

Bibliography

1. **World Health Organization.** Welcome to the diabetes programme. [Online] 2006. [Cited: 7 March 2007.] www.who.int/diabetes/en.
2. **United Nations General Assembly.** *World Diabetes Day*. New York : s.n., 2006.
3. **International Diabetes Federation.** About insulin. [Online] [Cited: 6 February 2007.] www.idf.org/home/index.cfm?unode=1DA26AAB-E840-4F76-B399-EDE131A4C2E7.
4. **Beran, D, Yudkin, J S and de Courten, M.** Assessing health systems for insulin-requiring diabetes in sub-Saharan Africa: developing a 'Rapid Assessment Protocol for Insulin Access'. 2006, Vol. 6, 1, p. 17.
5. **Central Intelligence Agency.** Vietnam. *World Factbook*. [Online] 20 March 2008. [Cited: 1 April 2008.] www.cia.gov/library/publications/the-world-factbook/geos/vm.html.
6. **United Nations Development Programme.** Viet Nam at a glance. [Online] [Cited: 1 April 2008.] www.undp.org.vn/undpLive/Content/UNDP/About-Viet-Nam/Viet-Nam-at-a-Glance.
7. **Joint Donor Report to the Vietnam Consultation Group Meeting.** *Social Protection - Vietnam Development Report 2008*. Hanoi : s.n., 2007.
8. **United Nations Development Programme.** *Human Development Report 2007/2008*. New York : United Nations Development Programme, 2007.
9. **Adams, S J.** *Vietnam's Health Care System: a Macroeconomic perspective*. Hanoi : International Monetary Fund, 2005.
10. **Jowett, M and Thompson, R.** *Paying for Health Care in Vietnam: Extending Voluntary Health Insurance Coverage*. York : University of York, 1999.
11. **Tuan, NT, Tuong, PD and Popkin, BM.** Body mass index (BMI) dynamics in Vietnam. *European Journal of Clinical Nutrition*. 2008, Vol. 62, pp. 78-86.
12. **Minh, HV, et al.** Risk Factors for Chronic Disease Among Rural Vietnamese Adults and the Association of These Factors With Sociodemographic Variables: Findings From the WHO STEPS Survey in Rural Vietnam, 2005. *Public Health Research, Practice and Policy*. 2007, Vol. 4, 2, pp. 1-10.
13. **World Bank.** *Vietnam Growing Healthy: A Review of Vietnam's Health Sector*. s.l. : World Bank, 2001.
14. **General Statistics Office of Vietnam.** *Statistical Handbook of Vietnam 2007*. Hanoi : General Statistics Office of Vietnam, 2007.
15. **Wagstaff, A.** The economic consequences of health shocks: Evidence from Vietnam. *Journal of Health Economics*. 2007, Vol. 26, pp. 82-100.
16. **World Health Organization.** Core Health Indicators - Vietnam. [Online] 2006. [Cited: 1 April 2008.] www.who.int/whosis/database/core/core_select_process.cfm?country=vnm&indicators=healthpersonnel.
17. **Giang, T L.** *Social Health Insurance in Vietnam*. Tokyo : International Labor Organization, 2008.
18. **Knowles, J C.** Some key Health Insurance Policy Issues in Vietnam. *Vietnam's Socio-Economic Development*. 53, 2008, Vol. March, pp. 22-45.
19. **van Doorslaer, E, et al.** Catastrophic payments for health care in Asia. *Health Economics*. 2007, Vol. 16, 11, pp. 1159-84.
20. **World Health Organization Viet Nam Country Office.** *WHO Country Cooperation Strategy 2003-2006*. Ha Noi : World Health Organization Viet Nam Country Office, 2003.
21. **Ministry of Health.** *Vietnam Health Report 2006*. Hanoi : Medical Publishing House, 2006.
22. **World Health Organization.** *Mortality Country Fact Sheet 2006*. Geneva : World Health Organization, 2006.

23. **Chuang, L M, et al.** The status of diabetes control in Asia--a cross-sectional survey of 24 317 patients with diabetes mellitus in 1998. 2002, Vol. 19, 12, pp. 978-85.
24. **Makame, MH; for the Diabetes Epidemiology Research International Study Group.** Childhood Diabetes, Insulin, and Africa. 1992, Vol. 9, 6, pp. 571-3.
25. **Collado-Mesa, F, et al.** Mortality of childhood-onset IDDM patients. A cohort study in Havana City Province, Cuba. 1997, Vol. 20, 8, pp. 1237-41.
26. **Yudkin, J S.** Insulin for the world's poorest countries. 2000, Vol. 355, 9207, pp. 919-21.
27. **Bassili, A, Omar, M and Tognoni, G.** The adequacy of diabetic care for children in a developing country. 2001, Vol. 53, 3, pp. 187-99.
28. **Beran, D, Yudkin, J S and de Courten, M.** Access to care for patients with insulin-requiring diabetes in developing countries: case studies of Mozambique and Zambia. 2005, Vol. 28, 9, pp. 2136-40.
29. **Elrayah, H, et al.** Economic burden on families of childhood type 1 diabetes in urban Sudan. 2005, Vol. 70, 2, pp. 159-65.
30. **Kessner, D M, Kalk, C E and Singer, J.** Assessing health quality: the case for tracers. 1973, Vol. 288, pp. 189-94.
31. **Nolte, E, Bain, C and McKee, M.** Diabetes as a tracer condition in international benchmarking of health systems. 2006, Vol. 29, 5, pp. 1007-11.
32. **Zimmet, P, Alberti, KG and Shaw, J.** Global and societal implications of the diabetes epidemic. *Nature*. 2001, Vol. 414, 6865, pp. 782-7.
33. **Binh, TV.** *Epidemiology of diabetes in Vietnam, methods of treatment and preventive measures*. Hanoi : Medical Publishing House, 2006.
34. **International Diabetes Federation.** *Diabetes Atlas*. [ed.] D Gan. Brussels : s.n., 2006.
35. **Quoc, PS, et al.** Blood Glucose Distribution and Prevalence of Diabetes in Hanoi (Vietnam). *American Journal of Epidemiology*. 1994, Vol. 139, 7, pp. 713-22.
36. **Binh, TV.** *Follow-up study on diabetic complications in patients since their first presentation at National Hospital of Endocrinology*. Hanoi : Medical Publishing House, 2006.
37. **Diamond, J.** The double puzzle of diabetes. *Nature*. 2003, Vol. 423, pp. 599-602.
38. **Hoan, NT.** *Introduction to the Endocrinology, Metabolic and Genetic Department at the NHP*. Hanoi : NHP, 2007.
39. **Doak, CM, et al.** The dual burden household and the nutrition transition paradox. *International Journal of Obesity*. 2005, Vol. 29, pp. 129-36.
40. **Pham, G K, Nguyen, L V and Pham, T S.** *Epidemiological survey of hypertension and its risk factors at 12 Hanoi urban communes* . Hanoi : Ministry of Health and Vietnam Heart Institute, 2001.
41. **Duc Son, LNT, et al.** Anthropometric Characteristics, Dietary Patterns and Risk of Type 2 Diabetes Mellitus in Vietnam. *Journal of the American College of Nutrition*. 2005, Vol. 24, 4, pp. 229-34.
42. **Dieu, HTT, et al.** Prevalence of overweight and obesity in preschool children and associated socio-demographic factors in Ho Chi Minh City, Vietnam. *International Journal of Pediatric Obesity*. 2007, Vol. 2, 1, pp. 40-50.
43. **World Health Organization.** The impact of Chronic Disease in Vietnam. [Online] [Cited: 4 August 2008.] www.who.int/chp/chronic_disease_report/vietnam.pdf.
44. **Armstrong, K L, et al.** Living with Congenital Adrenal Hyperplasia in Vietnam: A Survey of Parents. 2006, Vol. 19, 10, pp. 1207-23.
45. **CLAN.** *Parents survey Report*. Hanoi : s.n., 2008.
46. **Hong, L.** Support for People with Diabetes in Vietnam. *Diabetic Network Vietnam*. [Online] [Cited: 8 September 2008.]

www.daithaoduong.net.vn/portal.aspx?tabid=9&page=newsview&cid=30&lang=en&nid=141&

47. **Laniece, I, et al.** Adherence to HAART and its principal determinants in a cohort of Senegalese adults. *AIDS*. 2003, Vol. 17, Suppl. 3, pp. S103-8.

48. **Reuters.** By 2012, The Value of Vietnam's Pharmaceutical Market Will Have Reached US\$1.85bn. [Online] 15 July 2008. [Cited: 5 September 2008.]

www.reuters.com/article/pressRelease/idUS80393+15-Jul-2008+BW20080715.

49. **Management Sciences for Health.** *International Drug Price Indicator Guide*. Cambridge : Management Sciences for Health, 2007.

50. **Chuc, NTK and Tomson, G.** 'Doi moi' and private pharmacies: a case study on dispensing and financial issues in Hanoi, Vietnam. *Eur J Clin Pharmacol*. 1999, Vol. 55, pp. 325-32.

51. **Ministry of Finance, General Department of Customs.** *Tax 2007 Export-Import Tariff and VAT on Imports*. Saigon : Saigon Cultural Publishing House, 2007.

52. **Ministry of Health.** *Summary of Diabetes Prevention Project*. Hanoi : s.n., 2007.

53. **Binh, T.V. and Hoan, L.Q.** Improving the quality of diabetes education in Vietnam – a community based approach. *Diabetes Voice*. 2007, Vol. 52, pp. 46-8.

54. *Some Psychological Problems from Parents having children with diabetes.* **Tung.** Ho Chi Minh City : s.n., 2008.

55. **The Sponsoring Association for Poor Patients.** The Sponsoring Association for Poor Patients. [Online] 2006. [Cited: 15 September 2008.]

www.sapp.org.vn/index.php?o=modules&n=about&f=about.

56. **Beran, D.** *The Diabetes Foundation Report on implementing national diabetes programmes in sub-Saharan Africa*. London : International Insulin Foundation, 2006.

57. **Beran, D and Yudkin, J S.** Diabetes Care in sub-Saharan Africa. 2006, Vol. 368, 9548, pp. 1689-95 .

58. **Epprecht, M and Heinemann, A.** *Socioeconomic Atlas of Vietnam*. s.l. : Cartographic Publishing House, 2004.