MoPoTsyo
Patient Information Centre

annual report on 2009

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1 The Summary of 2009

2009 was the 5th year of our existence as organisation (08-08-2004) and the 4th year of operations (01-07-2005). By a process of continuous trial and error, theoretically separated into different consecutive phases called situation analysis, planning, implementation, assessment, evaluation and adaptation, but in reality more a simultaneous and complex mixture of these processes, we have managed to reduce - at least for people with Diabetes - some of their access-to-care problems, brought down costs of living with diabetes disease and improved quality of life of patients.

Not everything is rosy though: Ominously, ever since the start of our intervention In the urban slum areas, BMI continued to deteriorate. In 2009 for the first time also other health outcomes deteriorated (glucose control) and even blood pressure control. This has raised new important questions for peer education in urban slum areas that we have to answer and seek to address in effective ways. What is the benefit of reducing health expenditure when it is associated with deteriorating health? Maybe it is simply not good enough if it does not translate into better health at the same time....! Is it related to the fact that in 2009 we started to charge patients for their FBG test as the urban slum program struggled without sufficient external donor support? Some of the poorest and most needy people with diabetes received some equity fund support from us to help them pay for their medicines, including insulin. Financial sustainability of effective diabetes care in Cambodia comes at a price to the members. It is not easy for the peer educators to charge their fellow community members. It can put community-based peer educators in a difficult position when they can be perceived to push people into spending “more” (even if that “more” is “better” for patients).

In particular when compared with the urban intervention, the rural intervention delivered good results. This begs the question “why the situation is different there ?”

2009 ended with the major development partners and the Cambodian government at odds over the incentives that can be paid out to government staff who work in donor-funded projects. The incentive scheme for civil servants, which has cost millions of dollars to prepare, was suddenly wiped off the table at the end of 2009 by a letter written by the Finance Minister and addressed to the Head of World Bank. This move has thrown into tatters the feasibility of projects that major donors are carrying out together with government agencies. There is no alternative scheme. However, another immediate implication is an opportunity for civil society, now that government itself as implementing agent will likely become paralyzed until an alternative solution is found and implemented. Chances are small that this will happen in 2010 which may become a year that is mostly lost for Cambodians as well as for bilateral and multilateral development partners who depend on joint plans to reach the Millennium Development Goals.

High Blood Pressure: With a new donation from “Het Maagdenhuis”, a Dutch foundation, accorded at the end of 2008, we began to include people with hypertension (but who do *not* have diabetes). A year later, at the end of 2009, we think that we have found a strategy that is sustainable and works well. It is still a too early to claim “victory” because we cannot be sure until the end of 2010 when we can assess a larger numbers of high blood pressure patients. Unlike our diabetes intervention the high blood pressure “extension” is designed as less resource intensive, as it almost free rides on the grass roots diabetes structure. The minimal

incentives makes it go slower. By grouping it around "a trained person with diabetes who also has high blood pressure", we seem to have the right entry point at the grass roots level through whom to engage with people who have high blood pressure but not diabetes, a much larger group than the people with diabetes.

Exposure: We received more attention nationally and even internationally with our peer educator strategy. It was of course an unfathomable honor to be invited to speak at the World Diabetes Conference in Montreal (for high-speed connections the entire 30 minute presentation can be downloaded from a URL in footnote [1]).

Donor Funding: Late into 2009 MoPoTsyo's members collectively sighed with relief when after intensive preparations, major donors shortly one after another agreed to finance our planned activities in the coming years in 3 different regions in Cambodia;

1) WDF (World Diabetes Foundation) for an expansion.
2) ICCO-KIA for Thmar Pouk OD in Banteay Meanchey province;
3) DVN, the Diabetes Association in The Netherlands, in part thanks to a promise from Impulsis in The Netherlands to double fundraising by Friends For Life on our behalf including this important DVN 3 year commitment;

- **WDF** enables us to multiply our first district program by five in terms of Takeo's population coverage. It will cover the whole province of Takeo replicating the first district experience and making the project financially sustainable;

- **A link with Community Based Health Insurance**: a *health financing* partnership adventure: ICCO-KIA agrees to fund our proposal as part of a wider partnership with government which also includes Community Based Health Insurance managed by a Cambodian NGO called CAAFW (Cambodian Association for Assistance to Families and Widows) and a Study by the Center for Advanced Studies (CAS) of the effectiveness of the links between our peer educator network and health insurance. The results of the study can be important to inform future government policy in particular with regards to how subsidies can best be targeted. Whereas MoPoTsyo's normal progress can be followed at http://www.mopotsyo.org the records of what happens as part of the partnership will be available over a period of 3 years on a set of webpages at http://www.mopotsyo.org/TPPS_Web/Moa_Home.html
  A crucial element of the deal with ICCO-KIA is that the Cambodian government (MoH) agrees to pay the health insurance premium subsidies on behalf of the pre identified poor households in Thmar Pouk for year 2 and year 3. If the Cambodian government does not pay this, the donor will also not pay the subsidy for year 1 and also not fund our project in Thmar Pouk. Based on verbal commitments from Ministry of Health officials during the preparations in 2009, the donor has shown commitment by starting to pay for pre identification of poor households and has approved proposals from CAS and MoPoTsyo. With signed contracts and first donor instalments in the bank, both MoPoTsyo and CAS have started implementation of the projects.

[1] a large file to download http://conference2.idf.org/idf2009/0514/default.aspx

- **The funding from DVN** in The Netherlands is important not just for us to help fund our activities, but it is also a breakthrough: In 2009, the Dutch membership of people with diabetes voted that a percentage of the Dutch association's budget is to be used to help people with diabetes overseas in poor countries. Hopefully this policy sets a new trend in solidarity among people with diabetes. It can be followed in the future by other national associations of people with diabetes in other high income countries around the world creating links between North and South, between rich and poor. It is a milestone. So far this did not exist on the demand-side of the health care system.

Insulin For Life: Thanks to support from the Australian not-for-profit organisation Insulin For Life (http://www.insulinforlife.org/) we were able to guarantee continuous affordable supplies to our members who require insulin injections every day. IFL's President Ron Raab traveled to Cambodia and visited some of our projects. We hope that IFL will be able in the future to establish more branches of its organisation in the nations of Europe, the US and Canada where many of the hospital insulin overstocks can be well-used by being shipped to many low-income countries such as Cambodia to help insulin patients the world's low-income countries *survive*.

Revolving Drug Fund: To improve "adherence to prescription", MoPoTsyo started in mid 2008 to supply 8 private pharmacies with the 19 essential drugs that are most often needed by its members. In mid 2009 MoPoTsyo started to import the medicines from Europe where they are cheaper than in Cambodia or Thailand and quality is better guaranteed. With the revolving drug fund running well, the financial sustainability of the peer educator network is now a matter of increasing the number of contracted dispensaries (to reduce travel distance for patients), and of scaling-up.

School Teachers with Diabetes: In Ang Roka OD, a rural area, we have been organizing primary prevention activities by diabetic school teachers who had previously already been trained by MoPoTsyo as peer educators. The school teachers operate as a group of 4 in order to inform and train their non diabetic colleague school teachers in schools in their own district on healthy lifestyle, so that in turn the non diabetic teachers become better role models for the school children. The preliminary assessment in the rural area showed positive impact. Of course the primary prevention is not focusing on diabetes but on prevention of non communicable chronic disease in general.

Plans for 2010

Research: We need to understand better why health outcomes of urban slum patients are deteriorating and what should be done about it, by us.

Laboratory: MoPoTsyo is preparing to increase its scope of action with laboratory activities (Biochemistry) facilitating regular access to the most relevant tests for our members. The idea is that before people travel to town to go and see their doctor the test results will be available and their implications will have been discussed with patient as part of the counseling. For the Doctor it is also much easier to examine a patient if reliable lab results are available. It is going to save everybody's time and money and help produce better health outcomes. And last but not least, it is a source of cost recovery of our intervention making it again more financially sustainable.

Geographical Expansion: With AUSAID funding a peer educator network will be established in Kong Pisey OD, in Kompong Speu province, an area that neighbors Ang Roka OD in Takeo province.

Like in 2009, we will continue in 2010 to try to obtain funding from different donors.

2 Our History in brief

The NGO MoPoTsyo Patient Information Centre was founded on August 8th, 2004 in order to empower people with a chronic disease, with information and skills on how to manage and control their disease and to make them share information among each other.

Initially we tried to achieve this goal with professional health staff, but after some time we realized that we were more effective with peer educators, so with people who have "the" chronic disease themselves. We found that health staff is less inclined to let knowledge and skills transit to the patient, let alone "share". This is a problem because information transmission is especially relevant for people with diabetes in poor countries where such people have to pay out-of-pocket for everything, without even the most basic financial protection systems normally enjoyed by people with diabetes in rich countries. The monthly cost of living with the disease borne by the patient is an important factor that determines the ability of patients to adhere to a treatment prescribed by a doctor. If this cost can be brought down to an affordable level, adherence becomes feasible. That is why Peer Education and Self Management become strategies for survival for many who are not rich but who have a chronic disease that requires serious attention to be kept under control.

Again later, peer education became "community-based peer education" when we found patients who were suitable candidates to do peer education in their own slum community. This strategic element further improved the outcomes because during day-time or during the work-week many patients are simply away from home, so a regular health staff on "outreach" would never reach those people.

In 2005 July, after completing our registration as NGO, we became operational in one down-town slum and one remote slum. Now, at the end of 2009, we are operational in 4 down-town slums and one remote slum, as well as in 6 rural operational districts, 5 of which are in Takeo province, and 1 in Banteay Meanchey province in North Western Cambodia. By structuring peer educators into geographic networks that fit with Cambodia's National Health Coverage Plan (1996), and by appointment of a network leader and network administrator, the reporting and quality were both enhanced. The structure has administrative accountability which can be supervised or, possibly later, contracted.

We focused initially on diabetes. The large majority of our members are type 2 diabetics. It is striking that about half of our registered diabetic membership is *not overweight*. Many never were overweight. While insulin resistance appears to play a key role, many also do not produce sufficient insulin. Among those the proportion of young or middle aged people appears to be greater than for example in Europe.

Diabetes and high blood pressure in Cambodia are diseases of the rich and of the poor. Whereas most of the rich are rapidly becoming aware of the rationale behind the fitness-culture that is now normal in developed countries) they experience a struggle with the temptations of luxury to adapt to healthier lifestyles. For the poor who are affected by diabetes and associated disorders the challenges are much more varied. With food supplements being aggressively marketed including with health claims targeting chronic patients, these people can get easily lost in a bazaar of competing attractive offers without reliable guidance on how best to spend their meager resources.

One of major health challenges that Cambodian population still faces remains their overall preference for "overweight"-status as sign of wealth. Given Cambodia's recent history it is not surprising that many Cambodian people see extra abdominal padding with envy. The people will only be able to make a dent into the coming epidemic if this changes. We think that this is starting to happen among some better informed groups. But if you know it, it does not mean you can get rid of it.

Self-Screening for Diabetes: MoPoTsyo's peer educators organize detection ("self-screening[2]") of diabetes in order to create a community of patients. The techniques used are self-administered urine strips after lunch, which is followed by a confirmation Fasting Blood Glucose test with a hand-held glucometer measuring capillary blood, using 126mg/dl or, in case of PPBG, the limit of 180mg/dl for all the adults who report that their urine indicated presence of glucose. After finding someone meeting the criteria for DM, they assess any patient that they detect (screen in), counsel them and, if necessary, advise them to see a doctor. People with Pre Diabetes (>100mg/dl at FBG) *should ideally* receive counseling. Please note: screening is not done in order to be able to screen out participating adults. The screening is done to increase people's awareness of this risk factor, demystify the diagnosis and give people an opportunity to learn how to remain healthy or regain their health. People whose urine does not show presence of glucose are told that it is recommended to test again in a year or so. Done this way, it is a cheap but imperfect method in order to create a community of diabetes patients. To do accurate screening, we would have to make much more costs and we would not be able to teach people how to *self-screen*. So perfect screening would make our activity less cost effective especially in the long term. The self-screening can easily be repeated which is necessary for early detection of diabetes among a population who is not used to attend the public services. It greatly enhances the general awareness of diabetes and it helps to demystify the disease among the general population lowering the barriers to earlier diagnosis, problems which the formal system has not been able to address by itself.

Self-Screening for High Blood Pressure: After one suitable diabetes patient with high blood pressure has been trained and appears to be self-managing well, the peer educator starts a screening intervention at the village level where this person lives. The HBP screening is done with automatic blood pressure meters. It is the peer educators based at the grass roots who talk with the households, group leaders, village leaders and others to organize the hypertension self-screening village by village. In every village, the peer educator creates a group of high blood pressure people around the trained diabetic with high blood pressure. Through that trained patient, the information is then conveyed to the other members of the high blood pressure group, who do *not have diabetes*. Diabetes has become the entry point to create informed communities of high blood pressure people at the village level. We use a co-morbidity of diabetes as an opportunity to hook onto it an intervention of which other chronic patients will be able to benefit. HBP could be just the first of the other problems (we think of dyslipidemia's, heart problems etc.) in the future.

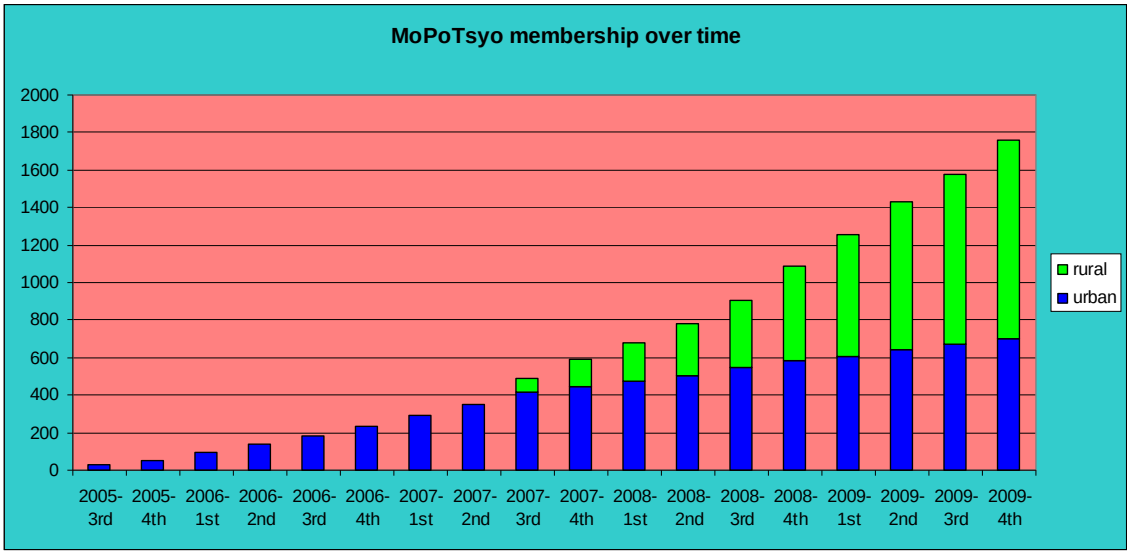
[2] Urine strips are not sensitive enough to detect all diabetics, but the people missed will have opportunities to be screened in later when they develop symptoms or when a second screening is organized. Using blood-glucose strips would increase the costs 15-fold and reduce much of the cost-effectiveness of the intervention. It is important to note here that almost half of Cambodian diabetics are NOT overweight (BMI <23), so only focusing on waist circumference or BMI as "risk groups" as done in the West would be wrong in the Cambodian context.

Primary Prevention: In rural areas we are able to recruit school teachers as peer educators. Once they are "ready" with their diabetes patient community in their health center coverage area, they can also be mobilized to form a team of diabetic school teachers who visit schools in order to improve health determinant awareness among their colleagues. A pilot took off in 2008 and continued in 2009 with interesting results. The action aims to turn teachers into better role models for the school children and develop together with them appropriate action to improve health behavior of the school children in a healthier environment in the long term.

3 Our interventions (projects)

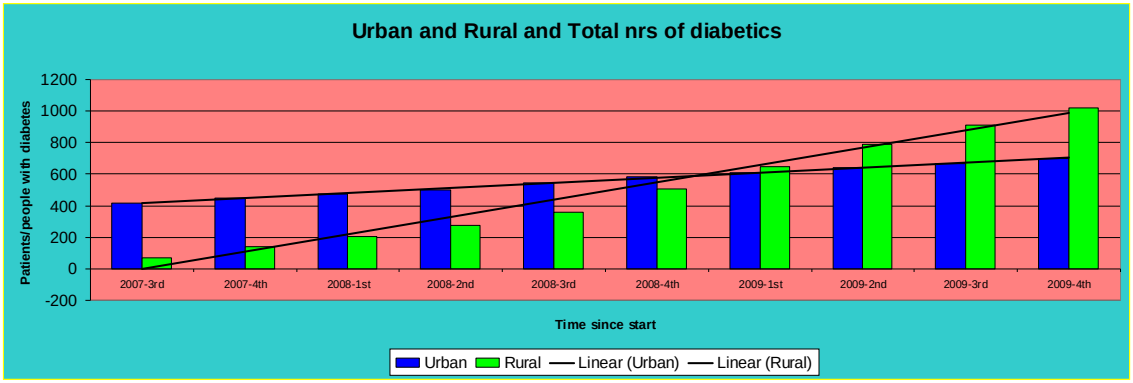
The graph below shows the older MoPoTsyo's urban network continuing at a steady rate although it has no longer has a donor who invests in expansion, compared with the donor supported intervention in the rural area. The urban program is meant to become sustainable and should continue to grow without an external donor supporting it. However, only with donor supported *equity fund* is it possible to improve access to medicines for the weakest among the urban poor.

Figure 1 urban and rural membership growth



The 2 trend lines in the graph below show more clearly the donor - "growth factor" of both networks during the same period. The trend of the rural network is sharply up compared to the slow upward trend of the urban network.

Figure 2 impact of donor support on membership growth



Since January 2009, MoPoTsyo has more rural diabetes patients than urban patients. Like in 2008 also in 2009 most of the membership growth is due to the rural network, as the urban slum network growth is slow since it switched from active to passive detection mode. The urban network concentrates on achieving managerial and financial sustainability. At the end of 2008, we copied the rural diabetes service model to an urban referral hospital (Pochentong Referral hospital in OD West of Phnom Penh), where there was previously no diabetes service or hypertension service.

If we include all the costs, the urban model's cost recovery can be set at 25% at the moment. Over time, with economies of scale and expansion of the hypertension program it should be able to break even. But in order to make very poor people benefit, extra resources to help them are necessary, such as equity fund. This can hopefully one day become part of Cambodia's social health protection safety net.

In the chapters below the urban network is first discussed and then the rural network.

3.1 Urban Slums

3.1.1 Achievements

Growth rate in the earlier years was higher because at that time we still did active screening in the slum areas. Without donor support this has had to stop. The 5 urban peer educators remain under the management of one Diabetes Program Manager.

There is one peer educator in each of the 5 slum areas. After years of imbalance, the urban network's gender balance has finally improved: The 5 peer educators are 2 men and 3 women while the Diabetes Program Manager is a man.

As in 2008 also in 2009 many households from around the Boeungkak lake were evicted and moved to places outside Phnom Penh. This affects them negatively in terms of their livelihood so also our members in the partly disappearing communities of Sras Chork (2005) and Boengkak2 (Jan 2006). Two of our peer educators also were relocated out of their areas while the follow up of the patients continues as best as they can. Relocated patients are now scattered, but they continue to benefit from follow-up. We are adapting the intervention to the new circumstances and try to keep the patients in the follow-up system. It happens as we are also trying to make the program financially more sustainable by charging patients for the BG test.

Key figures:

1. While 457 diabetes patients had been detected at the end of 2007, the passive screening resulted in another 136 registrations of DM, making a total of 593 DM registered at the end of December 2008, and another 107 during 2009, resulting in 700 registrations at the end of December 2009.

2. Per 30 June 2009, 72% of registering *urban* slum people knew that they have diabetes. The percentage is very high, compared to the national figures on awareness of their diagnosis among those who have diabetes. This is due to the fact that we have switched to passive detection and do no longer do active screening of Diabetes in the urban slum communities.

Glucose control in urban area:

MoPoTsyo's diabetes glucose control is based on a combination of Fasting Blood Glucose and Post Prandrial Urine Glucose Monitoring and occasional Postprandial Blood Glucose monitoring. Our Peer Educators encourage our members to present regularly, at least once per month, for an Fasting Blood Glucose test. The member pays 1300 riels (=USD 0,31) to the Peer Educator who has a handheld glucometer. This price recovers the costs of the strip, needle and peer educator. Patients can do the FBG more often per month. We aim to collect mostly FBG and fewer PPBG.

Some history: To evaluate our intervention, in 2006, six months after our intervention started in the urban slums, we started to take a baseline HbA1c of a number of patients. That HbA1c was mostly taken within a few days after the first assessment of the patient and repeated at least 3 months later. The total number of patients was 73 and the results are shown in fig 3 and fig 4 below.

Figure 3 First Urban HbA1c

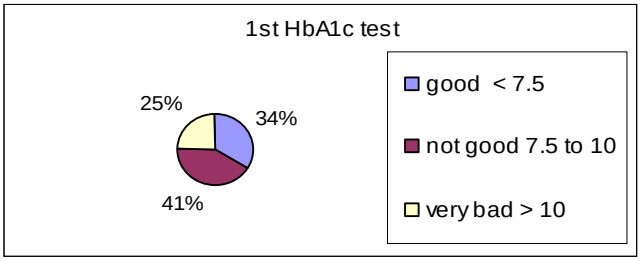
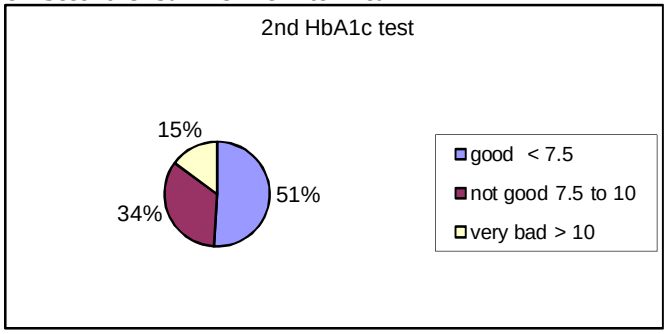
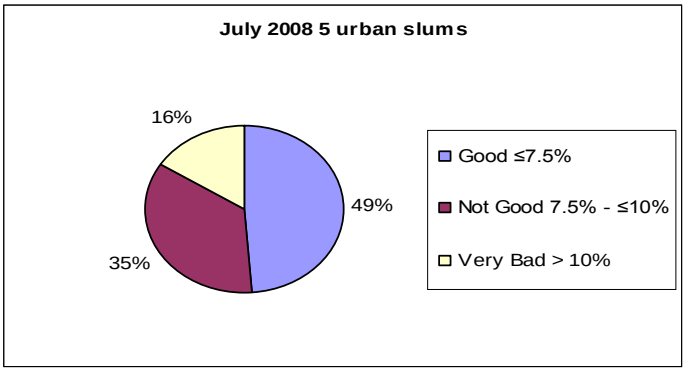


Figure 4 Second Urban HbA1c After Year 1



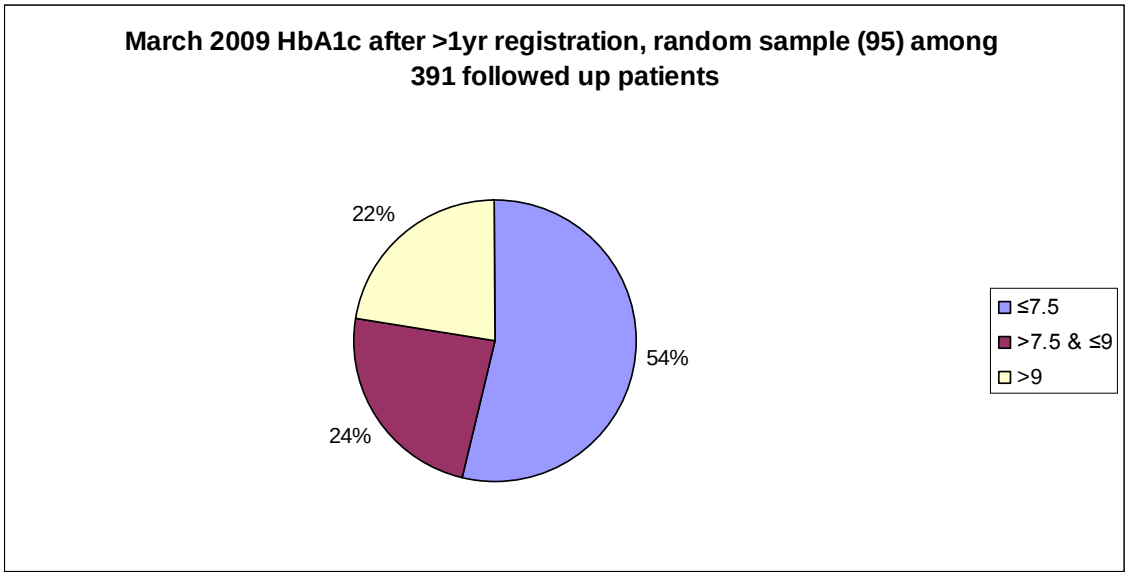
The graph (fig 5) below shows the results in year 3 among a different group of MoPoTsyo members when we took another HbA1c of our member-patients, but not necessarily exactly the same group.

Figure 5 Third Urban HbA1c at Year 3 of program



The graph (fig 6) below shows the results in year 4 among again a different group of MoPoTsyo members.

Figure 6 Urban HbA1c after year 4



When observed in combination, the graphs above show that the intervention has had a good impact resulting in that about half of MoPoTsyo's members with diabetes were living with good HbA1c control, but as much as a third was still with poor glucose control. It is difficult to interpret urine glucose recordings in the patients book in the sense that there is a chance they are not accurate in 2009. We had attached an incentive for the peer educators if the patient books showed that the patients were

recording. During the year, when checked, peer educators admitted that they were recording results that the patients reported to them but we cannot be sure about it because of the incentive attached to the recording.

When in early 2009 we compared a random sample of 95 DM patients with their own baseline, we see that they had improved their Fasting Blood glucose on average with 25 points since they registered but the average FBG level at 137 mg/dl is too high to be healthy.

	Urban Fasting Blood Glucose	
	Baseline (Reg)	**March 09**
Sum 95 DM patients	**15389**	**13004**
average mg/dl	162	137
average mmol	9.0	7.6

When we repeated the assessment in December 2009 with another group of 95 randomly selected DM patients, we saw a deterioration in the average FBG from 137mg to 148 mg/dl.

	Urban random sample N=95	
	Fasting Blood Glucose	
	Baseline (reg)	**Dec-09**
Sum 95 DM patients	**16942**	**14035**
AK	4093	2702
BK	3454	2971
BB	4070	2824
BR	2814	2757
BS	2511	2781
average mg/dl	178	148
average mmol	9.9	8.2

Although these patients have improved their FBG with regards to their baseline, it cannot be called a satisfactory result.

Points for consideration during 2010:

i. So far we recommend people to try to remain below 7% and avoid hypo's. However, with the ACCORD and ADVANCE study results known and a more recent online publication in the *Lancet* (27 January 2010, Survival as a function of HbA1c in people with type 2 Diabetes: a retrospective cohort study,.Craig J Curry et.al.) the highest survival rate appears at 7.8% so we may have to change our categories again:

1. “good if less than HbA1c of 8”
2. “not good if between 8 and 9”
3. “very bad if more than 9”

ii. With this in mind we can look back on what we did find over the years to make new definitions and recalculate what is actually good and what is actually bad... For the graphs above it means that ”good” (so the blue area) was probably larger in reality than we thought was. On the other hand, it is debatable whether some of our “good” patients who had low HbA1c should actually belong in “poor control” as a result of the same study.

iii. In 2009, without a donor for the urban area, we stopped to pay HbA1c for our members because of the high cost of this test and relatively little advantages except for programme managers:
    1. If people regularly keep track of FBG and keep checking for postprandial urine glucose, this is much cheaper for them.
    2. HbA1c do not show postprandial peaks that urine glucose is able to reveal sometimes.
    3. Another argument is that thalassemia among Cambodians makes results unreliable: sometimes driving up the result and sometimes lowering it, depending on the variety of thalassemia.

A further problem with showing the results of aggregated HbA1c in our annual reports is that they relate each time to different individual patients, so they cannot be compared year on year (except the first two graphs). Several times we took a random sample from the patient community that we are following up. The first HbA1c for most patients has become therefore an *evaluation* HbA1c and not a *baseline* HbA1c. These HbA1c are taken each time among different random samples of 19 patients, an equal number from each of the 5 slum areas in order to check whether the peer educators are succeeding in helping the members to keep their glucose levels under control. However, this method is too costly to maintain in view of financial sustainability of the intervention.

Blood Pressure

The blood pressure management had improved compared with baseline for urban diabetics who had been in the program for longer than six months but in year 4 there is a deterioration which makes people fall back to old levels.

Figure 7 Blood Pressure Urban area

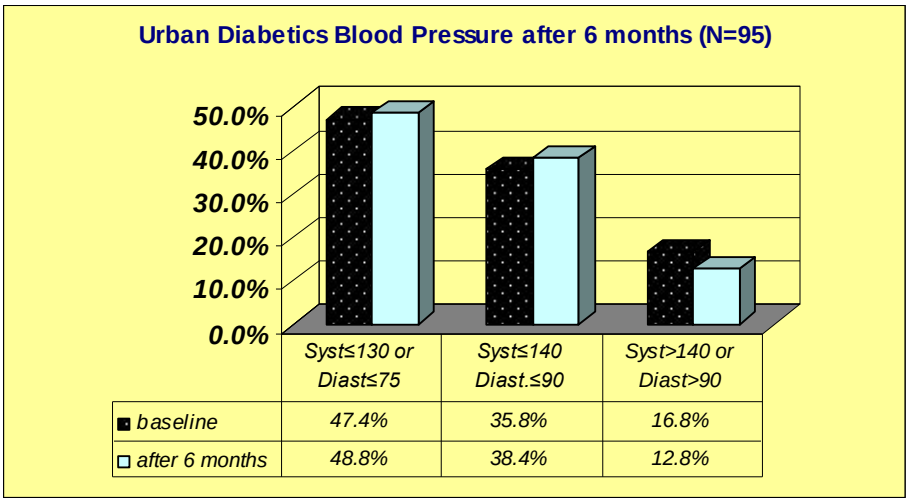
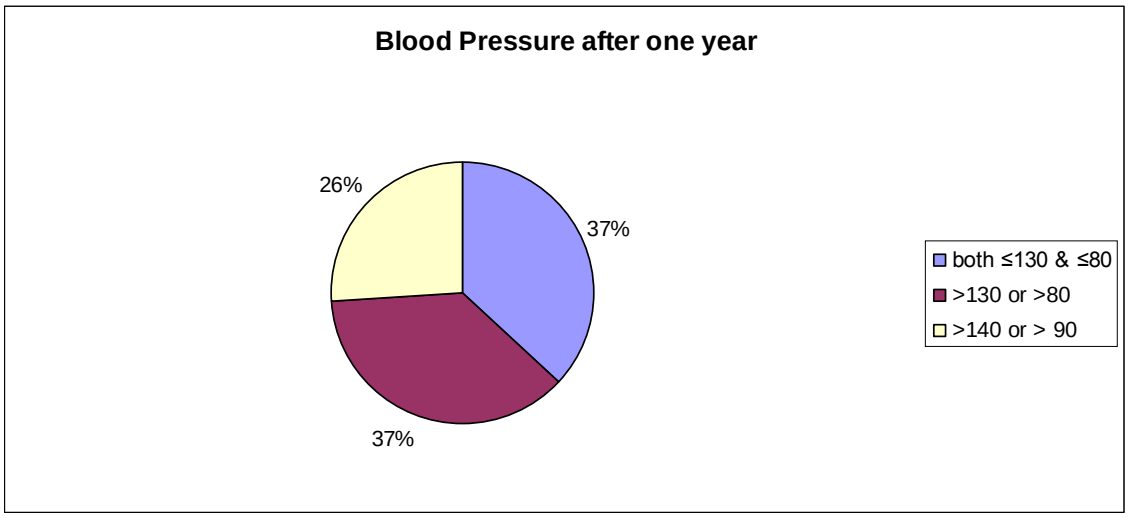


Figure 8 Blood pressure in urban year 4



The blood pressure control has deteriorated in the urban area when measured again in March 2009 in the sense that the gains that were made since the start of the intervention among our members have been wiped out: we are back at zero with this group of March 2009.

Table 1 Blood Pressure Urban Slums compared with baseline

	Urban DM Blood Pressure			
	March-2009		Baseline values	
	Systolic	Diastolic	Systolic	Diastolic
Sum of 95 DM	11982	7531	11956	7521
average	126	79	126	79
	Evaluation		*Registration*	

When we looked at the results more in detail per sample of 19 patients in each of the 5 slum areas, we saw that the picture was rather varied:

The reason of the sharp variation per slum area is not clear. The figures between brackets in column A and B indicate the average lowering of blood pressure for each area. The figures in columns D and E indicate the totals of systolic respectively diastolic per area. The areas are indicate by code in column C.

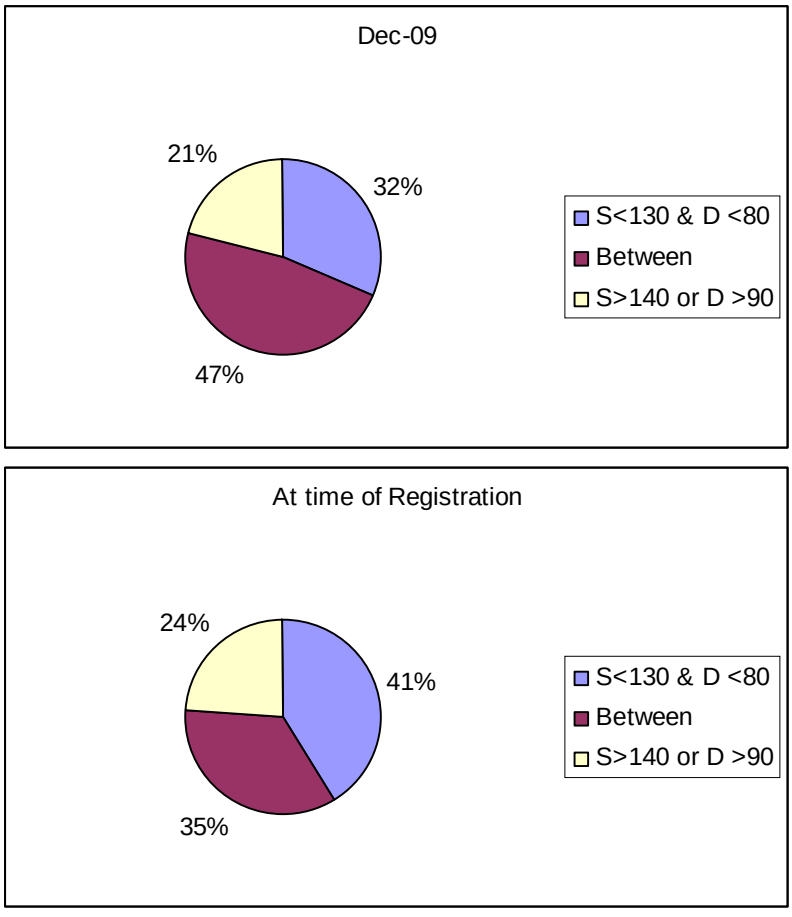
Table 2 Per slum area

	A	B	C	D		E	
			19 DM/area	Evaluation		Registration	
	Systolic Difference	Diastolic Difference	AREA	Systl	Diast	Syst	Diast
	32	(31)	AK	2313	1421	2281	1452
	65	(13)	BK	2426	1526	2361	1539
	54	120	BB	2484	1579	2430	1459
	(109)	(113)	BR	2321	1423	2430	1536
	(16)	47	BS	2438	1582	2454	1535
average	**5**	**2**					

Red figures between brackets indicate lowered pressure.

At the end of 2009, the blood pressure among a new sample of 95 randomly selected patients shows a slightly more positive picture":

Figure 9 December 2009 Blood Pressure urban



The 2 graphs suggest again a deterioration. However...

When we look at the total blood pressure and average blood pressures of the sample, there is a surprising lowering in average blood pressure both Systolic and Diastolic, so a small improvement which is not showing up in the categories that we use in the graphs.

Table 3 Dec 2009 sample of Blood Pressure Urban Slums compared with baseline

	Urban DM Blood Pressure			
	December-2009		(Reg) Baseline values	
	Systolic	Diastolic	Systolic	Diastolic
Sum of 95 DM	11694	7248	12020	7708
average	123	76	127	81
	Evaluation		*Registration*	

			19 DM/area	At time of Assessment in December 2009		At time of registration (>6months)	
	Syst Diff	Diast Difference	AREA	Syst	Diast	Syst	Diast
	(25)	(73)	AK	2293	1438	2318	1511
	(110)	(159)	BK	2308	1411	2418	1570
	(114)	(93)	BB	2352	1464	2466	1557
	(78)	(167)	BR	2347	1390	2425	1557
	1	32	BS	2394	1545	2393	1513
average	(3)	(5)		123	76	127	81
TOTALS	(326)	(460)		11694	7248	12020	7708

The red figures between brackets indicate lower blood pressure. So there appears to be some improvement of blood pressure in 4 out of 5 slum areas. The BS (Boeung Salang) is the only slum area where blood pressure overall has deteriorated. In the other 4 slums the blood pressure has lowered both Systolic and Diastolic. We will have to address the problem of Boeung Salang during 2010.

Insulin

33 patients in the 5 urban slums are on insulin at the end of 2009. The patients use about 9 ml per month on average. The proportion of urban patients on insulin is 33 out of 702 registered is 4.7%, but 8.5% of those under permanent follow-up (390 DM patients registered more than 6 months at the end of 2009).

BMI

The random group of 95 DM patients assessed in March 2009 has an average BMI of 24.3, which is 0.8 more than the average BMI they had at the time of their registration: 23.5 ; this means that, although already overweight at the time of their assessment, the group as a whole deteriorates further in terms of bodyweight.

The random group of 95DM assessed in December 2009 has about the same BMI: 24.2, this group 0.4 up from the moment of their registration. If we look at the problem per slum area, a varied picture emerges, showing a general problem except in Boeungkak (BK) and most serious in Boeung Salang, where the blood pressure also is not improving. The BMI and Blood Pressure findings appear to concur.

	Registration	Dec-09
BMI / DM	**23.8**	**24.2**
Total BMI of 95 DM	2262	2298
AK	448	455
BK	*461*	*459*
BB	431	436
BR	456	465
BS	466	483

However we do not know if the general population in the area is deteriorating faster than our group in terms of BMI, so it is difficult to say if our peer educators have simply insufficient impact or no impact at all on BMI. Whatever it is, it is not enough. It interesting to note, although the population gained weight, blood pressure did not go up except in BS, where the BMI went up much more than in the other slum areas.

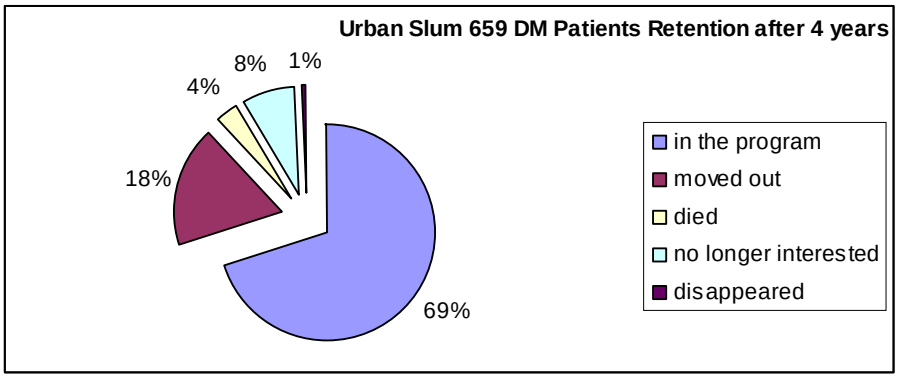
One has to put these health outcomes into a proper perspective:

1) Since one year the Peer Educator of Boeung Salang has moved out of the area and is “trying to follow-up” his group as good as he can. He drives a tuktuk is probably not spending a lot of time on follow up.
2) Recently, the population in the slums BK and BB have been confronted with many problems to meet the challenges of daily survival. Quite some people lost their houses and land because of evictions which took place in year 4. Others are absent for long periods of time as migrant laborers. It is difficult in such circumstances for many to adhere to the lifestyle changes, especially food restrictions and regular medication. For many, it remains difficult to meet the costs of medicine. If 3 out of 5 say their medicine regime is affordable, it means also that 2 out 5 have difficulty with that. Poverty makes it difficult for people with diabetes to remain healthy, although they know what they have to do, often they cannot adhere to the treatment that they would like.
3) MoPoTsyo’s peer educators continue to do active follow-up by visiting patients at home whatever patient’s attitude towards their disease and

whatever their adherence, so including patients who have decided to stop their western medication and switch to a traditional medicine approach for a change. The Peer Educators obtain evaluation results from patients who would have dropped out from a clinic program if they would have had to travel to a clinic regularly to be under its control. They remain enrolled and registered at MoPoTsyo and followed up because it requires no special effort on their part for this. Such "passive" patients are also more likely to have poor glucose control. We think that they are more or less passive members of our cohort that one does not find so often among the regular clientele of a clinic. They also include the "defaulters" who drop out after just one or a few visits to a regular clinic. Some of them are not convinced that what the peer educator explains about diabetes is actually true and continue to rely on traditional medicine, but they allow the Peer Educator to visit and will cooperate a bit now and then just to keep all their options open. It is always handy to be able to call the peer educator when trouble starts. The Peer Educators themselves do not mind that these people remain included, although those people depress the peer educator's performance during evaluations. In MoPoTsyo's cohort those people remain included unless they move out, die, or say that they do not want to be followed up anymore. The Peer Educators try to continue to engage with these people. So MoPoTsyo is not kicking "bad patients" out of its system....but it is quite depressing to see how some of them are doing.

Loss to follow-up: Among the 658 DM registered, MoPoTsyo lost 31% after year 4, so annually a little more than 7.5% of its patients.

Figure 10 Loss to follow up in Urban slums over 4 years



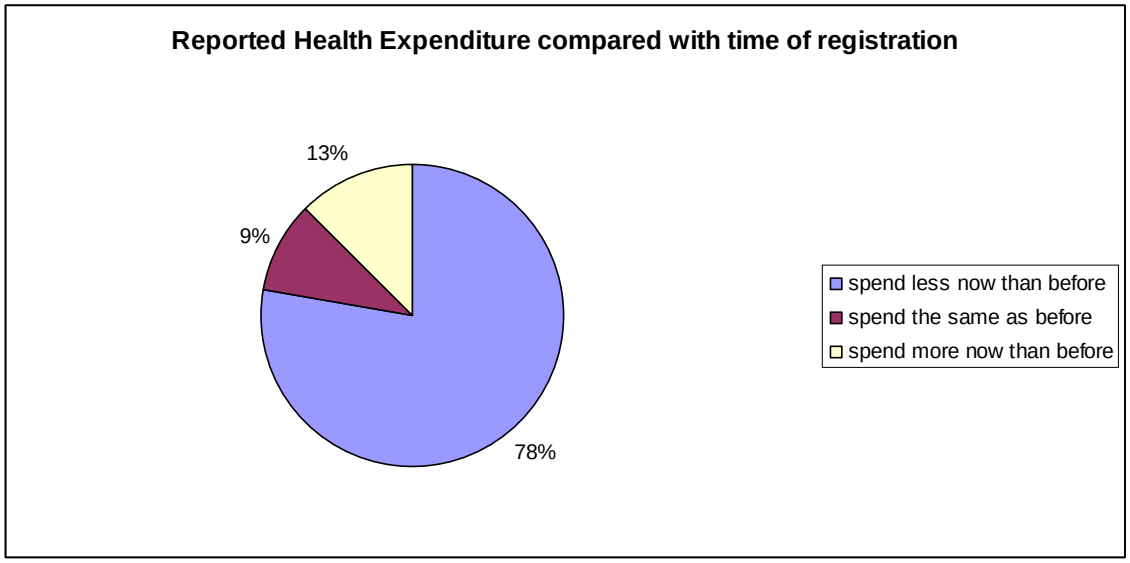
Over 48 months a total of 119 moved out, 25 died, 50 are no longer interested and 4 disappeared, so these figures are really encouraging. In fact it means that only 2% of patients quits voluntarily from the urban program.

3.1.2 Health Expenditure

The randomly selected patients in July 2008 reported to be spending USD 7.84 monthly as health related expenses. The random samples in March 2009 and December 2009 mentioned declining averages of USD 5.28 and 3.57 respectively

that they spend per month[3]. The pie below is based on the results of 95 randomly selected diabetes, 19 DM patients in each of five slum areas, as they report on their level of health expenditure compared to what it was before they registered with MoPoTsyo.

Figure 11 Reported Health Expenditure (urban)



The important question is whether this decline in health expenditure translates into better health for the patients. It is quite disturbing and puzzling to see that in terms of BMI, blood pressure and blood glucose it actually this year 2009 it does not, while at the same time the majority of patients reports to feel better now than before. Can it be that the peer educators are more keen to keep a nice relationship with the patient rather than confront them with hard truths about the poor quality of their self-management? The finding goes to the heart of what MoPoTsyo's peer educators really are about: are they just there to share feelings or do they have to confront patients or not? Whose disease is it anyway and who is responsible and who is in charge and is there common understanding? This is something that we may want to research.

More than 90% of the patients say they are satisfied with their peer educator. The peer educator cannot hear it when they answer the question to the independent interviewer. We think it is a reliable finding.

3.1.3 Medical Consultation and Gatekeeping

Health Service Contact rate:
The contact rate with the health services of our urban membership is impossible to calculate because many get services from different providers. In january 2009 we started to organize medical consultation for our members at Pochentong Referral Hospital, the public hospital of OD West.

Consultations at Pochentong Referral Hospital January to November (11 months)

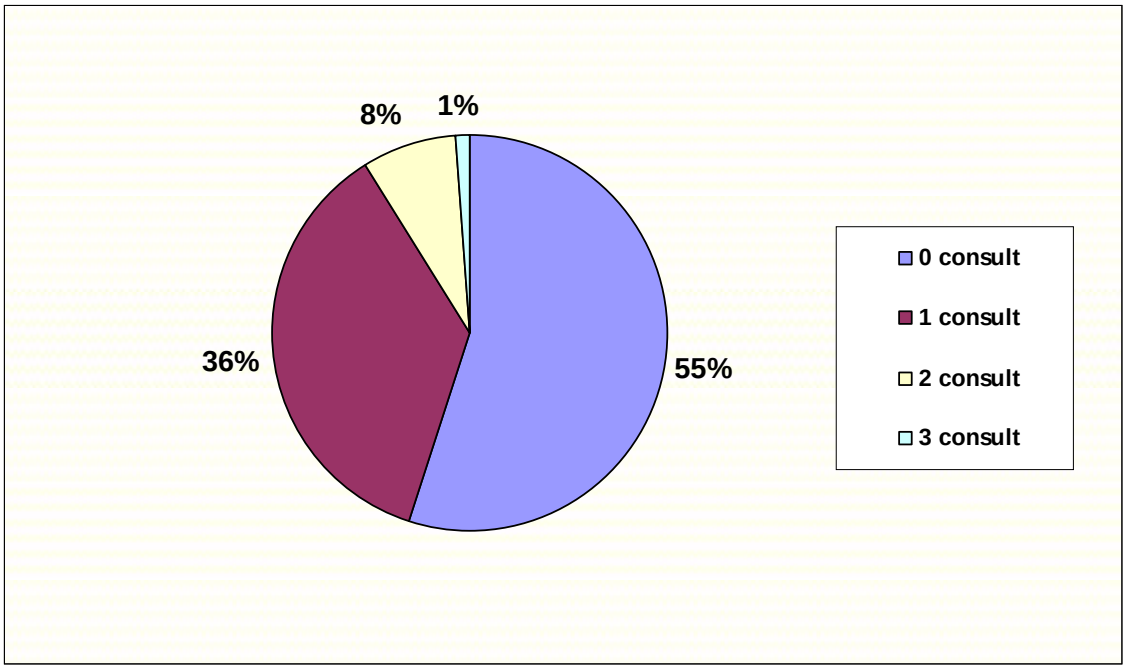
[3] one outlyer in each sample was removed from each of the 2 calculations;

	Total Cohort		Consultations		0 consult	1 consult	2 consult	3 consult	
AK	108	55%	**65**		49	59	6	0	0
BB	84	27%	**28**		61	23	5	0	0
BK	100	54%	**68**		46	54	12	2	0
BR	60	32%	**25**		41	19	6	0	0
BS	38	55%	**29**		17	21	6	2	0
	390		**215**		**214**	**176**	**35**	**4**	0
					214	141	31	4	390
					55%	36%	8%	1%	100%

This table shows that during 2009 55% of our active members never went to Pochentong RH, but maybe they went somewhere else to get free care from an NGO. So we cannot be sure that the figures reflect true access of our present members to medical consultation. Anyway, it should not be too far off the mark for this "stabilized" diabetes but poor population.

Our Peer Educators do not report that the consultation service cannot meet the demand for consultation. As a solution we have to increase the demand for consultation among the patients with the worse health indicators.

Figure 12 Number of medical consultations (jan – nov) 2009 urban membership



3.1.4 Main challenges in urban slums

Our greatest challenge is how to get a more effective grip on "weight control". Our members are getting heavier over the years. Even if blood sugars and blood pressures are brought back to normal ranges, people are gaining too much weight.

We have no funding to establish new peer educators in urban slum areas to expand our network of peer educators. The existing network carries on as it is but its growth is rather slow.

We may have to design a special intervention for the urban High blood pressure groups which allows us to set up these groups without the donor investment of the High Blood Pressure meter. This will go slowly unfortunately.

3.1.5 Urban Plans for 2010

The costs of management of the intervention to help hypertension patients may help to dilute the higher costs of diabetes patients. In other words, revenue generated from high blood pressure patients can subsidize the costs of the diabetes program.

The priority in the urban slums is now to expand the scope of its activity for diabetics to include also people who have no diabetes but hypertension, likely a 1000 urban poor people in the areas where we are working already. The first experiment has started in Anlong Kangan, a very poor suburb. The earlier diabetes intervention there is now followed by a high blood pressure intervention, funded by the same donor, het Maagdenhuis, in the Netherlands. By grouping high blood pressure patients around a trained person with diabetes, who also has high blood pressure, relevant knowledge gets transferred to the group members. The experience in Anlong Kangan is sufficiently encouraging to expand the model to other slum areas in Phnom Penh but there we do not have money to pay for the Blood Pressure Meter. We can maybe find a “community-based solution for this” where we pay half of the meter and the group pays the other half, or some other kind of arrangement.

The expansion of the screening for High blood pressure is combined with greater access to good quality laboratory services.

The program may expand to include other types of related chronic health problems, possibly cholesterolemia, triglyceridemia, certain heart problems.

3.2 First Rural Intervention in Takeo

In mid 2007, we started our first rural program (Ang Roka OD in Takeo province). This is an operational district which had been contracted to the Swiss Red Cross and which has a relatively good public health service, but no diabetes or hypertension services as part of the regular public services provided at the health centers or referral hospital. MSF Belgium had been operating a Chronic Disease Care clinic (CDC) since 2003 at Takeo Provincial Hospital, where people with diabetes can get diabetes service as well as free medicine supplies. MSF B pulled out of Cambodia in July 2009, leaving their patients with six months supply of medicines. MoPoTsyo was in a position to gradually take over the diabetes cohort but only as far as patients are residents of Takeo province. MoPoTsyo is offering the patients a different benefit package than the patients were used to under MSF Belgium. Per 30 June 2009, 132 of MSF’s CDC patients already switched to MoPoTsyo. This figure grew during the second half of 2009 to 458.

3.2.1 Achievements

1. By now, Peer Educators are formally established in all 10 health center areas in Ang Roka, one more than originally planned. Also Peer Educators have been established in the 4 other OD's in Takeo: 6 in Kirivong, 9 in Bati, 7 in Prey Kabass, 4 in Daunkeo. For this we used remaining WDF07-229 Ang Roka project budget and used it to start training and equipping them. This makes a total of 36 identified Chief Peer Educators.

2. 178 villages in Ang Roka have been screened completely and only 8 remain to be done out of 186 villages in the whole OD. In Ang Roka OD 98% of its adults have self screened (57,140 adults) and in the 4 other OD's already 23,835 adults self-screened (provincial screening total is 73,316 adults) with urine glucose strips resulting in 557 diabetics detected in Ang Roka and 264 in the four other OD's (total 821 DM) who live in the coverage areas registered as members of MoPoTsyo; 72% of the ones in Ang Roka did not know they have diabetes. Until now 30 of them use insulin (3.7%) among whom 6 are classified as Type 1.

3. 557 diabetes patients were detected in the first 24 months of the program; It turns out that 1.40% of the urine strips that we hand out becomes positive for urine glucose.

4. Still only one third of detected DM patients of them knew they have diabetes; this is the norm for rural Cambodia. It also means that there are many rural people with diabetes that are *not* found by us which comes as no surprise because we use urine strips for detection for reasons of cost effectiveness.

Glucose Control:

Diabetics who are at least 3 months into the program were tested randomly 2 times: A first small sample of 31 diabetics in two areas at the end of December 2007/early January 2008, showed that 53% had HbA1c ≤7.5, while 22% still had HbA1c>9. Another sample of 133 diabetics in 7 areas in July 2008, showed that 69% had HbA1c ≤7.5 and 23%>9. The first sample was in fact too small to let itself be expressed in percentages.

Table 4 Four times HbA1c in the same Rural Area Ang Roka OD

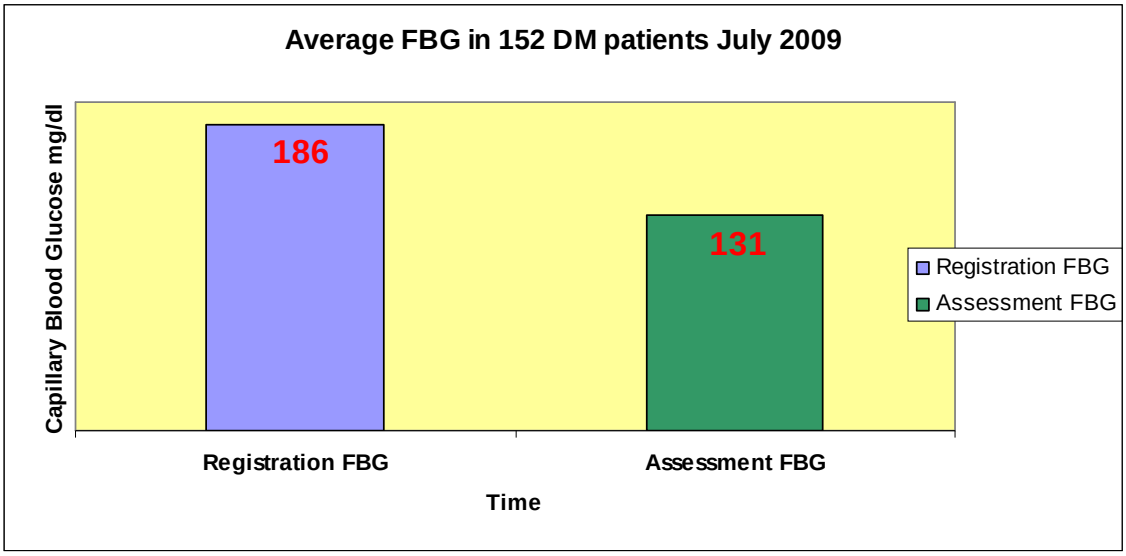
	N=32	N=133	N=152	N=152
HbA1c	Dec-07	Jul-08	Jan-09	Jul-09
≤7.5	53%	69%	67%	52%
>7.5 & ≤9	25%	15%	19%	19%
>9	22%	16%	14%	29%

Please bear in mind that these are each time different samples of patients. To get an idea of the patients have made an average improvement compared with their own baseline results, we can use Fasting Blood Glucose measurements:

In July 2009, MoPoTsyo took a random sample of 152 among 458 DM rural patients who had been registered with MoPoTsyo for more than six months. Their average Fasting Blood Glucose at time of registration was 186 mg/dl (10.3 mmol) but at the

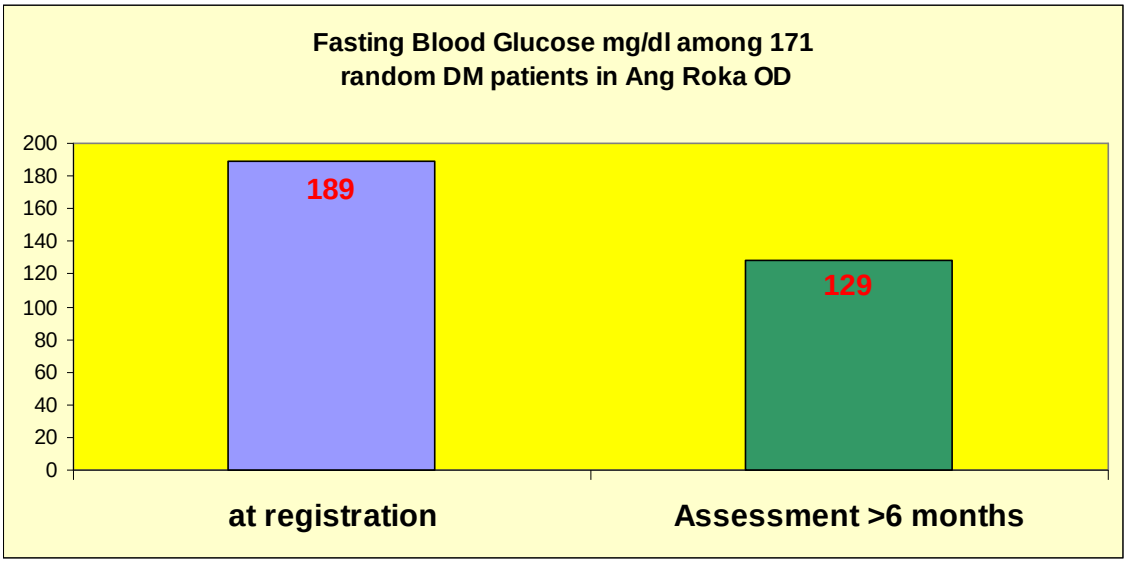
time of the July 2009 assessment this had gone done 55 points to almost normal level of 131 mg/dl (7.3 mmol).

Figure 13 FBG in rural area Ang Roka OD among randomly selected patients



Six months later, in December 2009, this was done again with a new sample, represented below. This time a larger group of 171 randomized patients in December 2009. However, we found a problem with the sampling frame, so it could be NOT representative for the whole diabetes population under control and the end of donor funding to this project. It shows people with diabetes, 72% of whom previously was unaware, are now benefiting from better glucose control since they registered with MoPoTsyo as their FBG descended from 189 mg/dl (=10.5 mmol) to 129 mg/dl (7.2 mmol) over the course of their membership. We will look at it again in mid 2010.

Figure 14 Reduction in FBG among random DM patients (Before and After)



Blood Pressure:

During 2008 we changed the cut off point for Diastolic from 75mm to 80 mm and the assessment method; We think that it is better to take an average of 5 or 6 recordings done at home by the same peer educator using the same machine as during registration than to rely on the more stressful hospital experience where hospital staff may hurry to get a blood pressure result from a patient who is often for the first time in a real hospital and who are a little bit afraid because their venous blood is going to be taken or it was just taken.

The end assessment was done at the of 2009, on a large group of DM patients registered longer than 6 months into the program. This time among 9 samples of 19 diabetes patients in Ang Roka OD so a total of 171 randomly sampled DM patients. However, there was a problem with the sampling frame, so we have to be cautious about these results until we can confirm them in July 2010.

These results show anyway that there is a small but overall improvement in Blood Pressure control among this group, which is hopefully representative for the whole registered diabetic rural membership in Takeo.

Figure 15 Sample of 171 DM Blood Pressure at time of registration (before exposure)

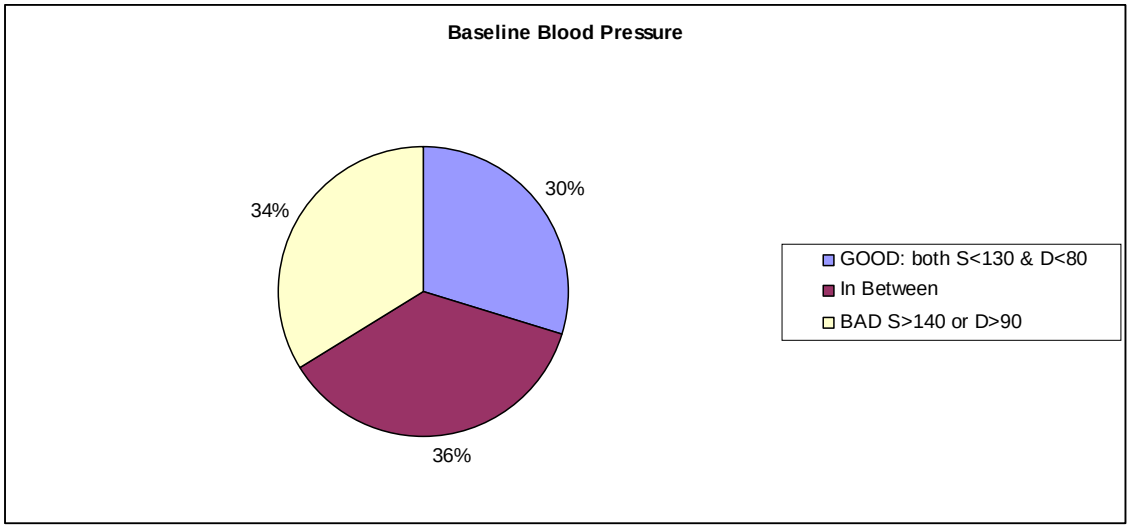
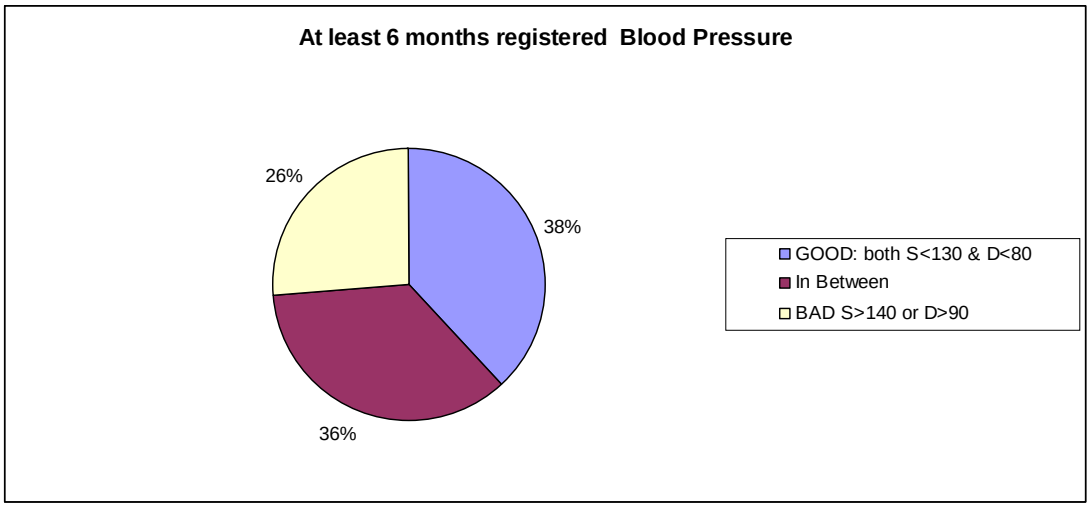


Figure 16 Same random sample (N=171) in December 2009 (after exposure)



The assessment results are the average recorded results during November and December 2009 when the peer educator visits the patient at home or the patient comes to meet with the peer educator. So the data show the results from same machines, same cuff and same persons in the same settings, reflecting the average of a series of home measurements done in November and December 2009, and not a one-off professional assessment in the stressful hospital setting. This way we avoid distortions by the "white coat effect" and by the use of a different measurement instrument.

Insulin

23 patients in the rural area (Takeo province) were on insulin at the end of 2008 of whom 14 in Ang Roka OD. At the end of 2009, these figures had increased to 28 in Takeo, and remained at 14 in Ang Roka OD. Insulin patients can buy their insulin in each of 5 OD's, except in Prey Kabass OD where there are only 2 patients who buy in Bati OD. To stock the insulin properly in the rural area, MoPoTsyo buys a fridge which the pharmacy can borrow from MoPoTsyo and has to return in case we end the contract. In turn we buy all our insulin, for a small handling fee, from Insulin For Life in Australia. At the end of 2009, we also received a first small donation from Insulin for Life The Netherlands, a new branch.

BMI

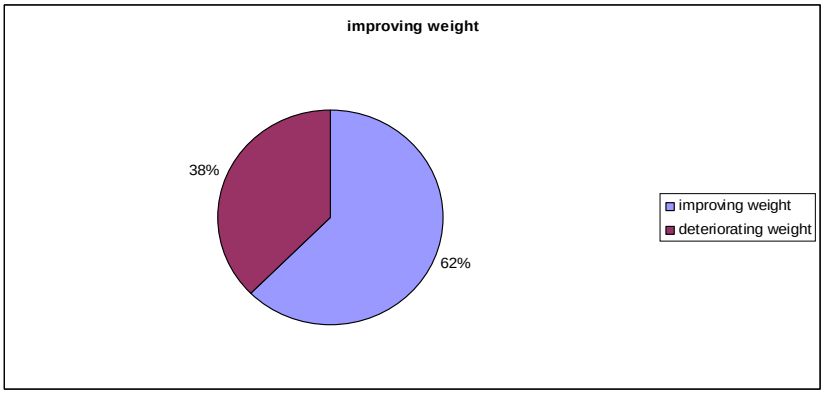
Among the same random sample of 171, obesity was reduced from 15% to 11% as people shifted from the obesity category to the overweight category. It is interesting to note that the size of both other categories remained constant.

BODY MASS INDEX of 171 randomized DM member patients		
December-09	**at time of registration**	**Categories of BMI**
0.39	0.39	Normal BMI 18.5 - 23.0
0.09	0.09	Underweight BMI < 18.5
0.40	**0.37**	Overweight BMI >23.0 <27.5
0.11	**0.15**	Obese BMI > 27.5

This is in sharp contrast to the urban area where the slum population gets heavier.

if we look at every assessed rural patient individually to see whether he/she has improved in the sense that she/she moved closer to a BMI of 20.75 (or in case he/she moved away from 20.75 did not move out of the normal zone of 18.5 to 23.0) or deteriorated further or moving away from BMI 20.75, then we find the following pie :

Figure 17 Improvement of BMI

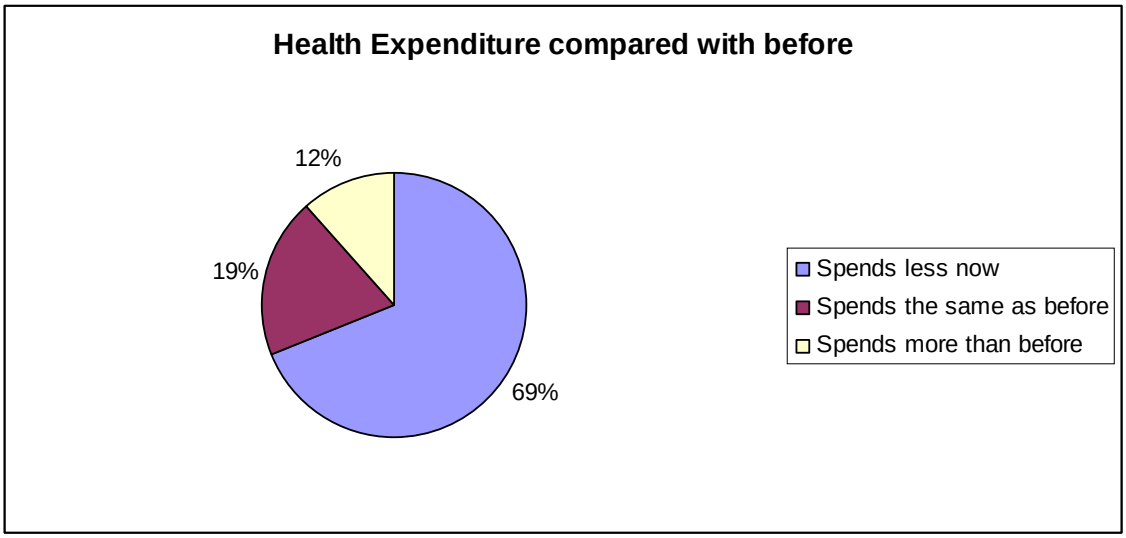


So 38% is actually deteriorating, which shows that weight control remains a big challenge. It was also 38% in July 2009, but it was 34% in the sample taken a year ago. So we are not improving our grip on the problem of overall weight gain in the population including our registered members. A complicating point is that we are not sure about the measurement quality of the hand carried weight scales used by the peer educators for the baseline. This will change, when every peer educator will have more robust scales at their home in the future. We will then have a better baseline to measure progress against.

3.2.2 Health expenditure

The randomly selected patients in July 2008 reported to be spending USD 4.88 monthly as health related expenses. The sample in July 2009 mentioned an average of USD 3.38 that they spend per month. At the end of 2009, more than two thirds is spending less on their health than before they registered with MoPoTsyo but they feel healthier.

Figure 18 Reported Health Expenditure in Ang Roka OD (rural)



More than 90% of the patients say they are satisfied with their peer educator.

3.2.3 Medical Consultation and Gatekeeping

From the table below it becomes clear the detection and registration of 558 people with diabetes does not threaten to overload the health services. Only 1480 medical consultations were given in a period of 2 years. The peer educators are effective gatekeepers.

Table 5 Overview of Medical Consultations

	Total nr of patients with diabetes followed by MoPoTsyo			
1	Peer Educators in Ang Roka OD	558		
2	Still alive on August 14, 2009	529		
3	Crude death of whole period	29		5.20%
4	Average follow up period of patients who died	0.73	year	
5	Number of consultations given to patients who died	3.47		
6	Standardized consult. for 1 year /died patients	4.76	(intensity in time)	
7	average follow up period of patients who survive	1.20	year	
8	Average Nr of consultations given to surviving patients	2.77		
9	Standardized consult. for 1 year/survivor	2.32	(intensity in time)	
10	Total number of consultations	1480		
11	Number of consultations per patient	2.65		
12	Average period of follow up per patient	1.17	year	
13	Standard consult. For 1 year / all patients	2.26		

The Diabetes patients who have seen the doctor, have waited on average 30 days, after registration, to see the doctor for the first time. However, the patients who have died since registration have had to wait only 5 days. People who have died have seen the doctor more than twice as much as people who are surviving. This shows that the peer educators promote medical consultation for more serious patients.

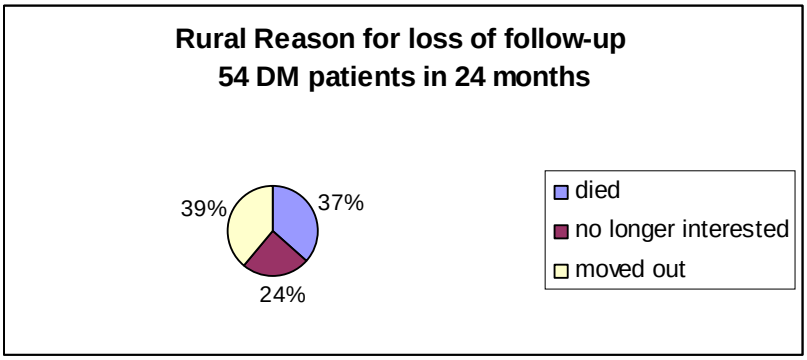
5. There were 4 diabetic pregnancies among the 557.

6. 45% of the registered diabetics also has hypertension(more than 130/80 mm)

Drop Out:

Per June 2009, there were 54 of the 557 detected and registered diabetics who had dropped out, which makes 10%. The most important reasons were that they moved out of the area and death (=3.6% in 24 months). Only 13 (=2.3 %) of our members in Ang Roka OD has indicated over the past 24 months that they are no longer interested in the program and don't want to be followed up anymore.

Figure 19 Reasons for drop out



3.2.4 Main Challenges in the rural intervention

Throughout the first rural intervention in Ang Roka OD, the rural government hospital doctors did not benefit from the regular presence of the trained diabetes specialist contracted by MoPoTsyo to learn from him how to treat diabetes patients. In the other OD's in Takeo however, to which MoPoTsyo is replicating the new rural model, the government hospital doctors are more interested and are more often present during consultations. It is not such a big problem if in the future Ang Roka Hospital cannot provide basic diabetes service to the diabetes patients from Ang Roka as long as the neighboring district hospitals will have the service available. Distances are not very large. Also, once doctors at Ang Roka RH will become interested we can consider providing a special training.

The Ministry of Health has never been allowed by the Ministry of Economy and Finance to pay unofficial health staff. This is a bureaucratic hurdle that we need to navigate around, to free the way for our intervention to be rolled out nationally. We would have to direct our energy towards other government agencies for this kind of money, or finance the intervention entirely through cost recovery activities. As long as private services are so expensive and public service so unattractive, MoPoTsyo can position itself as the best compromise for the average Cambodian.

The year 2009 ended with the major development partners and the Cambodian government at odds over the incentives that can be paid out to government staff who work in donor-projects. The incentive scheme for civil servants, which has cost millions of dollars just to prepare, was wiped off the table at the end of 2009 through an official letter written by the Finance Minister to the Head of World Bank. This gesture, which came out of the blue for most observers, has thrown into tatters many of the projects that major donors intend to carry out together with government agencies. There is no alternative plan. The immediate consequence of this is,

however, that there is an opportunity for civil society to seize, now that government itself as implementing agent will likely be less functional than it was.

3.3 2nd Rural Intervention in Banteay Meanchey

3.3.1 Linking with Community Based Health Insurance

In theory health insurance agencies may have financial benefit from successful self-help groups like MoPoTsyo as they help reduce adverse selection on the side of the patients and reduce moral hazard on the side of the health service provider and reduce costs of disease to the insurer, when lack of appropriate care has resulted in avoidable complications.

During the second half of 2009, MoPoTsyo, CAAFW, and CAS started a partnership with government health authorities in Thmar Pouk OD, to be financed by ICCO-KIA in The Netherlands for a period of three years. It aims to create better health insurance coverage for poor households and also for people with diabetes and or hypertension who will benefit from a Peer Educator Network that MoPoTsyo will set up in this OD in Banteay Meanchey province in North Western Cambodia. This OD was chosen because it is in this area where CAAFW operates the largest health insurance agency with the best population coverage in Cambodia. The role of CAS is to carry out research of the project. There is also a subsidy component: ICCO KIA will provide subsidy to help poor households pay premium during the first year, whereas the ministry of health will pay this subsidy in year 2 and 3.

Based on verbal commitments from Ministry of Health officials during the preparations in 2009, the donor has shown commitment by starting to pay for pre identification of poor households and has approved proposals from CAS and MoPoTsyo. With signed contracts and first donor instalments in the bank, both MoPoTsyo and CAS have started implementation of the projects. The deal is that if the Cambodian government does not pay year 2 and 3, the donor will also not pay the subsidy for year 1 and also stop to fund the partnership project in Thmar Pouk. The government funds have been secured through Annual Operational Planning process, so for the time being the project seems well on track.

At the of 2009, 3 Peer Educators have been identified, trained and passed the exam. The agreements with the local authorities have been worked out and signed. An official project inception meeting is planned for early January 2010 after a visit to Takeo province, where the project partners will be able to see a model of what is going to be applied in Thmar Pouk OD.

3.3.2 TPPS

The 3 implementing partners CAS, CAAFW and MoPoTsyo have formed a permanent Secretariat of the Thmar Pouk Partnership, the TPPS. The TPPS organizes meetings and workshops throughout the period that this project is running to review progress and make recommendations to the implementing agencies. There is a special budget of USD 20,000 for the Secretariat to perform this task, provided by the donor. Also, the Secretariat has sub contracted the pre-identification of poor households in Thmar Pouk OD to a local NGO called PFD (Poor Family Development). PFD is experienced in this and collaborates with the Department of

Planning of Banteay Meanchey since August 2009 to carry out this work. At the end of 2009 the pre identification is about "half way".

The progress of the partnership will be published over a period of 3 years on a special set of English language web pages at
Please visit: http://www.mopotsyo.org/TPPS_Web/Moa_Home.html

3.4 Urban and Rural networks compared

The two interventions are not exactly the same. We can spot 3 main differences:

A *first* important difference is that the urban slum networks reach mostly the poor urban diabetics, while the rural networks reach not just the poor but middle and some higher class people as well. In the rural villages the peer educators reach practically all people because very few people decline, while in urban areas many rich people and middle class are not interested because they can afford "a real doctor". Could it be that "poverty" explains why people in urban slums obtain overall less impressive health outcomes than the people in rural areas. If yes, then how does this mechanism work and how can we compensate for this ?

A *second* important difference is that a special incentive reimbursement system had to be designed to make sure that distance (remoteness) does not limit access to MoPoTsyo's benefits. This is necessary because transportation costs are much higher in rural areas.

A *third* important difference is that only 29% of the rural diabetics knew they have diabetes, while in urban slum areas this is 69%. This confirms what was already found in the diabetes surveys carried out in different areas in Cambodia as published in The Lancet in 2005.[4]

It is interesting that although the urban denominator is a slum population and the rural population is the general population in a contracted OD with a relatively good public service, the urban slum dwellers had better access to diagnosis than the rural population. Of course this better access also comes at a tremendous cost to people.

3.5 Equity Fund in urban and rural areas

In general
MoPoTsyo keeps its equity fund to assist the most needy temporarily in meeting some of the costs of their disease. We avoid that people start to see MoPoTsyo as "the chronic financial solution" to their own chronic problems. Equity fund support is in most cases a temporary matter. Without some financial support some people with diabetes cannot adhere to medicine treatment, although the medicines are not very expensive. We have in urban slum areas now 10% of people on permanent equity fund support. None are 100% supported. In March 2009, we sharply reduced providing equity fund in the rural area, except for a few extremely poor cases, because our donor had stopped to fund this. The need for equity fund support

[4] The Lancet November 2005, 366;1633-1639 "Diabetes and associated disorders in Cambodia: two epidemiological surveys" King H *et al*.

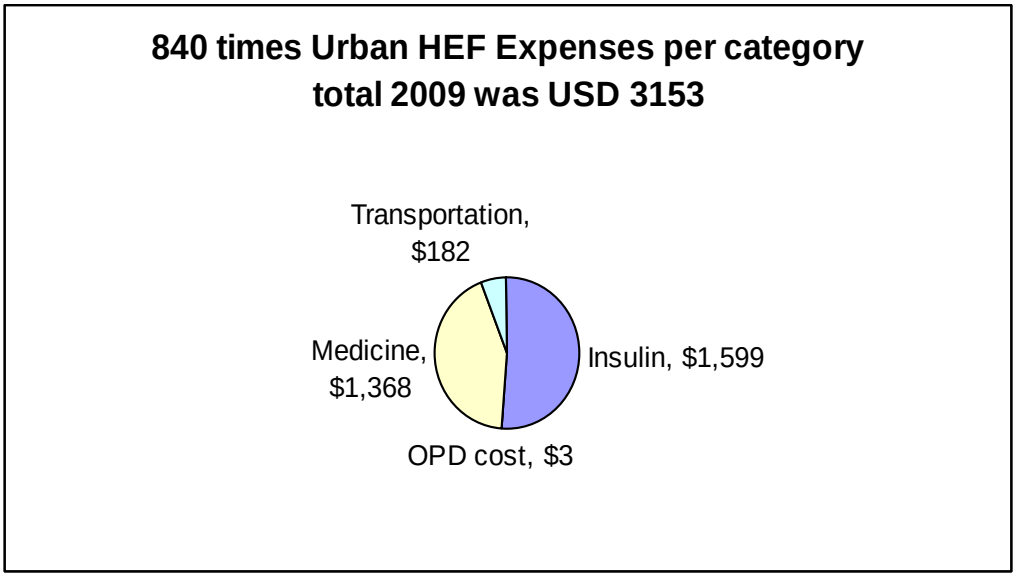
decreases for most patients as they recover from a long period of hyperglycemia and become productive again but of course there were many new patients still who needed it. The community based peer educator is in a position to counsel the relatives on their role. The patient's physical recovery can help to restore and strengthen the family bond, so the equity fund plays a modest but important role.

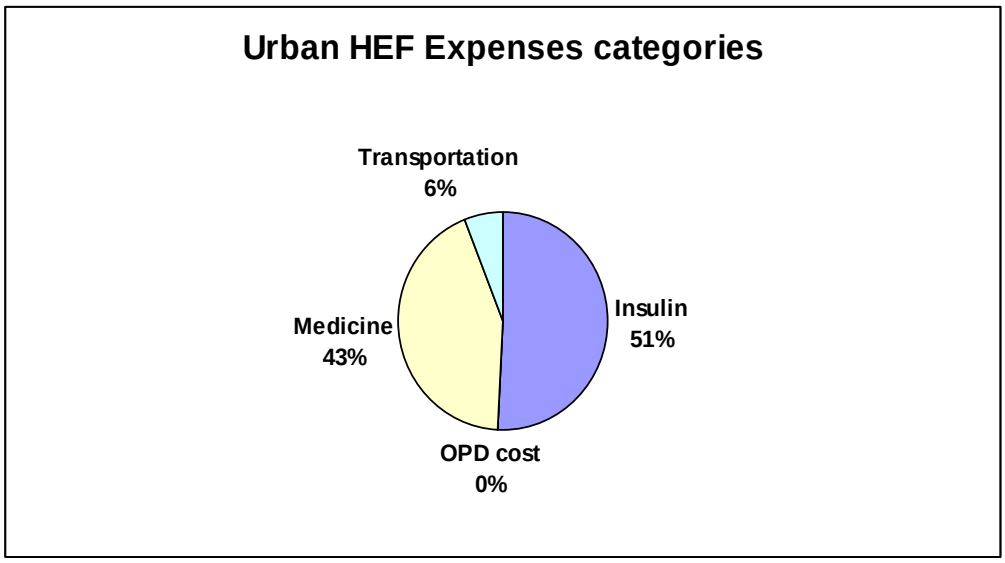
The sustainability of the equity fund support depends for a large part on the Cambodian government's willingness to support it in the future. The other strategy that we use is twinning of our projects with diabetes organisations in other countries. This has started to get shape at the end of 2009.

Urban

In 2009, we spent USD 3153 in total on **health equity fund (HEF)** for our urban members who cannot cope with the costs of their disease. Half of this amount was used to help 18.3 poor diabetics (55%) out of 33 insulin using members to pay for their insulin. Among our members living in the urban slums we have 33 who use insulin. Slightly more than half of them received our HEF support to pay for their monthly insulin. On average we assisted 70 times per month one of our members. In a few instances members received assistance twice per month, but never more often than twice. The insulin patients received monthly HEF assistance from us for an average amount of USD 7.30 per month to help them buy their insulin through our revolving drug fund. The other HEF beneficiaries do not require insulin. They received HEF support mostly in order to buy prescription medicines but only if purchased from our revolving drug fund.

Figure 20 use of Health Equity Fun d in urban slums



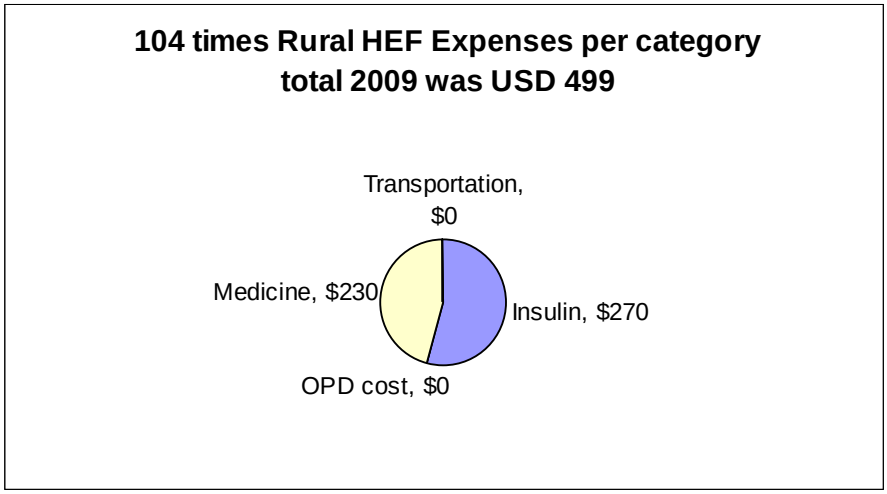


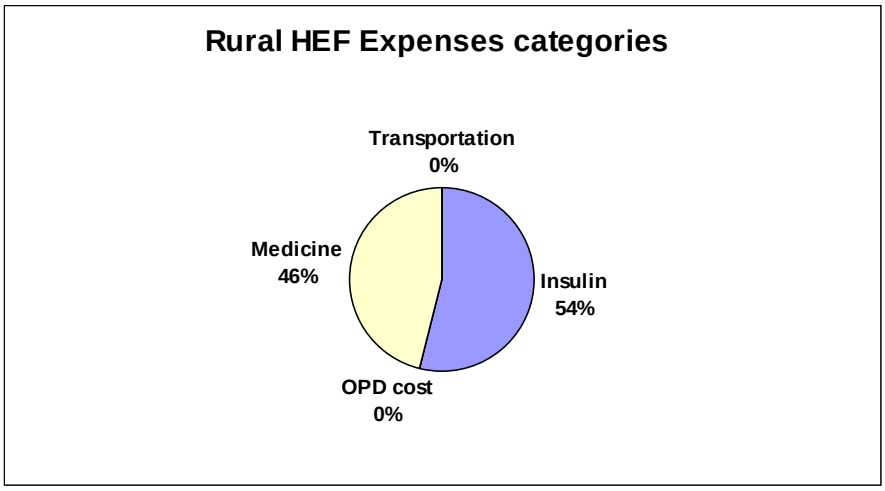
Rural

The spending on equity fund for the rural diabetics was reduced because donor-funding ended in February 2009 because their contract with the Ministry of Health had ended. Because there was no other donor there, we reduced spending to as little as USD 499 during 2009 by limiting to the very poorest cases only. Only at the end of 2009, we received a firm commitment from another donor but disbursement is expected to arrive only sometime in 2010 in our account. We can only spend on equity fund if there is a donor who has donated for future cases of poor people for a period of a year so we can communicate and apply coherently a fair policy of assistance in the local communities. For a chronic diabetes patient who is on prescription medicine such as insulin it is worse to help “once in a while” than not help at all because we want because financial assistance can undermine local support systems of relatives if they think that an aid agency will intervene. Stopping and reducing equity fund is worse than not starting one. It is a challenge to create sustainable assistance.

The other 4 OD’s started their activity only in 2009 without a donor for equity funding so only USD 102 in Daunkeo plus USD 12.50 in Kirivong plus USD 187.36 in Prey Kabbas were spent. Poor people with diabetes were assisted through MoPoTsyo’s Equity Fund by paying their medicine, their transport, a lab test etc.; The low spending in the other OD’s means that poor people are dying unnecessarily because of lack of access to life-saving medicines. With a little bit of money for equity fund, we can make a huge difference for the individual households.

Figure 21 HEF in Takeo province in 2009



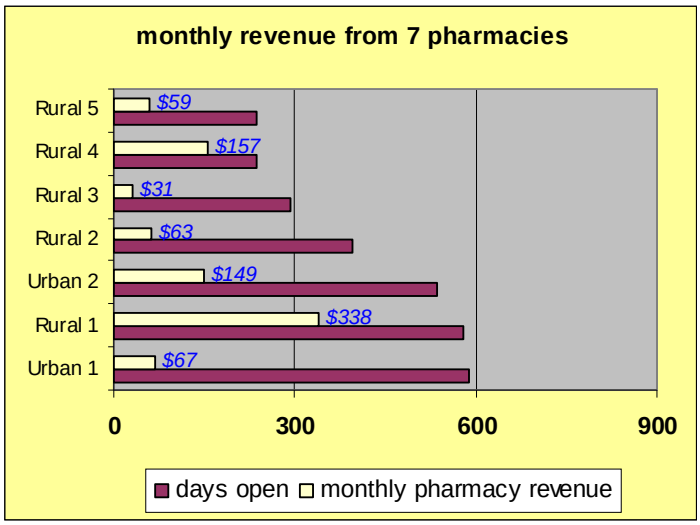


The proportions in spending are similar between urban and rural equity funds.

3.6 Revolving Drug Fund

During 2008 we established a small RDF for our patients, both in urban slum areas and in the rural area. Seven private pharmacies have been contracted. Every patient receives a preprinted invoice, with the names of the medicines in khmer and English. The invoices are numbered to facilitate control and supervision. The pharmacy buys the medicines from MoPoTsyo and sells them to the patient with 15% profit. The Peer Educators and patients play a role in the monitoring of the distribution of the medicines. The Peer Educator collects the revenue and transfers it by bank to a central RDF bank account which is used to purchase new medicines. The sales show an increase over time.

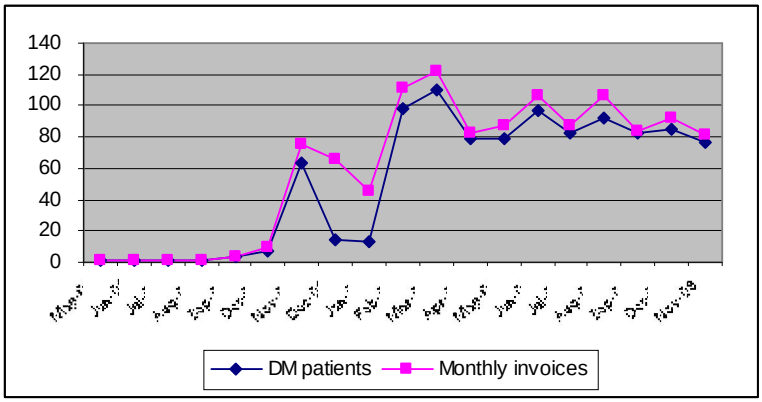
Figure 22 Income RDF



The data in the graph show average monthly income of MoPoTsyo from the 7 pharmacies who buy new medicines from MoPoTsyo to replace the ones they have sold to our members. In order to check whether the pharmacies are not selling our medicines to other people we have to compare the amounts that we sell to the pharmacies, with the invoices of the medicines sold to our patients. These data have not yet been entered at the moment of this report. It is important to note that these data come to us through the peer educator network as a separate channel. It means that peer educator network can monitor the amounts of money which guarantees transparency and community based control.
MoPoTsyo imports GMP certified medicines from Europe. This is cheaper than buying locally or in Thailand. We aim to have one regular supplier and build a long term relationship for steady supply of good quality affordable generic medicines.

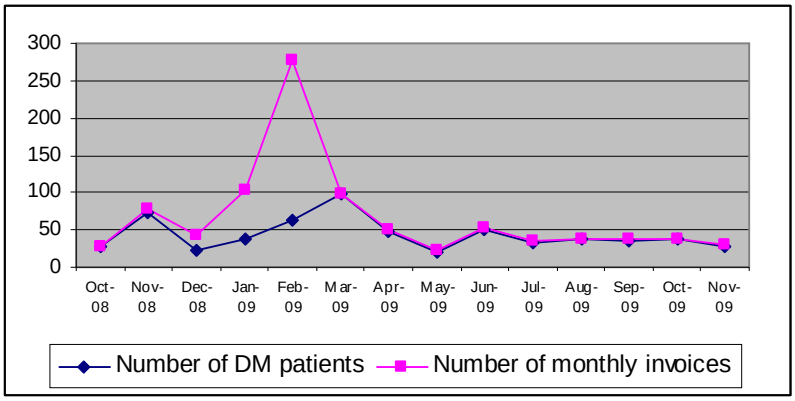
In the urban program we have a stable group of diabetic members who buy the medicines every month, as seen from the graph below:

Figure 23 Urban DM patients buying medicines



It is new to people so it takes time to get used to the system. Now we see that a monthly purchase seems to be convenient, whereas in the beginning the number of invoices exceeded the number of patients. There are only very few hypertension patients buying as in 2009 that intervention has been experimental only.

Figure 24 Rural Ang Roka OD DM patients buying medicine



In the first rural OD the DM patients purchasing follows the same pattern. There have always been problems with the contracted pharmacy in the sense that he did not always provide an invoice. In 2009 the contracted pharmacy drug seller has been impolite or impatient with his clients (our members). The average monthly revenue in 2009 was USD 402 compared with USD 237 in 2008 which is itself a good sign. The pharmacy is well located in front of the hospital. We will definitely increase the number of pharmacies in Ang Roka in 2010. The number of patients who buy medicine is too low and the most likely culprit is the distance between their home and the pharmacy...and a grumpy seller is not acceptable!

The RDF revenue since the start until end 2009 was USD 13,350. The revenue in 2009 was USD 10,391.

If in the future monthly average revenue rises thanks to high blood pressure patients and other chronic patients buying medicines, the revenue can cover the expenses related to prevention activities of the peer educator network, after having covered all the costs related to refilling the pharmacies with good quality medicines to keep them with sufficient stock. After two years in Ang Roka the expenses of the peer educators there only partly covered because the hypertension program was not yet launched.

3.7 Primary Prevention

We suspected that Primary School Teachers, although in a rural area, now lead a lifestyle which is not optimally healthy. If true, this makes them very vulnerable to Chronic Diseases. Because as teachers they influence the school children, they have an important role to play not just for their own health but also for the health of the school children.

In Ang Roka OD, MoPoTsyo conducted an action-research during 2008 and 2009 in order to find out their situation and the priority problems. The final report of the study is not ready at the end of 2009 but some preliminary results are:

1. The majority of surveyed School Teachers is at unnecessary high risk for chronic non communicable disease. The main intermediary risk factors are not concentrated among one group who accumulates all the different risk factors, but they are distributed affecting different groups that are together the majority of teachers. Some people have more than one risk factor.

2. Only third is healthy and two thirds is already showing signs of risk or disease.

3. Because only 1 in 20 teachers reports doing enough exercise, the lack of physical activity may be an important factor for the health problems.

4. With regards to answers given by the 115 School teachers to the baseline questionnaire: It is not that the teachers do not know what a healthy lifestyle is. They know it already. The main problem is that they are not doing enough exercise. Most of them are hardly moving. More than one fifth thinks it is a bit embarrassing as a teacher to be exercising. Only half of the teachers think that other people will understand that they are trying to keep healthy if they would take a bicycle going to work. It could mean that between one fourth and half of the teachers is worried about losing face if they would take a bicycle to work.

5. One fifth is smoking.

6. They do lack some knowledge with regards to which kind of fat is healthy and which kind of fat is unhealthy. The knowledge of the effects of added salt and sugar can be improved. Also, their knowledge of the benefits of fish for health can be improved.

The combined results of the mid-year questionnaire and endline survey indicate that:

With a very simple intervention that involves Peer Educators who are themselves also school teachers, there are important improvements that can be made in the health of school teachers, “evidenced” by better blood glucose control and better blood pressure control; In fact the evidence is not very strong due to the small size of the sample but this problem will be solved once we expand to the other schools in the OD thanks to the new funding from World Diabetes Foundation.

Blood Sugar:

The blood samples were obtained with a handheld glucometer (called “Accuchek Aktiv”, capillary whole blood through finger prick).

Denominator 70 teachers participating in both surveys (with 12 months in between)

FBG	12	**17%**	12	**17%**	Pre diabetics if ≥100 mg/dl is criteria for Fasting Blood Glucose)
FBG	6	**9%**	11	**16%**	Pre diabetics if ≥ 110 mg/dl is criteria for Fasting Blood Glucose
FBG	5	**7%**	4	**6%**	**Diabetics ≥ 126 mg/dl Fasting Blood Glucose**
PPBG	7	**10%**	16	**23%**	Impaired Glucose Tolerance if >160 mg/dl is criteria
PPBG	3	**4%**	11	**16%**	Impaired glucose Tolerance if > 170 mg/dl is criteria
PPBG	1	**1%**	8	**11%**	**Diabetics if ≥ 180 mg/dl is applied as criteria for Diabetes**
	2009		**2008**		

If we compare the blood glucose control among the teachers who have participated in both risk factor control surveys, we see some improvement in blood sugar control among the group who needed it (total 70 teachers compared their results in 2008 and 2009). The improvement is expressed both FBG and PPBG.

These results look nice but we have to caution against over-optimism about the significance of these results due to extensive variation of capillary whole blood results compared with venous blood and this in particular among PPBG. We will see in the future. We may be able to improve the strength of the evidence with our laboratory service plans in 2010....!

Blood Pressure:

Denominator 70 teachers

			2008	2009	2008	2009
BP	**Hypertension**	**Syst>140**	**15**	**5**	**21%**	7%
BP	PreHypertension	Syst>120	25	28	**36%**	40%
BP	**Hypertension**	**Diast>90**	**13**	**7**	**19%**	10%
BP	PreHypertension	Diast>80	13	11	**19%**	16%

If we compare blood pressure control among teachers who participated in both risk factor control surveys with a year in between, we see also an improvement in blood pressure control among those who needed it. Quite some teachers shifted from being hypertensive to again becoming “pre-hypertensive” meaning that they have successfully controlled their blood pressure bringing it back to levels where it is no longer doing as much harm.

The final reporting on the weight control is delayed because we found inconsistencies in the lengths, which is at the basis of BMI calculations. At the end 2009 we are beginning to look into this matter carefully to address these problems...if peer educators make mistakes in measuring people’s length that’s not a good sign.

The next step will be to produce the final report, discuss it with the Ministry of Education’s School Health Department to get their collaboration in the expansion of the action to the whole district of Ang Roka.

3.8 Cambodian Food Pyramids

Food pyramids are well appreciated by the users. Our first pyramid is based on glycemic index which helps white rice eating hyperglycemic Cambodian diabetics bring their glucose levels down to healthier levels. It works well, demand is strong and feedback from the past 5 years from users and doctors remains very positive.

During 2008 and 2009, MoPoTsyo helped the MoH create another type of food pyramid which helps inform people about the basics of healthy nutrition. The pyramid was launched officially during the first NCD Congress, which was held on 8 and 9 December 2009. MoPoTsyo adapted it slightly to use it for its primary prevention activities among school teachers.

Using this pyramid, MoPoTsyo developed a third pyramid to help people with high blood pressure live healthier, including to make healthier food choices.

Therefore we now use 3 different pyramids with the following order of priority to select who should use which period:

1. Glycemic pyramid: people who are hyperglycemic

If not hyperglycemic and diabetes under control, then

2. Hypertension pyramid: people who are hypertensive

If Blood Pressure under control, then

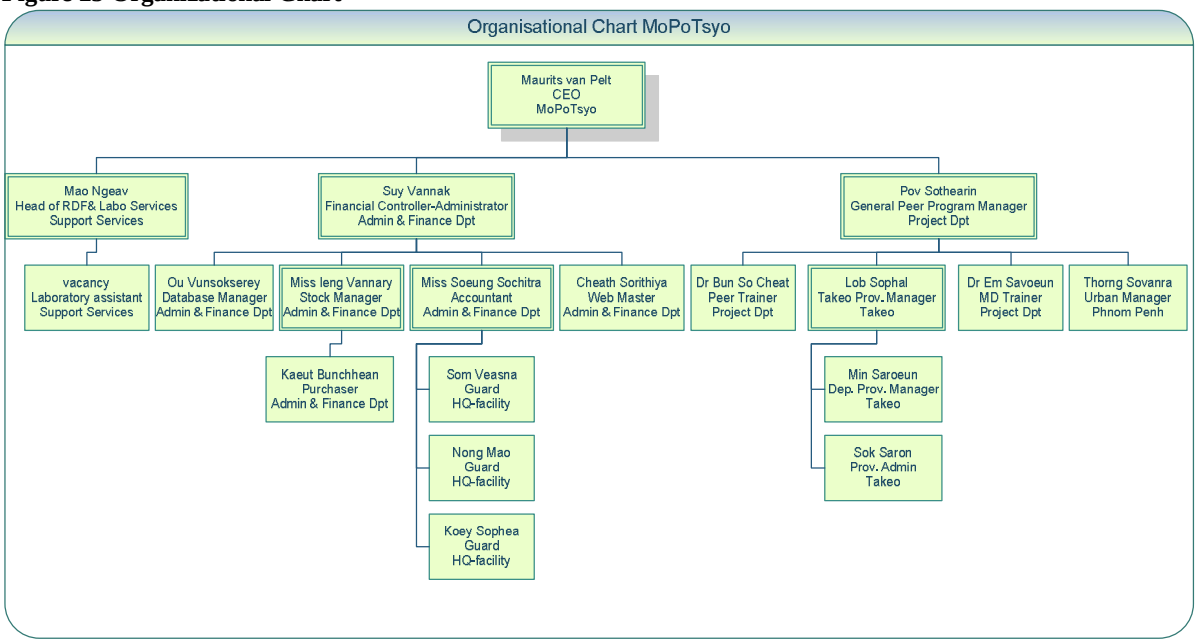
3. Primary Prevention pyramid for everybody else

We have included some remarks with regards to cholesterolemia and triglyceridemia on the hypertension pyramid because those comorbidities are among the same group of people as people with hypertension.

It makes sense to first bring down hyperglycemia and only after this problem is solved, start to address the lipids. Our priority setting must be understood in the local context in which people obtain habitually well over 80% of their calories from carbohydrates in the form of highly glycemic white rice.

4 Organizational Chart and structure

Figure 25 Organizational Chart



This chart shows that we have put a Diabetes Program Manager at the head of each of the networks, with a General Manager overseeing each salaried DPM, as they lead their network of peer educators in an area. A part of the administration and finance will be decentralized to each of the networks over time to ensure that MoPoTsyo Headquarters does not become a micro manager. This decentralization process started in 2008 by training of local people in the networks to take on administrative tasks.

Historically, we are an “information” provider, not a health service delivery organization like a diabetes clinic. We have not yet adapted our organizational structure to the fact that we are increasingly being forced to help organize health

services that are lacking and to deliver certain health services our selves. In order for us to be able to continue to advise large numbers of members on what is best for them, we are moving into territory for which we are not well equipped, but nor is anyone else. In the coming years we will have to develop our own capacity to deal with this challenge and not take on responsibilities and tasks where we can decentralize these to our local partners without that this compromises access to medical services for our members.

5 Communication and conferences

We regularly maintained our website with the latest news and progress on the growth of the network through two-monthly newsletter called “highlights”. During 2009 there appeared 6 highlights on our website at http://www.mopotsyo.org/highlights.html

There were 5 important opportunities for advocacy during 2009:

1. Diabetes Voice on *Access to Care for Diabetes in Cambodia*
http://www.diabetesvoice.org/files/attachments/2009_2_van%20Pelt.pdf

2. As Invited Speaker at the World Diabetes Congress in Montreal October 2009
http://www.mopotsyo.org/Final-IDF2009-MoPoTsyo-Peer-Education.pdf
http://www.mopotsyo.org/MVP-txt.pdf
downloadable video at http://conference2.idf.org/idf2009/0514/default.aspx

3. On November 12th, at the Faculty of Medicine, the Cambodian Diabetes Association had organized the 6th Diabetology Day. The topic was to review the relationship between Doctor and Patient. MoPoTsyo presented briefly its program.

4. 14 November 2009 World Diabetes Day organized by MoPoTsyo in Takeo province.

5. Antwerp Tropical Institute organized a conference/workshop on chronic diseases 'Health Systems and Chronic Diseases'. At the website www.strengtheninghealthsystems.be you can read the key messages and chapters separately and also download the full report, under the heading 'Care for Chronic Diseases'.

Morever, MoPoTsyo’s Peer Educator Network was described as an example of good practice in chronic diseases by the Health & Fragile States Network in "Health Systems Strengthening in Fragile Contexts: A report on Good practices and New approaches" June 2009, page 30 and page 31;
http://www.healthandfragilestates.org/index.php?option=com_docman&task=cat_view&gid=13&&Itemid=38

6 Financing and Funding

Early 2009, we started to use the funding that remained from WDF for Ang Roka to expand to the other 4 OD's, while we prepared our proposal to WDF for a new project to fund this entire expansion. The WDF Board approved it in late 2009.

We also prepared a proposal for ICCO-KIA for a partnership project in Thmar Pouk Banteay Meanchey together with CAS and CAAFW. It was approved in late 2009.

The Dutch foundation Friends For Life submitted a proposal to Impulsis NL to double the funding raised in the Netherlands (see below DVN and CHP and others).

The EU has twice rejected our proposal to set up a peer educator network in Kampot province Chhouk OD. The proposal scored high (40 out of 50 points). The competition apparently got higher marks than we..we keep trying.

We have submitted a proposal to set up a peer educator network in Kompong Speu province, Kong Pisey OD. We hope that AUSAID will fund this to start in 2010.

Diabetes Vereniging Nederland decided to fund MoPoTsyo for 3 years. We can use their funds to help cover expenses for which there is no donor, such as the urban activities, equity fund, medicines, incentives for peer educators etc. The funding is channeled via Friends For Life to be doubled by Impulsis NL.

We have obtained a donation from the Cambodia Holland Partnership, which will be channeled via Friends For Life to us, so it can be doubled by Impulsis NL,

In summary we used funding from the following donors during 2009:

- AUSAID
- French Embassy Fonds Social du Développement
- Swiss Red Cross
- World Diabetes Foundation
- ICCO KIA
- Impulsis NL
- Friends For Life
- Het Maagdenhuis
- Médecins Sans Frontières Belgium
- Cambodia Holland Partnership
- Diabetes Vereniging Nederland
- Ruud van Dam
- Other Private donors

6.1 Program Costs

The 3 graphs below are an attempt to give some insight into how our organizational costs have been developing since we started in 2005. The figures are not to be taken entirely at face value because of several reasons:

1. We don't depreciate items. For example, if an expensive item is bought and paid in 2009 although it lasts 5 years, the whole cost is booked in 2009. Similarly, if we refill our stock on the essential drugs for our Revolving Drug Fund just before the end of the year, the cost of that purchase is not spread into the following period and nor per area where the drugs are being distributed and sold to the pharmacies generating revenue to recover our program costs.
2. New programs demand higher investment in the beginning, so if a new program starts at the end of the year, the whole cost falls into that year although there are few patients and that drives up the average cost. In Takeo, the first OD intervention started in mid 2007 and cost of running this OD dropped in fact sharply during 2009 but also in 2009 we started a new intervention in the same province to replicate the Ang Roka OD intervention to 4 other OD's. So downward forces and upward forces have been at work which we cannot extricate.
3. A new program started in Banteay Meanchey province during second half of 2009, with high investment costs.
4. The costs of piloting the intervention costs for hypertension patients are "hidden" because that intervention is meant to be carried by the diabetes intervention, but the figures do not show its output. That will have to change when we present these figures in 2010.

Figure 26 Decreasing cost per registered urban DM patient over time

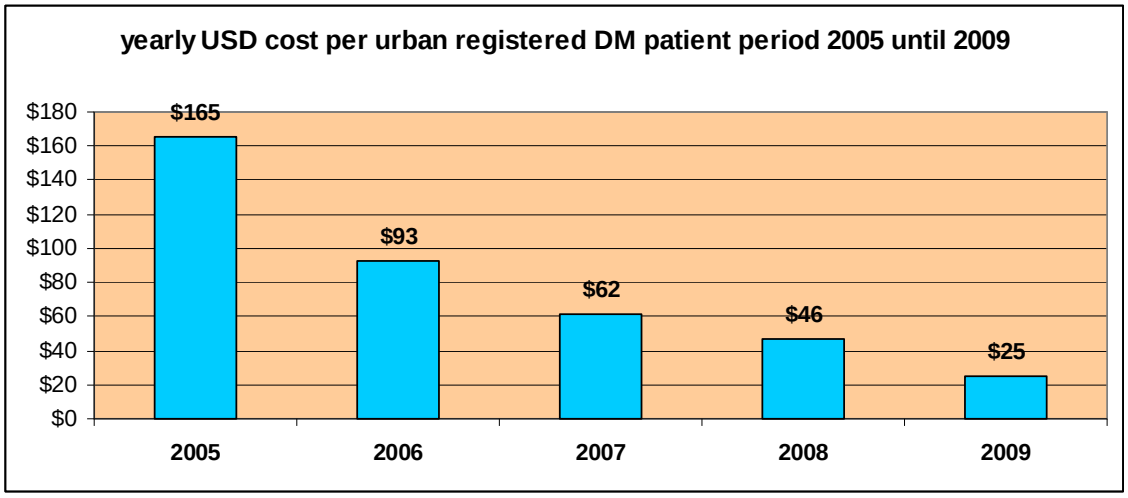


Figure 27 Costs per registered DM patient in Takeo

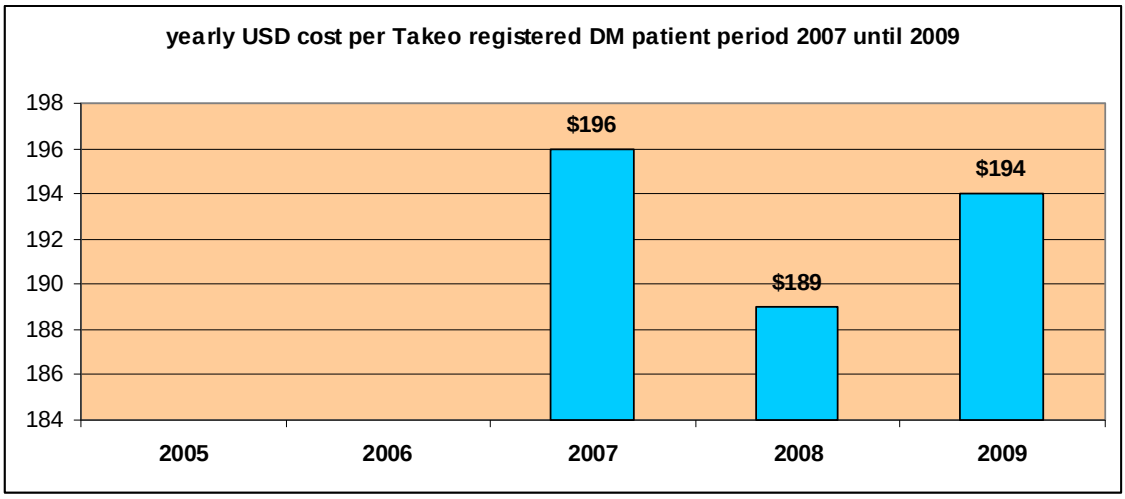
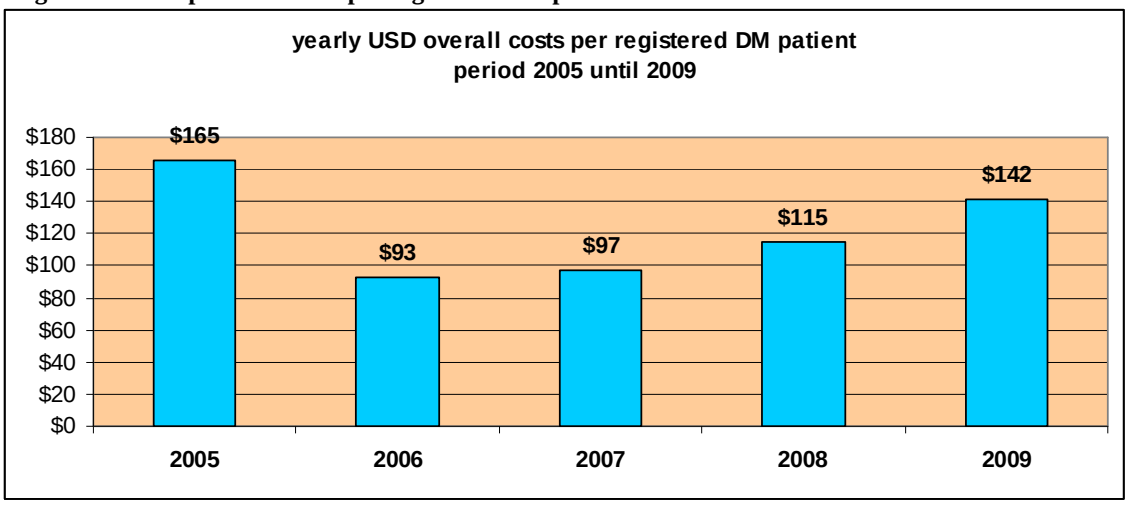


Figure 28 development of costs per registered DM patient over time



It would have been encouraging if in particular 2009 would not have presented a higher cost than 2008. At the end of 2009, a new program started in Banteay Meanchey requiring a substantial investment. In fact, the main reasons that the yearly columns vary in height are due to the upward and downward forces described in the 4 points at the beginning of the paragraph. It would be difficult to extricate these forces exactly and present a true cost picture year on year. Wait and see how it will look at the end of 2010.

Our plans for 2010 and beyond

1. Obtain funding from an insurance provider

Our intervention is reducing health expenditure, including by insurance providers. The size of these savings will be measured in 2010 in Thmar Pouk OD by CAS.

2. Obtain equity funding to help the pre identified poor diabetics and hypertensives pay for their health care costs;

We need to develop standards that are objective and which can applied to decide what to support and whom to support with how much money. An attempt to do this will be carried out in Thmar Pouk OD in Banteay Meanchey province.

3. Organise improved access to essential laboratory services

This will improve risk factor control for people who are not yet sick but at risk and also our members who are already affected by chronic NCD. It will also strengthen our ability to recover costs of running the peer educator network.

4. Expand and improve GDP and GSP compliant Revolving Drug Fund;

We must increase the number of pharmacy outlets to reduce the distance that patients have to travel to buy their prescription medicines.

5. Implement a provincial model, which can be replicated later on in other provinces:

This will be first tried out in Takeo province.

6. Strengthen our national support basis for a roll out of the intervention;

Several studies will be carried out in 2010, which will strengthen the evidence base of the intervention.

7. Expand geographically and in scope;

We will introduce proposals with donor agencies to start replicate the Ang Roka OD intervention to new provinces. We will try again to obtain funding from the EU to start a project in Chhouk OD in Kampot province. The area is adjacent to Ang Roka OD, from where it is efficient to replicate across both its provincial borders: to Kampot with his EU funding, if and when we get it, and to Kompong Speu with AUSAID funding that we will receive in 2010. The scope will be expanded to high blood pressure and dyslipidemia during 2010. We will collaborate with rural eye clinic in Takeo of Caritas to facilitate access to appropriate eye exam for our DM members with a history of more than 5 years. The next main health problem that we have identified as a major financial drain causing health related impoverishment is “stomach problems”

8. Plan for a reorganization in 2012

We need to adapt our organizational structure to the new challenges presented by more involvement in how the health services are being delivered to our members.