MoPoTsyo Patient Information Centre

Annual report 2013

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INTRODUCTION

MoPoTsyo Patient Information Centre is a Cambodian not for profit organization registered at the Ministry of Interior since 2005. It tries to help chronic patients with Non Communicable Diseases create an effective and affordable public health system to serve their long term health needs. It does this by involving chronic patients themselves :

- in community-based screening and awareness raising
- in chronic disease self-management
- in the organization and delivery of medical services preferably in the public services and as close as possible to where chronic patients live.

According to the MoH Strategic Plan for the Prevention of NCD 2013 – 2020, a network of community-based diabetic peer educators will be set up in every OD in order to help organize and deliver chronic care. It can be supervised and managed by the Operational District authorities thanks to adapted tools and modern technology.

The achieved health outcomes for people with diabetes remain good compared to other countries, in particular when compared to developing countries. For non-diabetic hypertensive people a much wider effort is required together with the public health system to overcome the barriers to the consistent use of available care.

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SUMMARY OF THE REPORT

Increased coverage: The year 2013 saw continued growth of MoPoTsyo's Peer Educator Networks (PEN) and with that the exponential growth in service outputs: An additional 110,521 adults were screened for Diabetes (DM) during the year 2013, adding to the numbers of people who benefit directly from the PEN activities.

TABLE 1 SCREENING ADULTS FOR DIABETES PER YEAR

	URBAN	RURAL					
years	2005 until 2007	2007 until 2008	2007 until 2009	2007 until 2010	2007 until 2011	2007 until 2012	2007 until 2013
Nr of covered and screened adults	29,335	71,329	99,839	156,860	240,550	460,240	570,761
per 31-12	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**

The number of chronic patients who registered as member grew with 36% from 12,496 at the end of 2012 to 17,050 at the end of 2013.

Enormous Needs: Despite special efforts to raise awareness of High Blood Pressure (HBP) and strokes, our Continuum of Care (CoC) remains seriously underutilized by patients with HBP who do not also have DM. Preliminary analysis of the laboratory data suggests that Chronic Kidney Disease (CKD) could be present among one third to half of our members with DM. The screening for Diabetic Retinopathy in collaboration with CSC showed that 23% of our members in urban area have Diabetic Retinopathy.

Financial analysis: MoPoTsyo contributed to the International Forum on Health Financing held in Phnom Penh in May 2013 with financial data on PEN. Peer Education (or Expert Patient) in DM and HBP care in developing countries is still a new health policy area without many peer reviewed publications, in particular on health financing. The Cambodian experience with the growing PEN and their ability to help organize popular health service, was shared with the international health policy experts through 4 brief presentations, posters and with an "Expert Diabetes Patient-panel". The Year 2011 was used as the year in which the cost – which was actually the expenditure – had been calculated per type of output produced by the Peer Educator intervention. The results were presented at the conference in the form of different "health care products" that the NGO using the PEN is able to deliver.

During 2013 we began to calculate the cost per type of service unit using a method called "step down accounting", (see 10.1093/heapol/czh015). The results of costing analysis over the audited financial year 2011 are in the annex of this report.

Monitoring Adherence to prescribed treatment for diabetes and hypertension: The annual report 2011 contained already some data on adherence to medical treatment prescribed to our member by the Medical Doctors consulted through the continuum-of-care system that is being facilitated in each Operational District(OD) by the PEN there. The measurement of adherence, on average for groups of patients, or at individual level of every patient, is possible thanks to the links between data on prescribing, the Revolving Drug Fund (RDF) management, the dispensing at contracted pharmacies through the integrated database. During the year 2013, the automation of the Revolving Drug Fund system was continued with financial assistance from GIZ and from LD. For this annual report the method of calculation of adherence has been improved. The details of the methodology are of calculation of adherence are the annex to this report. By applying our methodology over the whole year 2013 we find that DM patients have taken on average 68% of the routine medication that has been prescribed to them, whereas (non-diabetic) HBP patients took only 48% of what was prescribed. The DM treatment is much more expensive than the HBP treatment. The loss of HBP patients stands at 50%, whereas loss of DM patients has been 20% so far.

National Strategy Development:. During the year 2013 the Ministry of Health (MoH) translated Cambodia's new National Strategy for the Prevention of NCD 2013 – 2020 and prepared its administration. The new strategy was officially approved on November 7, 2013 and is going to promulgated officially after it will have been printed. This is expected for 2014. The finalized this strategy – translated into Khmer - calls for continuation and expansion of PEN for DM and HBP. The MoH takes on responsibility for the PEN and has included the cost of these networks included into the Annual Operational Plan (AOP) for 2013, at least in the OD which qualify as Special Operating Agency (SOA), a special administrative status. It is unclear if the transfer of responsibilities will be complete or not, because there are some activities, currently routinely undertaken by MoPoTsyo, which the counterpart may find challenging.

Vouchers for Poor: During 2013, we have continued to experiment with a discount voucher system. It entitles our Peer Educators and designated Poor Patients to a price reduction at the contracted pharmacies where they buy their prescription drugs. The same kind of voucher is distributed by them to poor DM patients. The discount is minimally 50% but it can be as high as 90%. The actual value of the discount varies with the height (cost) of the individual's monthly prescription.

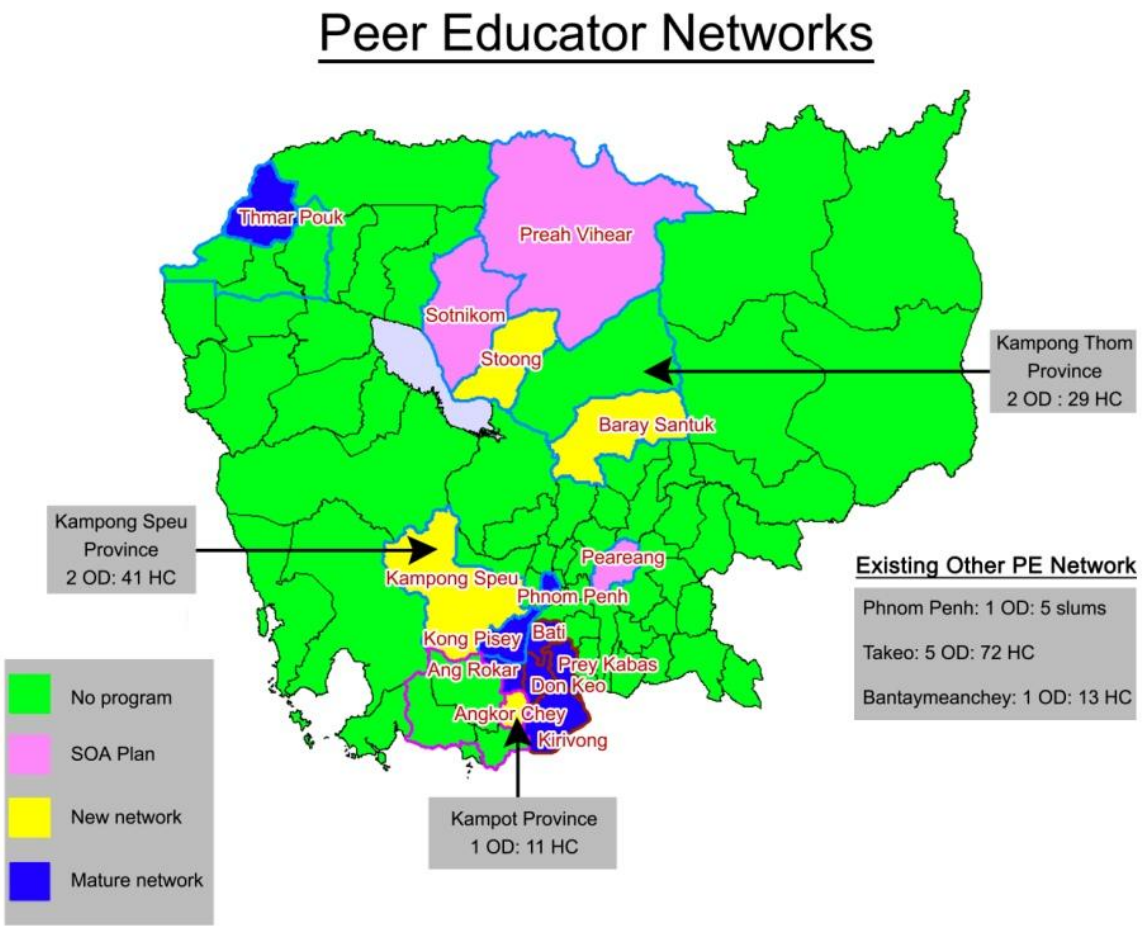
Partners: MoPoTsyo collaborates with CSC and with CARITAS Takeo to organize screening for Diabetic Retinopathy. Louvain Coopération au Développement (LD), a Belgian University NGO and MoPoTsyo continued to implement a 3-year agreement signed in December 2011, to set up a peer educator network in Baray Santuk OD, in Kampong Thom province. GIZ, the German technical cooperation agency, provided MoPoTsyo with a second grant at the end of October 2013 to support peer educator networks. This allowed us to start up a new network in Kampot province. On 23 November 2013, with GIZ and LD funding, we were able to draw national attention to Diabetes on World Diabetes Day, organized in Kampong Thom province with almost

a 1000 attendants who marched a few kilometers, followed by a large rally held on the grounds of the Provincial Health Department.

Research: MoPoTsyo is running 2 research projects: A multi-country translational research, led by ITM in Antwerp, measures the effect of SMS messages on blood sugar control. PATH (Seattle USA) and MoPoTsyo began to screen an urban population of Cambodian adults to compare different DM screening methodologies.

CONTINUATION & EXPANSION OF PEER EDUCATOR NETWORKS

FIGURE 1 LOCATIONS OF PEER EDUCATOR NETWORKS IN CAMBODIA



There are Peer Educator Networks in different stages of development. Mature networks exist in Phnom Penh, Takeo province, in Kong Pisey OD (Kampong Speu province) and in Thmar Pouk OD (Banteay Meanchey province). In 2012 we began to set up new networks in Baray Santuk OD and in Stoong OD in Kampong Thom province as well as in Kampong Speu OD in Kampong Speu province and in 2013 Angkor Chey OD Kompot province. The Ministry of Health has invited MoPoTsyo to set up PEN in 2013 in 3 OD's that are Special Operating Agency, which qualifies

them for HSP2 pooled funds from donors and the MoH development partners. The Peer Educator Network in Phnom Penh is counted for the moment as 1 OD but the slums are located in 3 OD's, whereas a new administrative division into OD's is underway. In 2011 we had begun to set up a peer educator network in Mongolborei OD but this OD has no SOA status (Banteay Meanchey) yet and was denied funding from the pooled funds although the set-up had been included into their AOP. We are not aware of any donor being able to fund our activity there so the set up was put on hold in Banteay Meachey until we resolve the lack of funding. During 2013 MoPoTsyo continued its growth in terms of beneficiaries and also of expenditures, gradually covering a larger adult population with the services of the Peer Educator Networks. By the end of 2013, we have spent over a 2 million USD dollars since we began operations in 2004. In November 2013, the Ministry of Health approved the National Strategic Plan for Prevention of NCD 2013-2020. This plan provides the health policy framework for the continuation and expansion of peer educator networks for diabetes and hypertension to all OD's in Cambodia with explicit targets and budgets.

EXPENSES AND COSTS

Expenses per covered adult and definition of coverage

This report presents calculations of both expenses and of costs per service unit. The expenses figures show that economies of scale make the expenses per covered adult go down. A covered adult is defined as a person who is familiar with the network through his/her participation in the diabetes screening and who lives in an area covered by a peer educator network. A covered adult is someone for whom membership is open, so not necessarily yet a member, because the beneficiaries are everyone who has been screened for diabetes. The reasoning for using this definition is as follows: Theoretically, every adult who has received urine glucose strip for self-testing for diabetes, is aware that the peer educator is living in her/his area and available any time to do a repeat test or provide information. In addition, there must be a Village High Blood Pressure Group in this person's village, because – ideally - the urine glucose screening in the village is immediately followed by the establishment of this High Blood Pressure Group. There are people with diabetes with high blood pressure and people without diabetes with high blood pressure who are member of this group and who use the automated Blood Pressure machine to check regularly on their blood pressure to see if it is in control. The Peer Educator regularly visits the High Blood Pressure group to register new high blood pressure patients and facilitate an appointment at the Referral Hospital for these new patients to get a prescription for the routine medication from the revolving drug fund. So any adult in the village, whether already a patient or not yet, the system is available for use.

TABLE 2 EXPENSES PER BENEFICIARY 2007 - 2013

Beneficiaries/expenses trend from 2007 to 2013 [in adults covered through the Peer Educator Networks in USD]							
Years **End of month December**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Beneficiaries Annual growth %		143%	40%	57%	53%	46%	31%
Beneficiaries							
Number of total population in OD's with PEN	1,109,287	1,109,287	1,466,213	2,322,262	2,322,262	2806790	3,067,517
Number population at NCD risk (=adults)	554,644	554,644	733,107	1,161,131	1,161,131	1,403,395	1,533,759
Nr of covered&screened adults	**29,335**	**71,329**	**99,839**	**156,860**	**240,550**	**351,071**	**461,592**
Coverage of Total Population	2.6%	6.4%	6.8%	6.8%	10.4%	12.5%	15.0%
Coverage of target population at risk	5.3%	12.9%	13.6%	13.5%	20.7%	25.0%	30.1%
Total Expenses Annual growth %		120%	44%	37%	62%	19%	32%
Total Annual Expenses [in USD]	$59,808	$131,725	$189,773	$260,446	$422,145	$504,321	$665,717
Accumulated expenses of whole intervention		$191,533	$381,307	$641,752	$1,063,897	$1,568,218	$2,233,935
Expenses per Unit per beneficiary [in USD]							
per population	$0.05	$0.12	$0.13	$0.11	$0.18	$0.18	$0.22
per population at risk (all adults) of NCD	$0.11	$0.24	$0.26	$0.22	$0.36	$0.36	$0.43
per covered & screened adult	**$2.04**	**$1.85**	**$1.90**	**$1.66**	**$1.75**	**$1.44**	**$1.44**

With growth the intervention is becoming more efficient, as larger numbers of beneficiaries are being served for less money.

The expenses per screened adult have been broken down in different types of benefits that these adults can receive, depending on their individual situation, as can be seen in the table below. The provision of benefits depends on the needs of the individual as these needs are not the same for everyone. Once the peer educator network is established and has screened a village and puts the Village High Blood Pressure Group in place, in fact the entire village population is covered, whether they are a still a child, a healthy adult, a diabetic, pre-diabetic or pre-hypertensive. The system is ready to receive them when healthy adults become diabetic or hypertensive as there is no financial threshold that makes membership difficult for them. In Cambodia, the adult population is roughly 50% of the total population. Our expenses per screened adult can therefore be conveniently converted into expenses per capita by reducing by half the expenses per screened adult.

Cost per service unit

In 2013, with technical assistance from GIZ, we were able to calculate the cost per service unit. We opted to create 4 cost(service) units. Screening is activity that may be only necessary during the start up phase. The cost of the community-based peer educator was calculated separately to be able to inform health policy makers of what it costs to add peer education into the care model. The annual treatment cost of a Diabetic patient and a High Blood Pressure patient are both low partly as a result of a community-based peer educator being involved in the care organization and service delivery. Without the peer educator both the health outcome would

likely be much inferior to what it is now and the cost of care would be much higher as seen in other low-income countries.

TABLE 3 COST PER SERVICE UNIT IN 2011

1 adult screened for diabetes	$ 0.10
1 Community-based Peer Educator in 2011	$ 1,318.70
1 Diabetes Patient receiving care in 2011	$ 43.47
1 High Blood Pressure Patient receiving care in 2011	$ 16.81

For the definitions used in each service unit and details, see the annex. In order to isolate the cost of care per patient per year, certain expenses were excluded, such as primary prevention, advocacy and health system development. The cost of the dispensing by the pharmacy to the patient was added (a 15% profit margin for the pharmacies). It is useful to note the phenomenon that for some patients some of the peer educators act as a "shopper": (s)he collects their patient books, goes to the pharmacy, gets all the medicine packed for every patient, redistributes these with the patient book and collects their money. When it happens, it further decreases overall cost of care per patient. Calculation of cost of care per patient is further complicated by the differences in services and in adherence levels, with diabetes patients having much better adherence to therapeutic treatment than high blood pressure patients. The cost of care for the high blood pressure patients should be around USD 25 per year with better utilization of service by this type of patient.

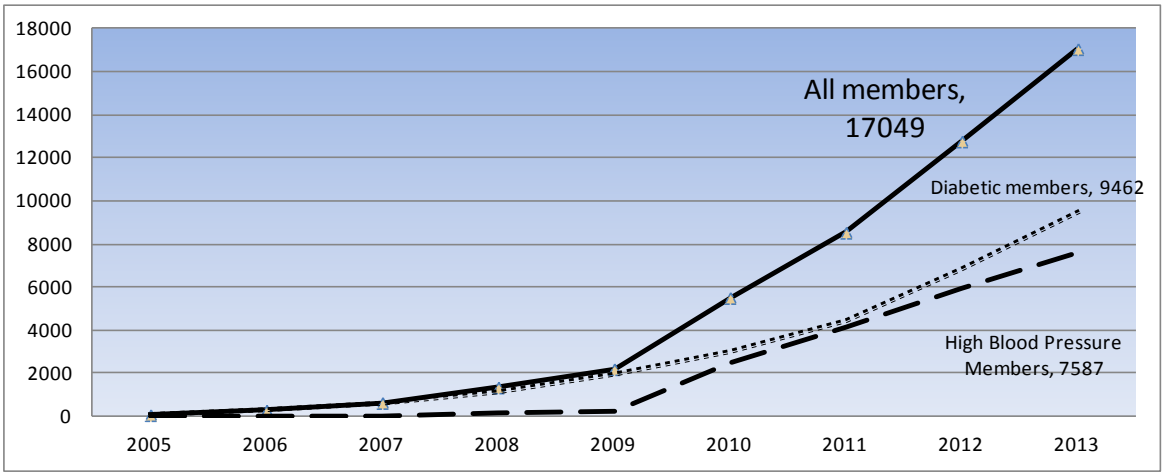
MORE PATIENTS DETECTED AND MORE MEMBERS

The numbers of chronic patients who register as member of MoPoTsyo have continued to increase: from 12,496 members at the end of 2012 to 17,049 at the end of 2013. Only patients with diabetes and or hypertension (>140/90) can become member.

The membership figures do not represent the current membership because we have not removed from this figure the patients who have died since 2005. A mortality rate of 2 to 3% yearly is what we estimate it to be.

Further down below we discuss access to and utilization of medical services by these patients and the follow-up system of these patients. Some registered patients make little use of the system compared with others. The graph below reflects the number of chronic patients who over the years have been formally assessed by the PE so we have their ID, address and bio-data in our database.

FIGURE 2 GROWING MEMBERSHIP



The lines represent the accumulation of chronic patients, individuals, who have benefited from the Peer Educator Networks since 2005.

If we want to know how many individual patients were benefiting during the year 2013, we have to deduct everybody of whom we know that they have died and everyone who did not use the peer educator networks during the year 2013.

TABLE 4 LOSS AND DEATH

Beneficiaries During 2013				Since 2005	Death and loss since creation in 2005	
	Active in 2013	Died	Lost	Total registered	Recorded deaths among registered	Patients Lost among registered
Diabetics	7350	228	1901	9479	2.4%	20%
High Blood Pressure	3714	50	3823	7587	0.7%	50%
Total	11064	278	5724	17066	**1.6%**	**34%**

We estimate a mortality rate of 2 to 3% yearly, but most cases remain unreported. The higher percentage (80%) of "died" among diabetics than among HBP (34%) means just that we have slightly better information about them, see table below.

	Active in 2013	Died	Lost
Diabetics	66%	82%	33%
High Blood Pressure	34%	18%	67%
Total	100%	100%	100%

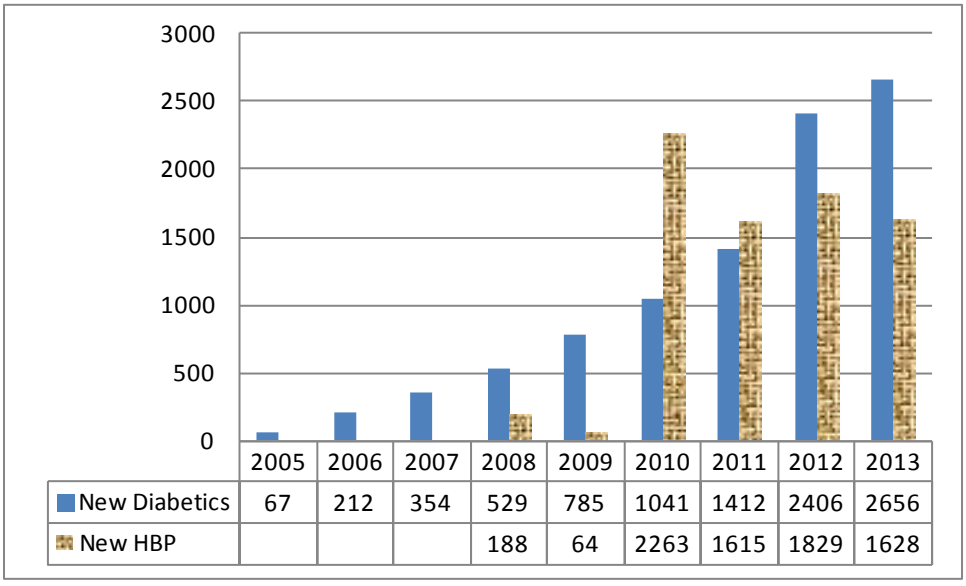
MoPoTsyo Peer Education began in urban slums in mid 2005 with screening for patients with diabetes (DM), including also care for diabetes patients with High Blood Pressure. In mid 2007 this intervention was piloted in a rural area, when peer educators began to be trained in Ang Roka OD in Takeo province with small amounts of funding from the World Diabetes Foundation, Swiss Red Cross, MSF Belgium and others to cover one entire operational district, with one peer educator per health center coverage area. The design was created to follow Cambodia's

National Health Coverage plan which is population based and which does not follow the country's administrative division into communes and administrative districts.

Since 2008, there is no more active diabetes screening in urban areas. There are only 5 urban peer educators who are very busy following up large numbers of diabetes patients, compared to more than 130 rural peer educators. There is no active High Blood Pressure program in the urban area, only in rural areas.

High Blood Pressure: An initial small group of members with High Blood Pressure, without diabetes, were recruited to the program in 2007 in urban slums. We created a Village High Blood Pressure group in 4 villages. After 2 attempts it did not catch on with the VHBGroup Leader nor the patients. Then it was tried in rural area with 578 groups, which initially also did not work well. There we added a primary prevention campaign for community leaders and for school teachers. This latter feature helped to ensure wider support for the intervention, but it cannot be implemented in the high-class urban environment by low-educated slum-resident-peer educators. In the rural areas a provisional modus operandi was found which shows better results. The High Blood Pressure intervention design remains unfinished without proper links with the health centers. The challenge is not to detect and register and counsel members on High Blood Pressure but to make them get a prescription and especially to make them adhere to treatment once the symptoms are over.

FIGURE 3 YEARLY GROWTH IN MEMBERSHIP



	2005	2006	2007	2008	2009	2010	2011	2012	2013
New Diabetics	67	212	354	529	785	1041	1412	2406	2656
New HBP				188	64	2263	1615	1829	1628

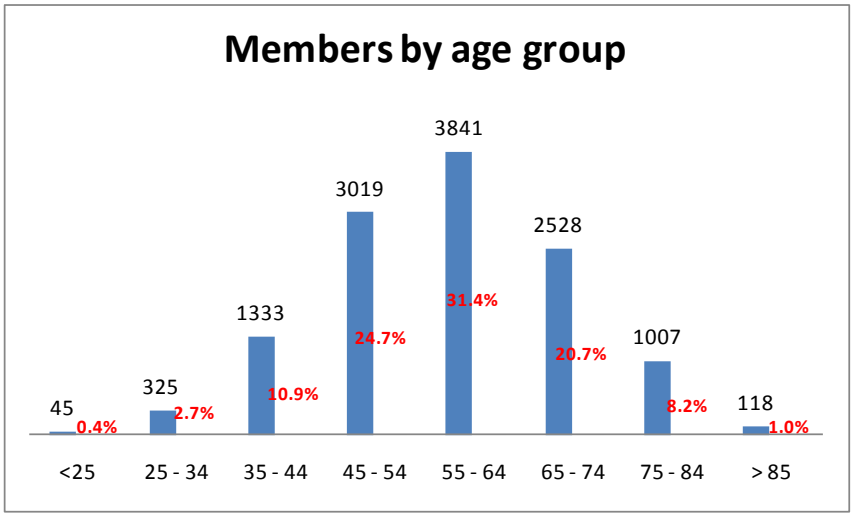
Yearly growth of people with DM is more gradual than the yearly growth of the members with High Blood Pressure. High Blood Pressure intervention design still requires more work and closer collaboration with the public service to enhance its effectiveness.

ELDERLY

According to the definition of the Madrid Plan of Action[1] we have 8,082 elderly members: of 60 years and older. According to that definition 49% is "old". The WHO STEP survey is using the age group 25 to 65. By adopting the age groups of the STEP survey we may be able to compare the registered numbers of patients of with national prevalence figures.

		Age based on D.o.B
all members		16600
60 or older	49%	8082
65 or older	32%	5370

FIGURE 4 ABSOLUTE NUMBERS & % PER AGE GROUP IN 12,216 MEMBERS AT THE END OF 2012



The age groups of only diabetics (non diabetics excluded) shows a similar pattern. More than 23% of the members with Diabetes is 65 years or older, an age group that is not (yet) being surveyed as part of STEP survey. In the 2008 Census the people from this age group formed only 5.5% of the general population.

TABLE 5 DIABETICS BY AGE GROUP BASED ON 2012 FIGURES

Diabetics per age group		
Age Group	Number	%
<25	31	0.5%
25 - 34	179	2.7%
35 - 44	798	12%
45 - 54	1813	28%
55 - 64	2202	34%
65 - 74	1156	18%
75 - 84	359	5%
> 85	21	0.3%
Total members	6559	100%

[1] (http://undesadspd.org/Ageing/DataonOlderPersons.aspx)

HUMAN RESOURCES: PEER EDUCATORS AND SALARIED STAFF

Every year MoPoTsyo is training new Peer Educators (PE) increasing Cambodia's health workforce with lay workers having a received special training that makes them in practice, a highly effective and low cost resource for public health duties. In 2013, 29 new PE's were added to MoPoTsyo's network, representing the largest yearly increase in PE's since operations began. From 2005 to 2013 there have been a total of 164 PE's trained by MoPoTsyo. Among them 112 are still working as PE.

FIGURE 5 TOTAL NUMBERS OF PE TRAINED + PE STILL WORKING

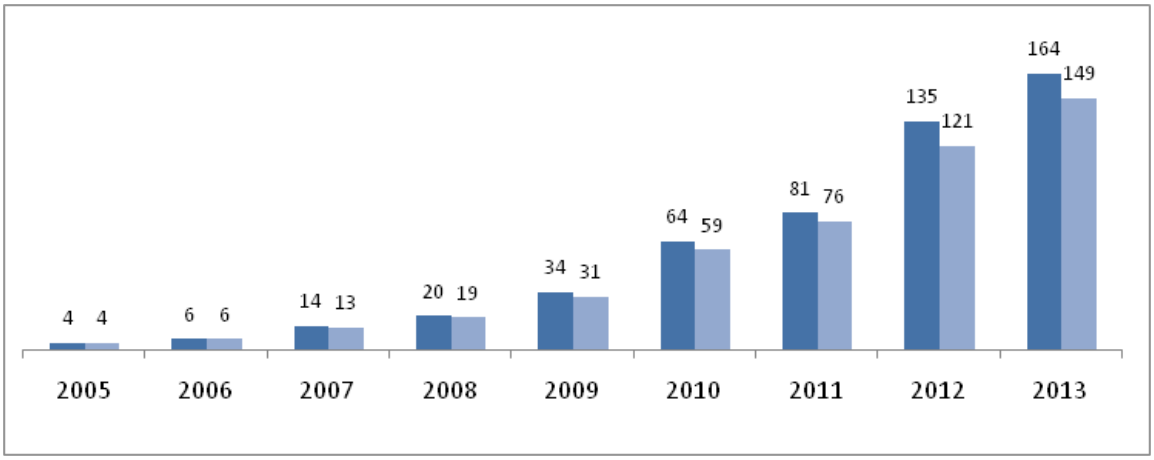
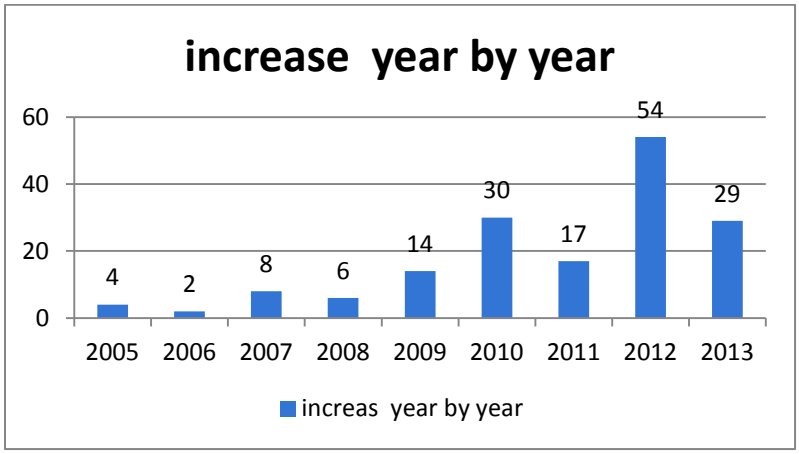
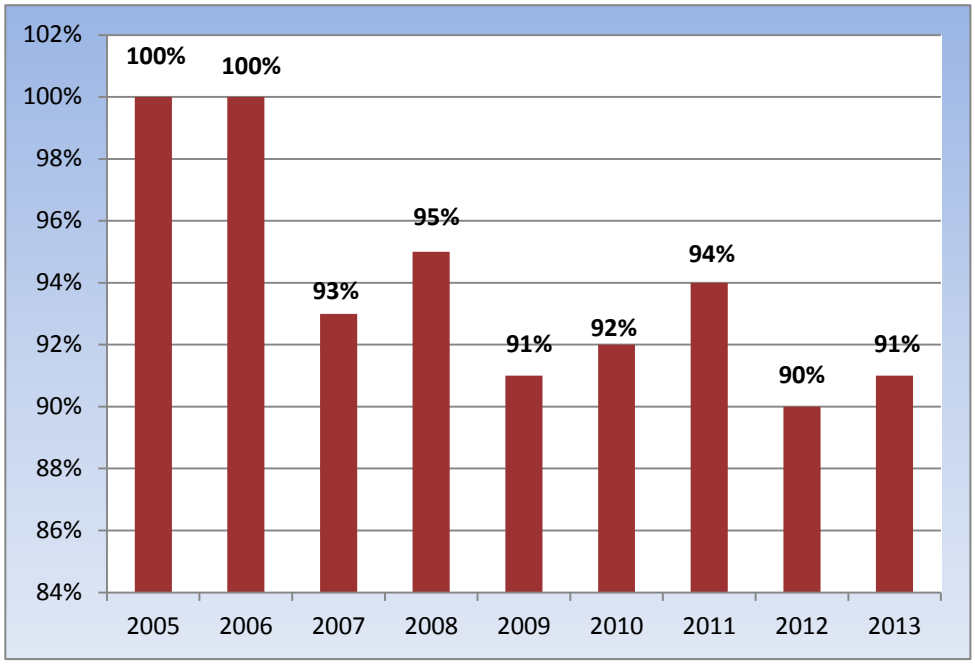


FIGURE 6 YEARLY NUMBER OF PE TRAINED



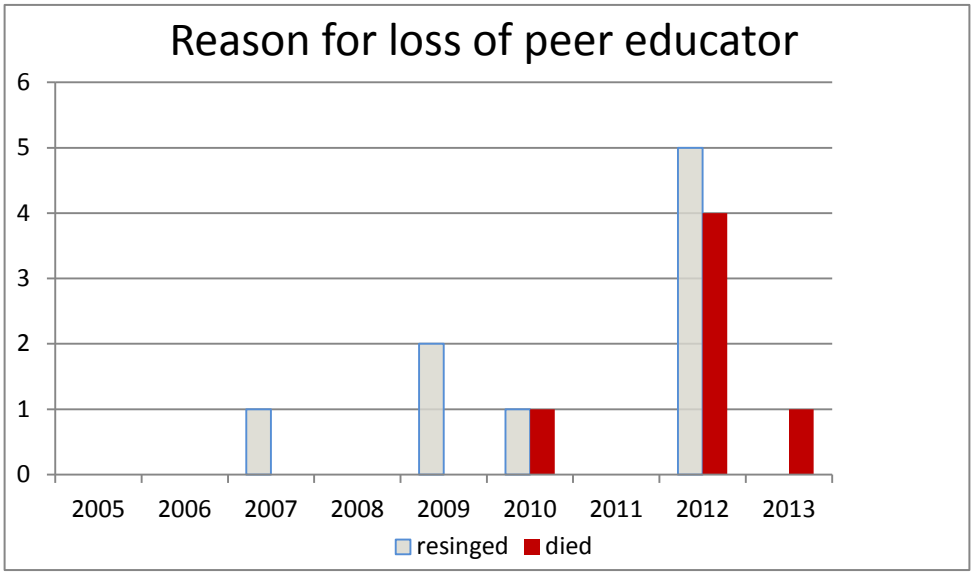
At the end of 2013, the percentage of PE's still working with MoPoTsyo remains very high: **91%** (149out of 164). Although there is little sign of attrition until now, with climbing of their age, this must be factored in for the future. We also have never *re*-trained the peer educators. In 2012 we did train the peer educators in *new* issues, such as Diabetic Retinopathy and in High Blood Pressure and Stroke by special educational materials in the form of an animated video. Also the peer educators have received special training in how to explain the biochemistry laboratory results to the patients.

FIGURE 7 PERCENTAGE OF PEER EDUCATORS STILL WITH MOPOTSYO



If we look at the reasons why we lose a PE, the following picture begins to emerge (figure 8).

FIGURE 8 REASONS FOR LOSING A PEER EDUCATOR



Also, not every trained PE remains in function as PE over time and there are different reasons for this. Some continue to work, but change their function from being a volunteer Peer Educator to a salaried staff member. These are PE's who are more involved in organisational issues or training. When they become salaried staff members, a new PE must be identified and trained so he/she can replace the "ex"-PE who continues to live inside the community. This has happened several times, in particular in the urban slums, where several patients worked themselves into the MoPoTsyo's salaried staff, being replaced by their former patients. Until the

end of 2013 MoPoTsyo HQ has 5 former Peer Educators and in the province there are 4 former Peer Educators who have become salaried staff. They are involved in management, representation, supervision and have organisational tasks in the Capacity Building Dpt of MoPoTsyo where the Peer Educator Networks are being managed. They help strengthen the capacity of the P.E.N. at the OD level..

HC in the table below stands for "Health Center" as a health center normally covers villages with numbers of residents between 8,000 to 15,000 people in total.

PEN field staff comprises the salaried Peer Educators who have become MoPoTsyo staff charged with management positions as supervisors and the volunteering peer educators who are not receiving salary but who receive a reimbursement of their travel costs related to their activities plus small incentives based on performance and outputs.

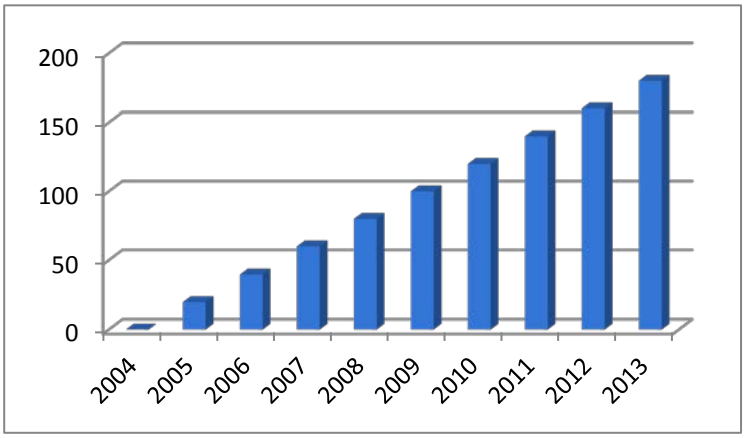
TABLE 6 PEER EDUCATORS & SALARIED SUPERVISORS

At the end of the year 2013

Provinces/Municipalities	HC areaswith peer educator	salaried superviors	Total PEN field staff incl PE's
Phnom Penh	6	2	7
Takeo	58	5	61
Banteay Meanchey	11	1	12
Kampong Speu	40	1	25
Kampong Thom	27	1	19
Totals	142	10	124

With 36 salaried staff plus the volunteers working for MoPoTsyo the workforce has gradually risen to 178 persons in total 2013. The ratio of workforce to members has to be understood in proper perspective because until 2007 there was no Revolving Drug Fund, nor were we organizing medical consultations. In 2009 we added non-diabetic hypertensive patients. In 2010 began to organize laboratory services.

FIGURE 9 VOLUNTEERS AND SALARIED STAFF



Also, Primary Prevention activities were added. These were first organized for school teachers in 2009 followed by similar sessions for Community Leaders, so the range of services that are being provided with the help of peer educators, themselves patients, has greatly increased.

For the reasons mentioned above, of the total 164 Peer Educators who have been trained, there were a total of 141 community-based peer educators at the end of 2013. In the year 2013 the network itself grew from 114 to 141 peer educators, an increase of 27 functioning PE's. At the start we had 33 salaried staff members. This number grew to 36 at the end of the year, so the total number of salaried staff and volunteer staff had grown to 177 at the end of 2013.

TABLE 7 NUMBERS OF PEER EDUCATORS PER PROVINCE

Yearly growing	Takeo	Phnpm Penh	Banteay Meanchey	Kampong Speu	Kampong Thom	Total
Per December 2013	57	6	11	40	27	**141**
Per December 2012	56	5	11	24	18	**114**
Per December 2011	46	5	7	16	0	**74**
Per December 2010	41	5	6	11	0	**63**

The figures above indicate health center coverage areas with a trained PE. Each health center area is covered by a single PE, with the exception of two PE's that each cover two health center areas. The figure does not include the salaried leader of each network Therefore, the real number of peer educators with the required skills is larger than indicated in the table 4 above.

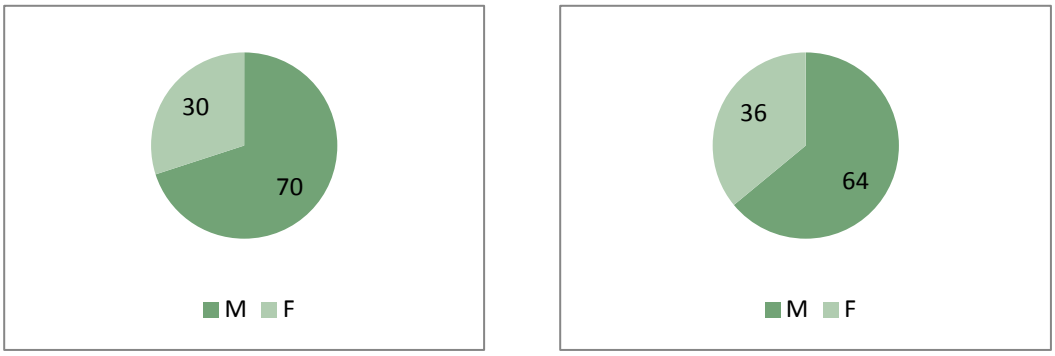
The leader of the Peer Educator Network is chosen by MoPoTsyo in consultation with the local health authorities. Once the leader is appointed, usually a new PE is trained to take over the daily peer education tasks. The leader then receives a salary as supervisor of the network, normally USD 5 per Health Center with a Peer Educator that he/she must supervise and report about.

CHALLENGE OF CREATING A BETTER GENDER BALANCE

It is difficult to reach an appropriate gender balance in both PE's and patients. Many husbands do not want their wife to become a PE. It is also difficult to find women with sufficient capacity who are willing to work as PE. The pay is minimal, making the job of PE something that you do mostly for honor. The immaterial rewards weigh probably more than the material rewards. Members in the household can be unhappy when the mother is not paying as much attention to them, and is busy going around the area in order to care for other people. This type of pressure can come from their children and from their husband. They demand the matriarch to be available 100% for them. In 2012, 30% of peer educators were female. In 2013, balance

improved slightly to 36%. There is also an imbalance in the gender of patients…but this is the opposite! The proportion of 1/3 male versus 2/3 female patients has not changed since 2005. In 2013, we find the following mismatch: only 36% of the diabetics are male, while 64% of PE's are male. Compared to 2011, we redressed the imbalance by 6%.

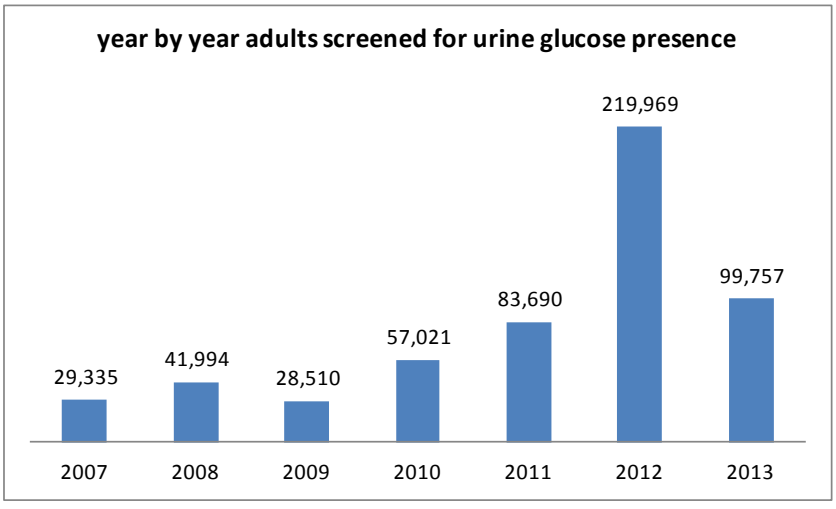
FIGURE 10 PEER EDUCATORS BY SEX IN 2011 & 2012



SCREENING ACTIVITIES

At the end of 2013 there were 570,761 adults in Cambodia that have had a post-prandial glucose screening(within 2-3 hours of a meal. Compared with previous years, in 2013 the screening activity dropped because we had expected that the Peer Educator Networks would be funded by the Ministry of Health, but the administrative process to organize this takes longer than planned. The funds have been committed through the Annual Operational Plan 2013 but there is no contract yet to spend the funds. Without being paid, so without external funding, Peer Educators cannot be expected to travel around and make costs doing prevention among the general population. They will continue to self-manage and help other patients in their community, but the great advantage of the "early diagnosis", the pro-active outreach element of the care evaporates if the activity is left unsubsidized, somewhat like a vaccination program. Justification for the screening can be found if there is locally a great discrepancy between registered members and the prevalence numbers (STEP Survey 2010). The next update of the prevalence numbers is expected for 2015.

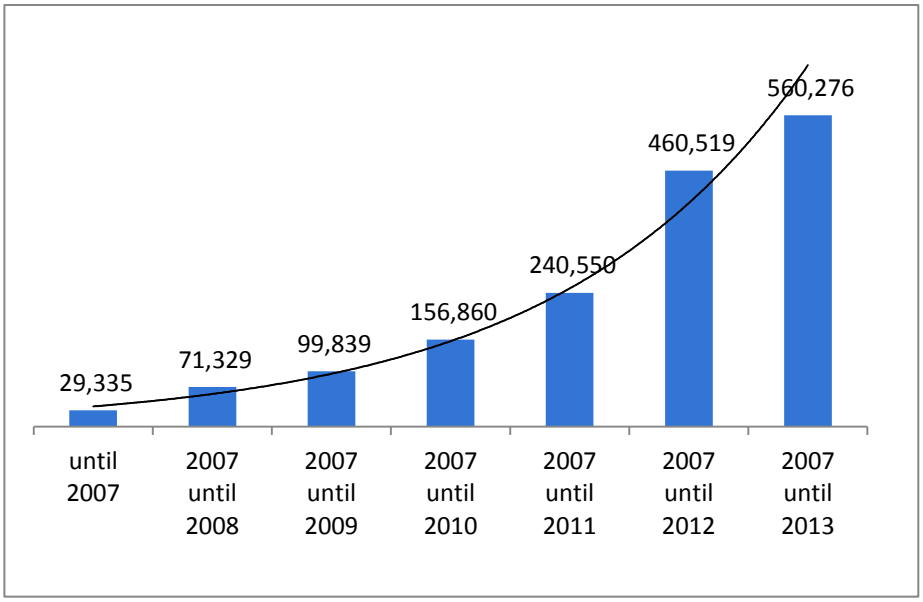
FIGURE 11 YEAR BY YEAR SELF SCREENING FOR PRESENCE OF URINE GLUCOSE



At the end of 2012, the German development cooperation GIZ began to fund Peer Educator Network activities (plus MoPoTsyo) in the OD's where it supports the health system and social health protection. The donors who financed early diagnosis of people with Diabetes through screening in 2013 were GIZ and the Belgian NGO Louvain Coopération au Développement.

The community-based PE distributes urine glucose strips to adults for self-testing. The figures above and below relate to newly screened adults who learn how to use the strip to test themselves. Adults who buy a strip from the Peer Educator (USD 0.03) to retest themselves in later years are not included. The Figure below indicates the accumulated number of adults who have been made familiar with the Peer Educator Network, through use of urine glucose strips over the years; about half a million Cambodian adults are now living in an area with a peer educator whose advice they can seek if they want to retest themselves, including blood glucose (USD 0.33).

FIGURE 12 ACCUMULATING COVERAGE OF ADULT POPULATION BY PEER EDUCATOR NETWORKS



To view self-screening activity from a perspective of efficacy in relation to membership: In 2013, the number of diabetics rose by 2694, from 6808 to 9502. Of the 99,757 screened in 2013, 2,694 newly diagnosed diabetics joined MoPoTsyo. This translates to 1.02% of members screened, which is well below the expected prevalence of diabetes determined by STEP: A survey of prevalence of diabetes in rural areas among adults. MoPoTsyo organizes screening among all adults, not just adults aged > 25 years and < 65 years, a different population than the sample in the STEP Survey. As the Cambodian population is relatively young, a large group of adults having access to MoPoTsyo's urine glucose test strips are between 20 and 25 years old.

It may be hypothesized that some resources are being wasted by testing such a young population. Among this younger group are MODY's (Maturity Onset Diabetes among the Young). As the disease group's name suggests, MODY's are younger people. MODY's are thought to be

heterogeneous in nature, meaning that a variety of environmental or genetic factors may be able to account for discrepancies in prevalence of MODY among different populations. Among MoPoTsyo's staff several are probably MODY. Most MODY's registered with MoPoTsyo require insulin but they are not type 1 DM. This subtle technical difference indicates that without insulin they would not die as fast as Type 1 DM, but would still suffer severe diabetic complications within a few years if they remain without insulin. Also, Cambodia's mass starvation that lasted from 1975 until 1979 began almost 40 years ago. Children who were conceived and borne during that period are more at risk of developing diabetes and other diseases than others. In summary, there are good reasons for Cambodia to diagnose early by screening including younger lives and ensure a healthy workforce among young adults. Like elsewhere in Asia, Type 1 DM in Cambodia is probably rare in Cambodia, but of Type 2 MODY's there are many. The issue should get more attention from experts to find out which kinds of MODY are prevalent in this country.

MoPoTsyo keeps the name, age, sex and address of every adult who has been screened for diabetes. The first 40,000 people had been asked additional questions about chronic disease and related spending on chronic disease, and on being indebted for health care but since 2008 this is no longer asked. Since 2007, these data are no longer entered into database. So far once a village has been screened for diabetes, it is not screened again.

Screening for High Blood Pressure:

At the end of 2013, there were 7604patients with High Blood Pressure (HBP)registered as members with MoPoTsyo. There were 5960 patients at the end of 2012, meaning 1644 new patients registered during 2013.

In the beginning of 2011, the screening process for HBP was changed from a screening process that depended on the PE's doing the screening to a system where there is one automated blood pressure machine in each village which can be used by people for self-screening. The PE's can still actively screen using their own BP machine to detect HBP patients, but if the PE is not around, people can also self-screen. If they are found to have HBP, the Village High Blood Pressure Group (VHBPG) leader reports it to the PE who comes once per month to collect the results. Similar to the previous model, a PE has to meet the person to assess the BP and confirm the "hypertensive status". By making the machine available at village level, people who live in a village with an automated blood pressure machine can use the machine once or twice a year to check their blood pressure to find out if it is too high or not. VHBPG are meant not just for the people with HBP living in the village but for anyone who is at risk. This means that the whole village has to be aware of the possibility to test as well as how, where, and when they can try it. It is the job of the PE to set up VHBPG's with the leader and then make them work. People who are found to have HBP can then be formally assessed by the PE so they get a patient book, access to laboratory testing, consultation, and prescription services. Before such a VHBPG can be set up, the PE must do some screening in the village to find people with HBP who can form the group and are interested to sign up for this. Once they are found, a formal contract is made

up between the VHBPG and MoPoTsyo before the machine is being dispatched to the Leader of the group. The machine reaches the group via the PE.

Screening for Dyslipidemia

All members of MoPoTsyo can access a lipid panel blood laboratory test. The test includes Total Cholesterol, HDL and Triglycerides. LDL may be estimated using a formula unless Triglycerides are high (>400mg/dl) and LDL is not below 80. The members are encouraged to do it but it is no obligation. The price of the tests is on average at 30% of the level of well known other laboratories and the blood collection is in the community during early morning to improve convenience for members and facilitate the test being done under fasting conditions.

Screening for Chronic Kidney Disease

Chronic Kidney Disease (CKD) can be stopped or slowed down in many cases with simple treatment. The therapeutic cost related to slowing down this progression towards CKD is almost negligible compared to the cost of dialysis (in Cambodia) let alone transplantation (abroad). However, we have not investigated to what extent the physicians are prescribing appropriate medication. All members of MoPoTsyo who use the laboratory service do the creatinine test and the potassium test. These two tests are more strongly recommended as the results are essential for appropriate prescription of routine medication: Metformin, a commonly prescribed anti-diabetic agent, may carry a risk of lactic acidosis if prescribed to a patient with lowered kidney function. Another common anti-diabetic agent, glibenclamide is a renally eliminated drug, meaning that in patients with low kidney function, medication effects may be prolonged and increase the risk of hypoglycemia. Angiotensin Converting Enzyme Inhibitors (ACE-I) such as enalapril or captopril decrease glomerular filtration due to efferent arteriole dilation causing transient increases in SCr and potassium which may also carry risks in a CKD patient. Also, hydrochlorothiazide (HCTZ) tends to lose efficacy as a hypertensive agent in the setting of low kidney function making it a somewhat inappropriate choice for a hypertensive patient with CKD. Additionally, members are encouraged to be tested for proteinuria. This was introduced in late 2011. In 2012 we have began to collect data and engaged with a USA based nephrologist for analysis. The preliminary analyses indicate that CKD is present among almost half of our diabetic members.

MEDICAL SERVICES FACILITATED BY PEER EDUCATOR NETWORKS

Below we review first the laboratory services, their utilization and cost, then the Medical Consultations, their utilization (discussed as access to prescription because every medical consultation results in a prescription that can be used repeatedly to buy prescribed medicines at the pharmacy), and then the cost to the patient of adhering to the treatment and adherence. This is followed by a review of the Revolving Drug Fund that is managed through contracted private and public pharmacies that dispense the medicines using preprinted invoices, paid for by our members.

Laboratory Services

MoPoTsyo began to organise laboratory services in 2009. In 2010, laboratory services were used during the so called “re-assessments”. These are assessments of members of MoPoTsyo who have been registered for more than 6 months. We take a random sample of patients among those who are followed by every one of our peer educators and assess blood sugars, blood pressures, knowledge and other health outcomes. These randomized patients do not have to pay for the laboratory tests, explaining the high utilization in that year. Although this was too costly to continue it was useful to make the patients familiar with the new service and give them important information that they need for self-management. We stopped paying for it in 2011. After we had stopped to provide the free lab service, utilization of the lab first fell back. It fell back a bit from 2012 with 3400 users in 2013. With the prices that we charge, it appears not sustainable.

Laboratory service is useful for 3 main reasons:

1) It helps to inform and motivate patients to seek medical care and make use of the medical consultation service and adhere to their medication. Without a laboratory, people rely on their feeling of well-being. This can be treacherous as many conditions are “silent” and a-symptomatic.

2) The Doctor needs the laboratory result for prescription of appropriate medication for the patient and for adaptation of the prescription and referral.

3) Public Health authorities need access to these results to be able to analyse whether people’s therapeutic needs are being adequately met by prescribing physicians and monitor the effectiveness of prescription therapy.

There were 3400 patients who used the laboratory at least once during 2013, compared to 3916 in 2012. We have had to increase the number of laboratory technicians to 2 Full Timers and 1 Part Timer. As can be seen in the figure below, a substantial proportion of people from the age groups in which the prevalence of NCD is not measured during the national STEP survey make use of our laboratory services as members with chronic disease: Elderly people and younger persons who are member of MoPoTsyo also use these services. Compared to 2012, the proportion of elderly people (65 years or older) using the laboratory services during the year 2013 fell to (because elder patients already use) 13% among 3972 users, 16% used the lab twice. The figure below is now more meaningful as we show those who have access compared to how many patients there are in their own age groups in the assessment data. This way we can keep an eye on which age group is crowding out another one. We can see that access for the elderly is an issue among those over 65 years, unsurprisingly.

Figure 13 Access to lab services by different AGE GROUPS

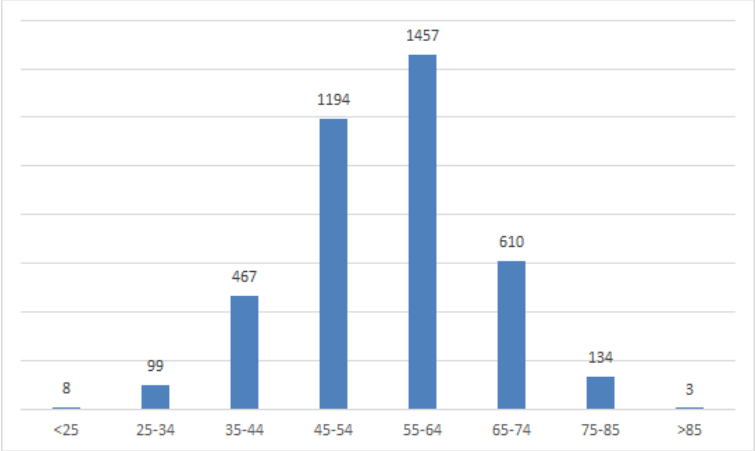
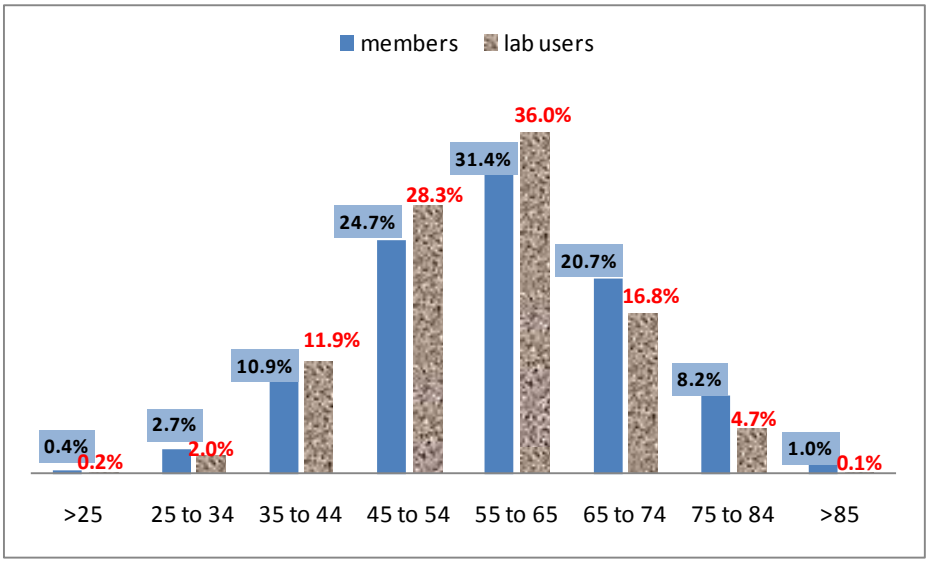


Figure 14 access to the lab is reduced for elderly



As proportionally more women use the services of MoPoTsyo, they also make more use of the lab. In that sense, the access for women and men to the laboratory services was equal, according to their representation as members in MoPoTsyo with women 2/3 and men 1/3 of the total in 2011. This remains the same in 2012.

Table 8 Equal Access among members to the lab services by gender in 2013

men	1074	31%
women	2326	69%
in 2013 Total	3400	100%

There is a declining proportion of (15% in 2013) users who use the laboratory more than once during the year. This trend suggests increasing efficiency of the service. While we allow “elites” to use the cost-effective service more than once per year, we want every patient to use it at least once per year. The problem is that many did not use the service, as can be concluded from

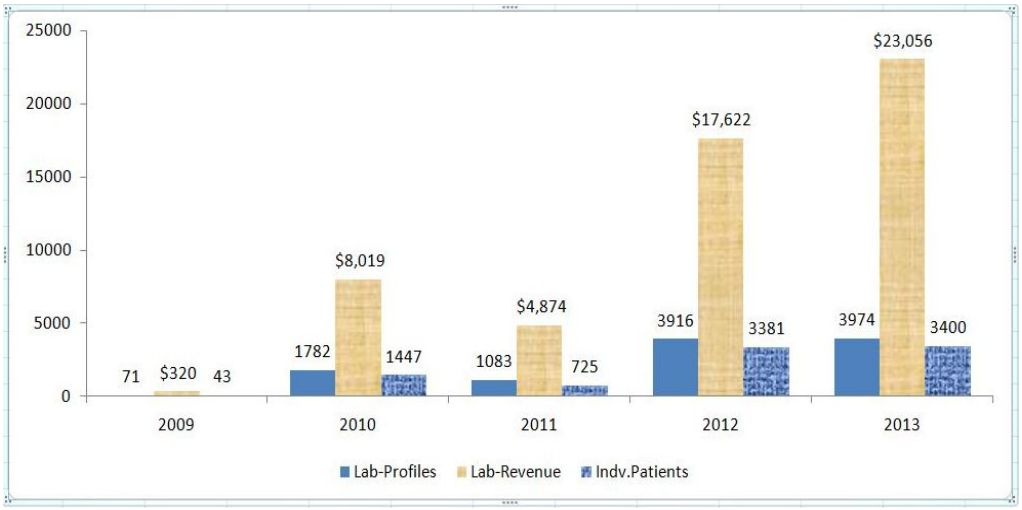
the numbers of patients registered as member in 2013. On the other hand, it is encouraging to see how the number of patients who uses the laboratory service increases yearly, despite the fact that this service is provided almost at the cost price.

It seems worthwhile to subsidize the service for the poorest patients, so they can access the service as well.

Cost of the Lab Services

During 2013, we calculated the cost of the laboratory services by putting the life of our lab machines at 10 years which is optimistic. That creates the cost picture in the table below. It shows it is truly a "not for profit approach". The result of our pricing policy is that we offer the laboratory service at 70% lower than the rates of Cambodia's public services. It would have been more realistic to put life at 5 years.

Figure 15 laboratory services Use and Cost



If the machines in reality break down after only 5 years, the cost of depreciation would have been double. Then we would have been operating at a loss. We may have to adjust our lab prices upward in the future if we want to be able to replace our laboratory machines every 5 years.

Table 9 Laboratory costs based on 10-year life of machines

Fixed cost of laboratory program								
	Purchase price	2009	2010	2011	2012	2013	2014	2015
Humalyser Junior	$ 2,854	$ 571	$ 571	$ 571	$ 571	$ 571	$ -	$ -
Humalyser 3000	$ 5,800	$ -	$ 1,160	$ 1,160	$ 1,160	$ 1,160	$ 1,160	$ -
Combilyzer 13	$ 1,500	$ -	$ -	$ 300	$ 300	$ 300	$ 300	$ 300
Humascope	$ 950	$ -	$ -	$ 190	$ 190	$ 190	$ 190	$ 190
Humalyser 3000	$ 5,800	$ -	$ -	$ -	$ 1,160	$ 1,160	$ 1,160	$1,160
Humalyte Plus3	$ 4,200	$ -	$ -	$ -	$ 840	$ 840	$ 840	$ 840
		$ 571	$ 1,731	$ 2,221	$ 4,221	$ 4,221	$ 3,650	$2,490
Expenditure in laboratory program		$ 4,710	$ 12,020	$ 5,892	$ 22,320	$22,272	Total	
Expenditiure on fixed costs		$ 571	$ 1,731	$ 2,221	$ 4,221	$ 4,221	Fixed	
Expenditure on variable costs		$ 4,139	$ 10,289	$ 3,671	$ 18,100	$18,051	Variable	
Cost per lab result								
	Total of fixed 2009-2012	$ 8,743						
	Total of variable	$ 18,051						
	Total cost 2009-2012	$ 26,794						
	Number of results	3974						
	Cost per result	$ 6.74						
	Cost per member who used the lab	$ 12.10						

The name of test is written both in Khmer and English, as well as the normal value and a basic indication of what the test measures to facilitate patient understanding of disease severity.

The presentation of results is to help patients understand and peer educators explain the results to the patients. This is possible because the database now allows to print multiple results over time of the same patient. This helps everyone to see in one glance what is happening with the trend of each indicator, see the example below. Last but not least, it saves the Doctor time during the medical consultation.

Figure 16 the new 2 page LAB RESULT (2012)

ឈ្មោះសមាជិក (member name):		003349
ភេទ (sex): ស្រី	អាយុ (age): 67	កាលបរិច្ឆេទស្នើសុំ (date):
វត្តមានឈាមក្នុងសេរ៉ូម (BIS): 0		17/12/2012

		លទ្ធផលចុងក្រោយ (last results)				
លរ nr	បរិយាយតេស្ត (test description)	03-05-2012	02-07-2012	17-12-2012	ឯកតា (unit)	គោលដៅកំណត់ធម្មតា (normal range)
1	ស្ករក្នុងឈាមមុនហូបអាហារ (Fasting Blood Sugar)	98	102	109	mg/dl	មុនហូបអាហារពេលព្រឹក៖ ច្រើនជាង 126 mg/dl បង្ហាញថាអ្នកមានជំងឺទឹកនោមផ្អែម ច្រើនជាង 110 ml/dl បង្ហាញថាអ្នកត្រៀមមានជំងឺទឹកនោមផ្អែម ចន្លោះ 60 ទៅ 100 mg/dl ជាលទ្ធផលដូចអ្នកគ្មានជំងឺទឹកនោមផ្អែម
2	ប៉ូតាស្យូម (Potassium)	4.6	3.8	4.4	mmol/l	ចន្លោះ 3.5 ទៅ 5.0 មីលីមូលក្នុងមួយលីត្រ
3	សូដ្យូម (Sodium)			148	mmol/l	ចន្លោះ 135 ទៅ 145 មីលីមូលក្នុងមួយលីត្រ
4	ក្លរ (Chloride)			102	mmol/l	ចន្លោះ 98 ទៅ 108 មីលីមូលក្នុងមួយលីត្រ
5	ទ្រីគ្លីសឺរីដ (Triglyceride)	149	113	92	mg/dl	តិចជាង 150 មីលីក្រាមក្នុងមួយដេស៊ីលីត្រ
6	កូលេស្តេរ៉ុលសរុប (Total Cholesterol)	222	206	202	mg/dl	តិចជាង 200 មីលីក្រាមក្នុងមួយដេស៊ីលីត្រ
7	អេច ដេ អិល (HDL Cholesterol)	42	46	52	mg/dl	ចន្លោះពី 40 ទៅ 70 មីលីក្រាមក្នុងមួយដេស៊ីលីត្រ
8	អិល ដេ អិល (Estimated LDL Cholesterol)	150	137	132	mg/dl	ចន្លោះ 62 ទៅ 100 mg/dl អត់មានបញ្ហាខ្លាញ់មិនល្អ ចន្លោះ 100 ទៅ 160 mg/dl ត្រៀមមានបញ្ហាខ្លាញ់មិនល្អ ច្រើនជាង 160 mg/dl មានបញ្ហាខ្លាញ់មិនល្អ
9	ត្រង់សាមីនាស (Transaminase SGPT)	38	34	29	U/L	ចន្លោះ 7 ដល់ 50 ឯកតាក្នុងមួយលីត្រ
10	ត្រង់សាមីនាស (Transaminase SGOT)	31	37	25	U/L	ចន្លោះ 10 ដល់ 40 ឯកតាក្នុងមួយលីត្រ
11	ក្រេអាទីនីន (Creatinine)	0.9	0.8	1.2	mg/dl	តិចជាង 1.1 មីលីក្រាមក្នុងមួយដេស៊ីលីត្រ សំរាប់ស្ត្រី តិចជាង 1.2 មីលីក្រាមក្នុងមួយដេស៊ីលីត្រ សំរាប់បុរស
12	អ៊ី ជី អែហ្វ អរ (eGFR)	>60	>60	45	mL/min	ធំជាង 60 មីលីលីត្រក្នុងមួយនាទី
13	ប្រូតេអ៊ីនក្នុងទឹកនោម (Proteinuria)	-+	-+	+	សញ្ញា	- គ្មានប្រូតេអ៊ីនក្នុងទឹកនោម -+ សង្ស័យមានប្រូតេអ៊ីនក្នុងទឹកនោម + ឺ ++ ឺ +++ ឺ ++++ មានប្រូតេអ៊ីនក្នុងទឹកនោម (សូមពិនិត្យតេស្តអោយបាន 3ដងក្នុង3ខែ ដើម្បីបញ្ជាក់ថាអ្នកមានប្រូតេអ៊ីនក្នុងទឹកនោម)
14	អាល់បូមីនក្នុងទឹកនោម (Albuminuria)	150	150	150	mg/l	តូចជាង 20 មីលីក្រាមក្នុងមួយលីត្រ

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លរ nr	បរិយាយតេស្ត (test description)	03-05-2012	02-07-2012	17-12-2012	ឯកតា (unit)	គោលដៅកំណត់ធម្មតា (normal range)
15	ក្រេអាទីនីនក្នុងទឹកនោម (Urine Creatinine)	200	200	300	mg/dl	ចន្លោះពី 10 ទៅ 300 មីលីក្រាមក្នុងមួយដេស៊ីលីត្រ
16	អនុបាតអាល់បូមីនទៅក្រេអាទីនីន (Albumin-to-Creatinine Ratio)	មិនធម្មតាតិច	មិនធម្មតាតិច	មិនធម្មតាតិច	.	-ធម្មតា លទ្ធផលអនុបាតតូចជាង 30 mgអាល់បូមីនក្នុង 1 gគ្រេអាទីនីន -មិនធម្មតាតិច ចន្លោះពី 30 ទៅ 300 mgអាល់បូមីនក្នុង 1 gគ្រេអាទីនីន -មិនធម្មតាច្រើន អនុបាតធំជាង 300 mgអាល់បូមីនក្នុង 1 gគ្រេអាទីនីន

សំគាល់៖ សូមយកលទ្ធផលតេស្តនេះទៅជាមួយគ្រូពេទ្យពេលដែលអ្នកទៅពិនិត្យ និងពិគ្រោះជំងឺជាមួយគ្រូពេទ្យព្យាបាល។

អ្នកបច្ចេកទេសមន្ទីរពិសោធន៍ (laboratory technician)

Signed by one of 3 laboratory technicians and the lab manager employed by MoPoTsyo. At the end of 2012 we had hired a specialist to carry out an independent assessment of our lab which resulted in a series of recommendations which were addressed in 2013.

Patient Consent in the Lab Test application Form:

In the annex is the application form for the lab test. This is filled when the member pays for the tests. This happens in advance. At the bottom of this application form is a special permission to use the result for research purpose is mentioned at the bottom of the form.

Medical Consultation Services

Medical consultations are organised by MoPoTsyo in 12 public facilities in 11 Operational Districts, mostly at rural referral hospitals (CPA1 or CPA2) in a room at the hospital that is made available or kept available for these weekly or 2-weekly sessions. A session lasts half a day during which some 30 to 50 patients receive medical consultation.

For more than 11,737 medical consultations in 2013, MoPoTsyo hired experienced Medical Doctors. Every one of them consults once or a couple of times per week, for a morning. MoPoTsyo's capacity building department plans these sessions, based on information it receives through its PEN about the size of need, in other words "the volume of the demand". The contracted doctors then travel to the public facility to hold a consultation session which is "run" and organised by a team of PE's. The PE's perform tasks such as crowd control, registration, preparing, administration etc., tasks that in other countries is done by nurses and other professional hospital staff. Sometimes the session is in the morning, sometimes in the afternoon, but never the whole day. Some of these doctors are government staffs and others are not government staff. Government staffs hold their sessions on the weekends.

There are different advantages in letting the PE's join in the management of the service delivery to the members including but not limited to:

1. Lower overall cost because nurse time is much more expensive than PE time
2. Patients trust the PE's because they know them personally
3. PE's can hear the doctor's treatment or advice. Often it is helpful if PE's repeat and repeat again the advice of the doctor, later back in the community, because very often patients do not remember what the doctor told them once they are outside or back home again.
4. Prestige, motivation, and ownership of the service by the PE's
5. PE's provide a safeguard against loss of coherence between prescription by doctors and dispensing of medication through the RDF, by being vigilant and monitoring services.
6. PE's offer convenient hours/time for consultation (weekends) outside working hours.
7. Service provision is more casual and more fun for everyone.
8. Having a PE creates a more satisfactory work environment for the Doctor

In the local context it is difficult to list any disadvantages that really make sense. It remains utterly puzzling why it is not done more often in other resource constrained contexts comparable to the Cambodian one.

During 2013, the number of consultations increased from 10438 consultations (2012) to 11737 consultations in total (in 2013), an increase by 7%.

The number of consultation ***sessions*** increased by only 11% from 270 to 305, thus the number of patients per session fell from 39 in 2012 to 38 patients per session in 2013. This means a bit more time spent between the doctor and the patient. We have to analyse every year if this issue is causing problems or simply represents a gain in efficiency - for example to better availability of laboratory results - requiring less time for the physician to come to a decision. Ultimately it depends on "which doctor achieves the best outcomes" if we can isolate this from other confounding factors. We have been working with four different physicians to deliver more than 10,000 consultation services to our members. Among them, two are private doctors and two are government employees (who perform consultation services during the weekends when they are not on duty in national hospitals.) MoPoTsyo hires them in their private capacity and pays these civil servants for their travel and for performing these services for our NGO and its members.

TABLE 10 HIRED MEDICAL CONSULTANTS IN 2013 SEEING OUR MEMBERS

Dr 1	2151	18.3%
Dr 2	6084	51.8%
Dr 3	1708	14.6%
Dr 4	1794	15.3%
Total consultation	11737	100%

Only patients who are member of MoPoTsyo can see the doctor. It is an appointment-based system, facilitated through the Peer Educator Network. So far the patients pay a user fee to the hospital and to hire consulted doctor, not to MoPoTsyo. The idea behind hiring a doctor, is to train the residing doctor of the public facility to do the medical consultation, however their attendance is irregular.

Below is the cost calculation of 2012: the 270 half mornings does not include the "travel" time that is needed for the doctor to travel to and from the hospital. For estimating the Full Time Equivalent (FTE) of Doctors needed to do this activity, the traveling time should be added. We have not calculated the FTE for conducting all the consultations that include travel time. It may be more than 1 FTE. The session time is 0.5 FTE.

However, the cost of reimbursing the doctors for traveling and spending time traveling is included. It is of course more efficient to pay the doctor for his travel than to reimburse 35 patients for their travel. If on average 35 patients would have to travel to the provincial hospital,

it would add at least 1,000,000 riels (USD 250) to their travel cost. So this solution is more efficient and probably helps reduce Out of Pocket Health Expenditure for a large and vulnerable population.

If the doctors in the local hospitals become comfortable examining and treating patients, they can begin to take over the less complicated cases. When that happens, the specialised doctors will not have to travel so frequently to the local hospital as used to do. This is not yet the case in 2012.

TABLE 11 MEDICAL CONSULTATIONS IN 2013

Year 2013	***Total***	***annual average per location***	***average monthly for 10 location***
1- Nr of patients who received consultation	10,438	870	87
2- cost {(nr3+Nr4)*nr5}	$ 20,773	$ 1,731	$ 173.11
3- Transportation			
4- Paid in doctor fees for 10 location			
5- Number of consultation session	270	22.5	2.3
6- Nr of patients per session	39		
Cost per consultation	$ 1.99		

In 2013, consultations were done in ..?? hospitals in ?? OD's,

	Total	**Per OD**	
year 2012		Annual average	Monthly average
1. Nr of patients who consulted Doctor	10,363	1,151	96
2. Cost [(nr3+nr4)*nr5]	$20,773.00	$ 2,308.11	$ 192.34
3. Transportation expenses	$ -		
4. Fee for Doctor per consult session	$ -		
5. Nr of consultation sessions	219	24	2
	$ -		
cost per consulting patient (nr2/nr1)	$ 2.00		

Because of the varying distances that must be covered by the Doctor to travel to remote hospitals the cost per consultation per patient varies strongly, depending on the location.

TABLE 12 HELPING PATIENTS SAVE TRANSPORTATION COST 2011 AND 2012 WHEN THEY SEE THEIR PHYSICIAN

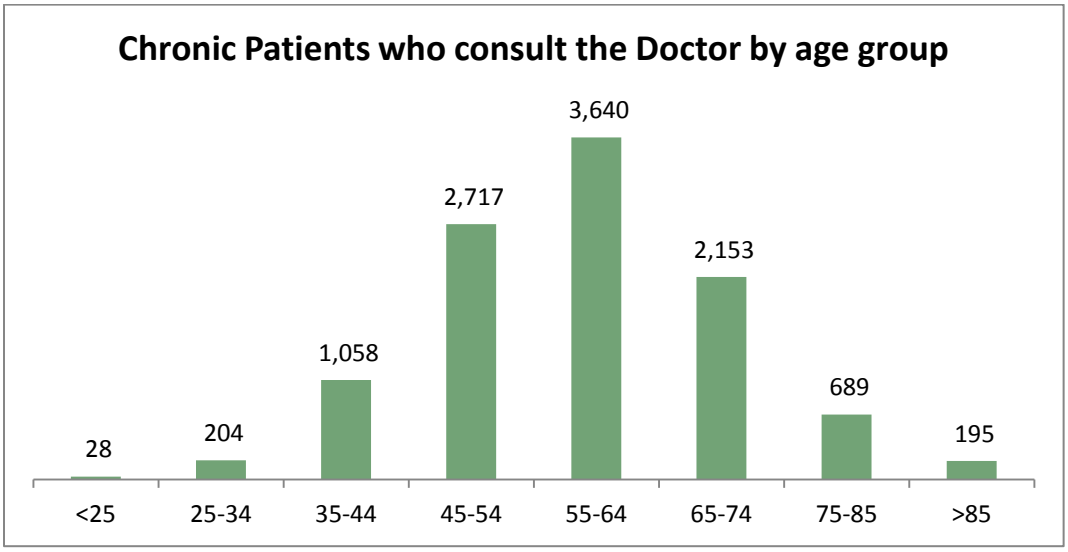
	Phnom P	Takeo Province					BMC	Kg Speu		Kg Thom	
	1	2	3	4	5	6	7	8	9	10	11
Year 2013	Pochento	Ang Roka	Doun Ke	Bati	Prey Kab	Kirivong	Thmar P	Kong Pis	Kg Pongs	Baray Sa	Stong
1 Nr of patients who consulted D	2047	410	718	542	476	1461	814	1634	1071	1930	400
2 Cost [(nr3+nr4]	2319.93	1762.7	1942	1811.7	2088.9	3729.4	5447.1	4338.24	2510.74	5834.11	1554.29
3 Transportation expenses and other	473.13	1045.7	1128.4	812.7	1216.8	2253.4	3102.3	2490.24	1360.74	3656.51	800.79
4 Fee for Doctor per consult session	1846.8	717	813.6	999	872.1	1476	2344.8	1848	1150	2177.6	753.5
5 Nr of consultation seessions	45	12	14	14	14	23	24	48	24	44	10
Cost per consultation (nr2/nr1)	1.13	4.30	2.70	3.34	4.39	2.55	6.69	2.65	2.34	3.02	3.89

	PhnomPenh	Takeo Province					BMC	K. Speu	K. Thom
	1	2	3	4	5	6	7	8	9
year 2012	Pochentong	Ang Roka	Doun Keo	Bati	Prey Kabass	Kirivong	Thmar Pouk	Kong Pisey	Baray Santuk
1. Nr of patients who consulted D	1529	662	1118	662	628	1739	1077	2163	785
2. Cost [(nr3+nr4)*nr5]	**$1,479.00**	**$1,782.00**	**$1,620.00**	**$1,215.00**	**$2,299.00**	**$3,751.00**	**$3,553.00**	**$3,612.00**	**$1,462.00**
3. Transportation expenses	$7.50	$45.00	$45.00	$45.00	$85.00	$85.00	$115.00	$50.00	$50.00
4. Fee for Doctor per consult sess	$36.00	$36.00	$36.00	$36.00	$36.00	$36.00	$72.00	$36.00	$36.00
5. Nr of consultation sessions	34	22	20	15	19	31	19	42	17
t per consulting patient (nr2/nr1)	**$0.97**	**$2.69**	**$1.45**	**$1.84**	**$3.66**	**$2.16**	**$3.30**	**$1.67**	**$1.86**

	1	2	3	4	5	6	7	8
year 2011	Pochentong	Ang Roka	Doun Keo	Bati	Prey Kabass	Kirivong	Thmar Pouk	Kong Pisey
1. Nr of patients who received Consul	642	588	621	639	527	1149	606	1575
2. Cost [(nr3+nr4)*nr5]	**$913.50**	**$2,106.00**	**$1,782.00**	**$2,268.00**	**$2,178.00**	**$3,509.00**	**$4,392.00**	**$3,108.00**
3. Transportation	$7.50	$45.00	$45.00	$45.00	$85.00	$85.00	$115.00	$50.00
4. Fee per consultation for Doctor	$36.00	$36.00	$36.00	$36.00	$36.00	$36.00	$68.00	$34.00
5. Nr of time of consultation	21	26	22	28	18	29	24	37
cost per consulting patient (nr2/nr1)	**$1.42**	**$3.58**	**$2.87**	**$3.55**	**$4.13**	**$3.05**	**$7.25**	**$1.97**

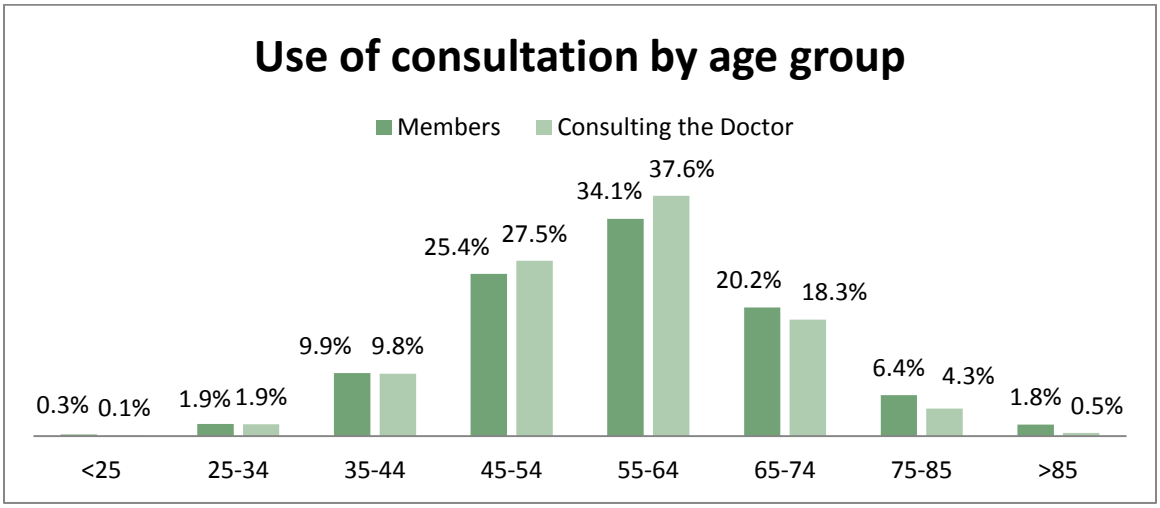
The average cost in 2013 per patient is USD 1.99. In the coming 5 years, even if local doctors working at the referral hospitals in OD's where the PEN are active, become sufficiently trained to examine and prescribe appropriate treatment for the majority of patients with Diabetes and High Blood Pressure, there will be always a proportion who should be sign by a more experienced Doctor. The PEN can remain "instrumental" in organizing such complicated cases into groups, for which it is worthwhile to make the specialist travel, rather than making these vulnerable people travel to a clinic.

FIGURE 17 BY AGE GROUP 10,684 MEDICAL CONSULTATIONS UNTIL END OF 2013



The profile of the 10,684 patients who consulted the medical doctor until end of 2013 is seen in the figure above. We can see a barrier to access if we compare the actual use by age group with their proportion among the membership of MoPoTsyo as chronic patients. For elderly people their access to medical services appears compromised with climbing of age.

FIGURE 18 USE OF MEDICAL CONSULTATION BY AGE GROUP



Throughout the report the underutilization of services by non-diabetic hypertension patients is evident in almost all the areas. The table below is meant to show that although there is some progress over the years, it remains very unsatisfactory.

TABLE 13 USE OF MEDICAL CONSULTATION BY TYPE OF PATIENT

Medical consultations facilitated by the Peer educator networks in the public services				
year	Diabetes, no hypertension	Diabetes & Hypertension	Hypertension no Diabetes	Totals
2007	42	92	0	**134**
2008	180	511	8	**699**
2009	370	800	15	**1,185**
2010	664	1,093	295	**2,052**
2011	1,709	3,045	1,355	**6,109**
2012	3,030	5,080	2,330	**10,440**
2013	4,006	5,265	2,466	**11,737**
totals	**10,001**	**15,886**	**6,469**	**32,356**

Medical consultations facilitated by the Peer educator networks				
year	Diabetes, no hypertension	Diabetes & Hypertension	Hypertension no Diabetes	Totals
2007	31%	69%	0%	**100%**
2008	26%	73%	1%	**100%**
2009	31%	68%	1%	**100%**
2010	32%	53%	14%	**100%**
2011	28%	50%	22%	**100%**
2012	29%	49%	22%	**100%**
2013	34%	45%	21%	**100%**
totals	31%	49%	20%	**100%**

For most of the Diabetes patients in 2013 who went to see their Doctor it was not the first time. MoPoTsyo database records go back to 2007. The average of these individual DM patients was 3.5 so while most have experience, 1257 came for the first time and came only once in 2012.

FIGURE 19 DIABETES PATIENTS IN 2013 BY THEIR TOTAL NUMBER OF MEDICAL CONSULTATIONS

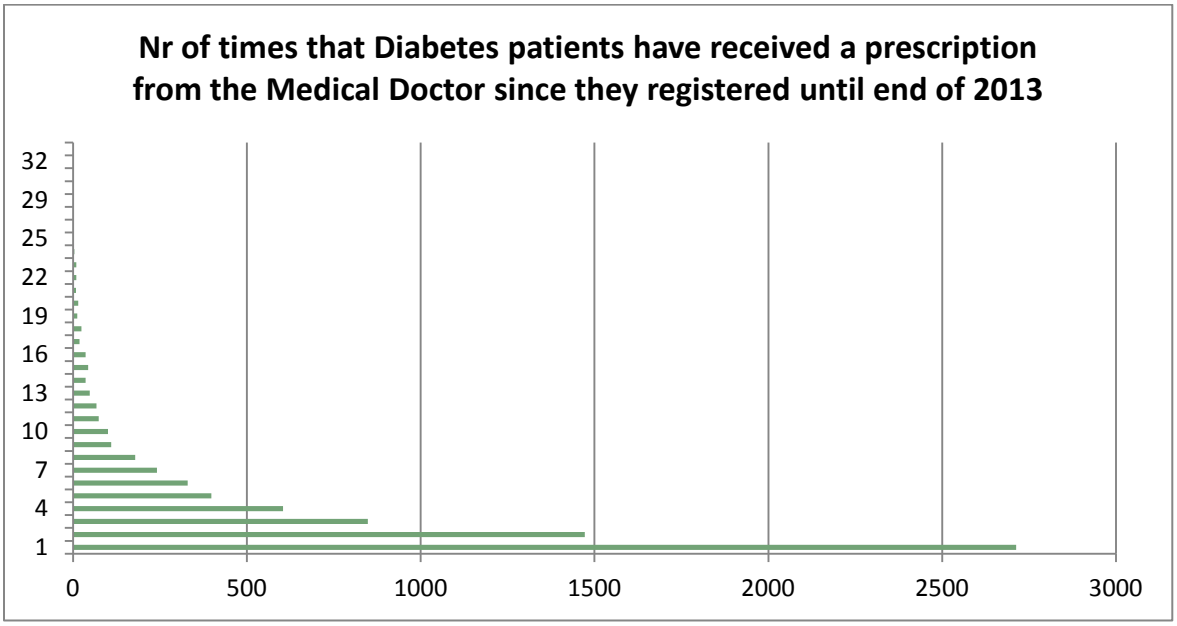


TABLE 14: ACCESS TO MEDICAL CONSULTATION & PRESCRIPTION BY DIABETES PATIENTS 2010-2013

year	DM Regist	Med Consult	Indiv DM Pat	Annual Contact Rate	Has no prescription
2010	2,965	1,757	1,161	0.59	60.8%
2011	4,357	4,751	2,193	1.09	49.7%
2012	6,732	8,085	3,440	1.20	48.9%
2013	9,499	9,271	4,335	0.98	54.4%

The number of diabetes patients who register has more than doubled between 2010 and 2013 showing a steady increase. The proportion of diabetes patients who are without a prescription (due to not being examined by a medical doctor) was improved from 61% to 49% between 2010 and 2012, but this proportion was deteriorated during 2013.

The number of individual diabetes patients who are using the medical consultation service during the given year has multiplied from 1161 individuals in 2010 to 7405 individuals in 2013. The frequency with which these individuals are using the medical services is also increasing from (1757/1161 in 2010, to 4751/2193 in 2011 to 8085/3440 in 2012 to 25,847/7405 in 2013) but that figure is not so relevant as the annual contact rate which takes as denominator all the patients who have registered:

$$\frac{\text{total medical consultations}}{\text{Nr of DM patients registered}}$$

The trend shows that overall the trust in the medical services is gradually improving and that more diabetics are ready to meet the doctor:

a) Among diabetics a larger proportion now has a prescription
b) Those diabetics who have a prescription go more often to the doctor

The most relevant denominator would be the number of diabetes patients who live in the area, whether they have been registered or not. So ultimately we should use the estimated prevalence of diabetes as the denominator. This becomes possible with regularly repeated surveys such as the STEP Survey.

The tables below show the comparison of DM and HBP. The trend in the figures is encouraging. While the totals of patients registered do not differ enormously, the Diabetics make much better use of the services. The proportion of diabetics among those who consult the Doctor is much larger than the consultations of HBP patients without diabetes. (NB Prescription is a proxy for “having consulted a Medical Doctor” so “has no prescription” means that the patient has not yet consulted a Medical Doctor.

TABLE 15: ACCESS TO PRESCRIPTION

year	DM Regist	Med Consult	Indiv DM Pat	Annual Contact Rate	Has no prescription
2010	2,965	1,757	1,161	0.59	60.8%
2011	4,357	4,751	2,193	1.09	49.7%
2012	6,732	8,085	3,440	1.20	48.9%
2013	9,499	9,271	4,335	0.98	54.4%

year	HBP Regist	Med Consult	Indiv HBP Pat	Annual Contact Rate	Has no prescription
2010	2,514	295	263	0.12	89.5%
2011	3,997	1,358	907	0.34	77.3%
2012	5,809	2,323	1,343	0.40	76.9%
2013	7,604	2,467	1,482	0.32	80.5%

A similar line of reasoning as for DM above and analysis is made for HBP. This shows that for HBP the picture is worse than for DM. HBP continues to pose an enormous challenge. There is no way PE's for diabetes can deal with the organization caseload of HBP all by themselves. More support is needed from the public services, in particular the health centers. This requires an adaption of public policy with health centers being actively involved in providing support for chronic care for HBP patients.

The trends in the HBP figures are the same as in DM: positive. But HBP remains less than satisfactory overall.

TABLE 16: ACCESS TO MEDICAL CONSULTATION BY ELDERLY CHRONIC PATIENTS (DM+HBP)

	2010	2011	2012	2013
Consulting patients	2,000	5,918	10,303	11,738
>60 years old	719	2,088	3,694	4365
>65 years old	420	1,227	2,068	2,331

	2010	2011	2012	2013
Consulting patients	2,000	5,918	10,303	11,738
>60 years old	36%	35%	36%	37%
>65 years old	21%	21%	20%	20%

With the access to the laboratory services for elderly being compromised, it is no surprise that there is little or no improvement over the years in access for the elderly. We are increasing our numbers of patients in general, but we are not improving access for the elderly to medical consultation. Old people's access to the medicines is via medical consultation. This requires state subsidy and the burden cannot be put on the shoulders of diabetes patients who are already vulnerable.

With prescription we mean that the Medical Doctor, consulted by the patient, writes in the MoPoTsyo self-management book of the patient, which medicines must be taken every day and the quantity, and signed by this Doctor and dated. With this prescription, the patient can go to one of the pharmacies contracted by MoPoTsyo and buy for example 30 days of medication, with a maximum of 3 months. When the medication is finished, the patient can go back the pharmacy with the same old prescription to pay for a refill. PE's are supposed to keep an eye on the patient to see if the medication is working adequately or not. If the PE see that it is time for the patient to get a change in medication, they urge the patient to go for medical consultation. Then, the Doctor gives the 2nd prescription. Patients go to see the Doctor once or twice a year on average.

Through the peer educator's experience new patients will get a sense of how much it is going to cost them every month to buy medication, if they go to consult the Doctor at the Hospital, in a session organized by MoPoTsyo's Peer Educator Network. For this reason we must assume that only people who want to and are able to pay for their medicines go to consult and have a prescription.

The price of consultation is usually much lower than the price of the medicines. The lowest is 1500 Riels (USD 0.38) and the highest is 3500 Riels (USD 0.88). The patients pay these amounts at the Public Hospital according to the user fee schedule of each hospital. MoPoTsyo's peer educator collects it and hands it over to the Hospital as user fee income. However, this income is not used by the Hospital to pay the Medical Doctor, hired as consultant from outside and paid by MoPoTsyo. In 2012, the cost of that Medical Doctor is paid by our donors or out of the revenue of the Revolving Drug Fund if there is no donor to pay for the location where we are organizing these consultations. For the real cost to MoPoTsyo of these consultations see the analysis further down below.

Through talking with their own PE, who can usually give them a fair estimation of what their disease is going to cost them every month, the patients are already aware before they meet the doctor during consultation what their monthly cost approximately is going to be. This knowledge is probably discouraging for some and encouraging others. Among those who do not have a prescription, there are many who do not need a prescription, because they are successfully applying lifestyle changes. There are also many who should have a prescription but they do not want to or they are unable to afford the medication or meet other barriers. We do not know the barriers and proportions exactly.

The average level of cost of the "first prescription" given to a DM patient in a given year is of course lower than the average cost-level of all prescriptions given in that year, because later prescriptions for the same patients almost always add medication as can be seen below. It is remarkable that the median in 2013 is reduced compared with 2012, see table below.

TABLE 17 COST TREND (PRICES CHARGED) PRESCRIPTIONS FOR DIABETIC PATIENTS

Total / Year	4-year trend in prescription cost		
Nr of prescriptions analyzed	monthly cost to be paid by DM patients for their medication (1USD =4000 riels)		
40,173	**4-years**	**average**	**median**
1,757	2010	$ 4.47	$ 3.75
4,751	2011	$ 6.09	$ 4.88
7,818	2012	$ 6.29	$ 4.50
9,271	2013	$ 5.66	$ 4.69

There were reasons for the increase in 2011 :

In 2011 we introduced a statin and a fibrate, SIMVASTATIN 20mg and GEMFIBROZIL respectively. Both are relatively expensive compared to the other drugs but necessary to treat types of dyslipidemia. Because these 2 molecules are already relatively expensive, MoPoTsyo does not mark them up. This means that they are dispensed at an actual loss to MoPoTsyo. Gemfibrozil is necessary as we have 15% of diabetics presenting with normal glucose and normal cholesterol values but Triglycerides >400 mg/dl. This puts them at risk for pancreatitis. Statins are part of WHO's recommended standard package for low resource settings for most cases of dyslipidemia.

In 2013, 35% of DM patients pay less than 500 Riels per day, so less than USD 3,75 per month. That leaves 65% of patients among those with prescription vulnerable to cost related barriers in obtaining medication, see the Table below. There is also a much smaller group that would need to pay >30,000R (7.5USD) per month that may be highly vulnerable to cost related barrier in obtaining medication. The table below summarizes these findings.

TABLE 18 PROPORTION OF DM WITH HIGH PRESCRIPTION COST IN 2013

Year 2013		
per month $	**Riel/day**	
3.75- 5.63	500-750	26%
5.63- 7.50	750-1000	16%
7.50- 9.38	1000-1250	7%
9.38- 11.25	1250-1500	5%
> 11.25	>1500	10%
	in total	**65%**

Whom to target with a subsidy (a discount voucher) and with how much?

The table shows that it may be more efficient to help the bottom 3 rows (10%+5%+7%) =22% of patients with 70-90% of their cost instead of helping "all diabetics" so 100% patients with an "average" amount. The average and median are not enough for those who face the highest cost and the majority of diabetic patients may not need financial help with this. It is an organizational challenge to target the right patient with the right amount of financial assistance. If you help only the bottom 22%, there may be some people in the 16% group and in even some in the 26% group that could also benefit from assistance but they are not the priority with the highest needs. After you have dealt with the bottom 22%, you can add that group as well, but then the total proportion of assisted diabetics is still not more than 35% of everyone with a prescription.

When we analyse the cost of prescribed medication for a NEW diabetes patient, for one month, when this patient consults the Doctor for the first time within the year and we compare how that type of cost evolves over the past 3 years then we get the following table:

TABLE 19 PRICE OF 1 MONTH PRESCRIBED MEDICATION

Nr of 1st Prescription	Year	daily cost in Riel	monthly cost
1161	2010	546	$ 4.09
1537	2011	565	$ 4.24
2069	2012	487	$ 3.65
4335	2013	640	$ 4.80

The numbers of new patients are rising year by year, but the proportion of new patients compared to the patients already in the cohort becomes smaller. That is good sign.

TABLE 20 PROPORTION OF NEW PATIENTS AMONG THOSE COMING FOR CONSULTATION (DM ONLY)

Year	nr of 1st prescription	% of 1st prescription	total prescriptions
2010	1161	57%	2052
2011	1537	25%	6109
2012	2069	20%	10408
2013	4335	47%	9271

Comparing DM patients and HPB Patients in the year 2013

TABLE 21 PRICE OF PRESCRIBED MEDICATION IN 2012

Cost of Prescribed Medication paid by Patients

DM patients	per day Riels	755
DM patients	per month Riels	22,650
DM patients	per month USD	$ 5.66

HBP patients	per day Riels	339
HBP patients	per month Riels	10,170
HBP patients	per month USD	$ 2.54

Frequency of buying: In 2012, 6031 patients bought 31,928 times their routine medication. That is 5.29 times/patient instead of the 12 times if the patient is supposed to refill one time per month. In 2013, 7958 patients bought 40,589 months worth of medication. That is 5.1 times, so slightly less often. However just the existence of the invoice itself does not give us the information about the volume of medicines the patient buys. Some patients buy for half a month and others for 2 months or even 3 months. Patients can save transportation cost and time if they buy less often. In principle, there is financial conflict of interest between the current Hospital "user fee system" and the interest of the patient to economize the frequency of travel. That is why the "adherence" calculation is important.

The cost of the routine medication on annual basis depends on how often the patient goes to buy his/her medicine. This has been improving, as we can see in the table as in the early years people did not buy sufficient medication. Hypertension patients are still not buying enough.

TABLE 22 TRENDS IN ANNUAL EXPENDITURE ON ROUTINE MEDICATION BY TYPE OF CHRONIC PATIENT

Amounts spent in riels by type of individually registered Patient for their medication at the contracted pharmacies					
Year	**D**	**DH**	**H**	**Unknown**	**Average**
2008	21,451	21,171	6,500	-	16,374
2009	66,186	48,434	9,245	-	41,288
2010	77,128	65,215	17,313	19,175	59,610
2011	111,944	113,620	7,138	81,250	104,651
2012	101,299	124,248	22,659	56,333	101,513
2013	127,109	163,246	64,877	-	118,411

As will be explained below, increase in expenditure reflects improvement in adherence, not drug price changes.

ADHERENCE TO PRESCRIBED MEDICAL TREATMENT

To calculate adherence, we look at the date of the medical consultation and then calculate the number of days until 31 December 2013. We take this remaining number of days in 2013 and multiply it with the individual patient's daily cost of prescribed medication to calculate the value of medication that this patient should have bought. We do this for all patients with a prescription in 2013 and sum the total. For a detailed explanation of the methodology, see the annex.

Thus in 2013, there are 5,086 individual patients with a prescription who together should have bought 1,545,105 days of medication for a total of USD 256,838 or 1,027,350,882 Riels. If we look at the value of their prescribed medication, during 2012, we have supplied the contracted pharmacies USD $138,768 and patients have bought for a total of USD $134,895. Although we have to subtract 15% profits of the pharmacy from the amounts paid by the patients, the remaining level of USD 114,661 (being 82% of our sales at USD 139,240) still suggests good adherence.

The figures in the table below are a comparison of what all Diabetic members should have bought in 2013 according to their 'first prescription since 2010" and what they actually bought in the year 2013: that is 68%. There are still problems with the method: in later prescriptions the medicine that the patient has to take has probably increased so it is not an overestimation. The number of Diabetics with a 1st prescription is 5,086 persons. However the numbers who have been buying in 2013 is less: 3,458 Diabetics. So 1,628 DM with a first prescription (=32%) did not even buy once in 2013 their medication. Perhaps they have died, and that means that the actual adherence among the smaller number of actual buyers is a slightly better. Perhaps the negative and the positive compensate each other, so we keep the figure as it is: 68%. As a group they bought 32,915 times. It means that on average these 3,458 diabetics paid USD 50.60 for their medication in the year 2013.

TABLE 23 ADHERENCE IN 2013 AMONG DIABETICS

Year 2013	**DM Should spend**	**1,027,350,882**	**if 1 USD = 4000 riel**
		$ 256,838	
Year 2013	**DM did spend**	**699,950,425**	**68%**
		$ 174,988	

For non diabetic Hypertension patients the situation does not look as good.

TABLE 24 ADHERENCE IN 2013 AMONG HBP PATIENTS

Year 2013	**HBP Should spend**	**177,442,784**	**if 1 USD = 4000 riel**
		$ 44,361	
Year 2013	**HBP did spend**	**85,477,620**	**48%**
		$ 21,369	

The average price of High Blood Pressure HBP medication is lower (USD 3.50) than that of diabetes medication (USD 5.50 per month).

It is not so much a matter of affordability, it seems. We speculate that non diabetic hypertensive people underestimate the importance of taking their daily medication and are confused by conflicting information from different sources.

MoPoTsyo's Revolving Drug Fund

We have contracted 17 private pharmacies and 3 public pharmacies who get our supplies of medicines (including insulin) so they can sell it to our members. Our turn-over has been increasing steadily since we started in 2007.

TABLE 25 SALES AND CREDIT TO PHARMACIES

		Baseline 100	83%	276%	521%	753%	
		2007-2009	2010	2011	2012	2013	Grand Total
Pharm Purchase deliveries by MoPoTsyo	Riel	89,380,850.00	163,827,300.00	335,780,857.50	555,072,456.00	762,618,888.00	
	US$	$ 22,345	$ 40,957	$ 83,945	$ 138,768	$ 190,655	$ 476,670
Pharm Paid to MoPoTsyo	Riel	54,730,350.00	101,846,500.00	241,333,110.00	398,501,322.00	694,841,831.00	
	US$	$ 13,683	$ 25,462	$ 60,333	$ 99,625	$ 173,710	$ 372,813
Patients Paid to Pharmacies	Riel	44,242,250.00	117,520,080.00	342,432,110.00	539,578,225.10	816,625,800.00	
	US$	$ 11,061	$ 29,380	$ 85,608	$ 134,895	$ 204,156	$ 465,100
						Out Standing Credit	$ 103,857

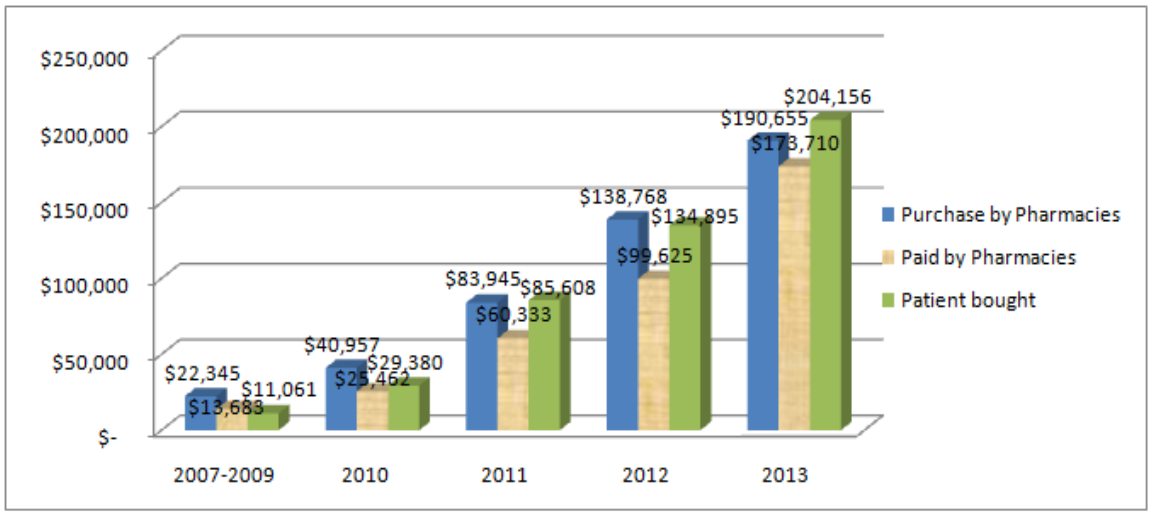
In the year 2013, the speed with which pharmacies paid their bills to MoPoTsyo for supplies of RDF drugs remained the same, ending the year with 91% of bills paid and 9% outstanding bills. The debt is due to only 3 pharmacies who are withholding payment. The others all pay on time.

	Do pharmacies pay on time...level of outstanding credit				
	2007-2009	2010	2011	2012	2013
paid by pharmacie	61%	62%	72%	72%	91%
credit to pharmaci	39%	38%	28%	28%	9%
patients bought	49%	72%	102%	97%	107%

From the beginning in 2007, some pharmacies started to delay paying for the medicines that we supplied to them. In 2011, we intervened and changed the contract. We stipulated that they had to pay a market interest rate over invoices that were more than 100 days old. It took some time to become effective. It was effective in the sense that the level of outstanding credit reduced by 19 %. The 9% reflects the value of 100 days not paying bills by some pharmacies because we don't charge interest over the first 100 days to them. Pharmacies do not want to pay for the medicines as long as they have not have sold them to our patients.

Below is a graph that shows how the pharmacies are using their intermediary position between central supply and their proximity to the patient.

FIGURE 20 INCREASE IN MEDICINE SUPPLY TO PHARMACIES & CREDIT



The 3 columns show that the patients are buying what we are supplying. Patients pay for their medication at the moment it is dispensed to them. The pharmacies do not want to pay when they receive the medicines from MoPoTsyo but after they have sold them to our members. Below is a more detailed description of the 3 columns:the value of medicines purchased by the pharmacies from MoPoTsyo and supplied to them by MoPoTsyo based on the contracts that we have with each of pharmacy that dispenses our RDF medicines to our members; MoPoTsyo supplies small amounts of medicine every month or every week because most pharmacies do not have the required air conditioned storage conditions that we have at our central stock;

1) The value of what the pharmacies have paid to MoPoTsyo. They are always behind in paying so we have to keep a pressure system in place;
- The value of what the patients buy from the pharmacies that we have supplied. This value includes an average mark-up of 15% on top of the value of what we have supplied to the pharmacies, so actual value of the 3rd column in 2013 is USD $ 177,527 (if consider USD 204,156 as 115%). So have supplied medicines for a value of USD 190,655, the pharmacies have received for a value of USD 177,527 from the patients plus they charged another USD 26,629 to these patients for profit, but they delay payment to us as supplier. Only 3 pharmacies a responsible for this and we plan to address this again in 2014.

The detailed picture of the year 2013 in khmer riels is as in the table below. You can see the quantities and prices we paid at the supplier, the prices we charge to the pharmacies and the prices that the pharmacies charge to the patients, for each item. The table shows the real quantities MoPoTsyo's supply during the whole year 2013 to the pharmacies. For clarity we have added the unit costs of what we were charged by our suppliers for these medicines. The next 2

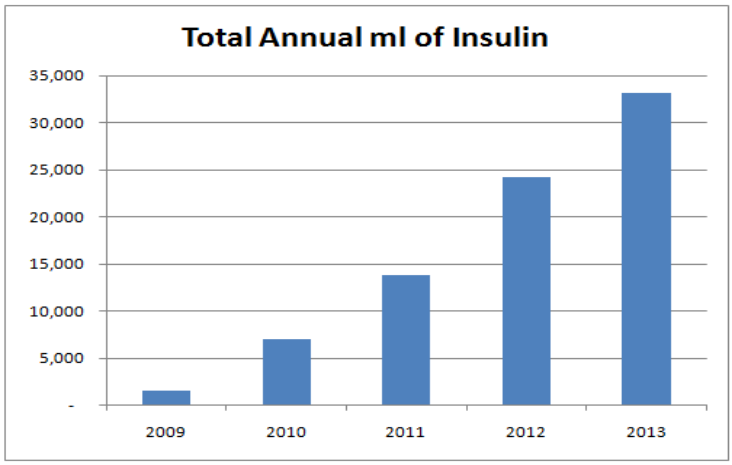
columns indicate what MoPoTsyo charged to the pharmacies, and the last 2 columns show what the pharmacies charged to the patients for 2013.

TABLE 26 THE COST OF REVOLVING DRUG FUND MEDICINES IN 2013

COST OF MEDICINE IN 2013 (IN KHMER RIEL)										
Nr	Items Description	Dosage	QTY	FROM SUPPLIER		TO PHARMACY		TO PATIENT	
				UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
1	GLIBENCLAMIDE	5mg	2,187,000	16.64	36,391,680	42.50	92,947,500	50.00	109,350,000
2	METFORMINE	500mg	2,753,500	43.69	120,300,415	85.00	234,047,500	100.00	275,350,000
3	HYDROCHLOROTHIAZI	25mg	549,111	17.08	9,378,816	42.50	23,337,218	50.00	27,455,550
4	FUROSEMIDE	40mg	61,000	21.92	1,337,120	42.50	2,592,500	50.00	3,050,000
5	ATENOLOL	50mg	422,648	22.88	9,670,186	85.00	35,925,080	100.00	42,264,800
6	PROPRANOLOL	40mg	16,000	22.64	362,240	85.00	1,360,000	100.00	1,600,000
7	ASPIRIN	300mg	63,383	17.36	1,100,329	42.50	2,693,778	50.00	3,169,150
8	CAPTOPRIL	25mg	64,607	38.60	2,493,830	127.50	8,237,393	150.00	9,691,050
9	ENALAPRIL	10mg	447,000	35.08	15,680,760	127.50	56,992,500	150.00	67,050,000
10	AMITRIPTYLINE	25mg	194,000	22.68	4,399,920	85.00	16,490,000	100.00	19,400,000
11	AMLODIPINE	10mg	464,842	24.32	11,304,957	127.50	59,267,355	150.00	69,726,300
12	SIMVASTATINE	20mg	138,780	97.30	13,503,294	220.00	30,531,600	250.00	34,695,000
13	GEMFIBROZILE	600mg	53,460	794.60	42,479,316	950.00	50,787,000	1,000.00	53,460,000
14	THIAMINE	50mg	337,718	27.92	9,429,087	42.50	14,353,015	50.00	16,885,900
15	MULTIVITAMINE	N/A	208,000	13.28	2,762,240	25.50	5,304,000	30.00	6,240,000
16	LOSARTAN	50mg	134,010	185.33	24836073.3	315.00	42,213,150	350.00	46,903,500
17	INSULIN ACTRAPID	3ml	31	7,560	234,360	8,500	263,500	10,000	310,000
18	INSULIN ACTRAPID	10ml	377	22,704	8,559,408	21,300	8,030,100	25,500	9,613,500
19	INSULIN LANTUS	3ml	-	-	-	-	-	-	-
20	INSULIN MIX 30/70	3ml	-	-	-	-	-	-	-
21	INSULIN MIX 30/70	10ml	2,104	22,704	47,769,216	21,300	44,815,200	25,500	53,652,000
22	INSULIN NPH	3ml	-	-	-	-	-	-	-
23	INSULIN NPH	10ml	1,328	22,704	30,150,912	21,300	28,286,400	25,500	33,864,000
24	INSULIN SYRINGE	N/A	59,040	414	24,442,560	450	26,568,000	500	29,520,000
25	INSULIN PEN NEEDLE	N/A	150	86.71	13,007	170	25,500	200	30,000
TOTAL					416,599,726	MoPoTsyo sold to pharmacies	785,068,288	incl. profit for pharmacy	913,280,750
								16%	128,212,463

According to our database, the total amount paid by patients to the pharmacies in the year 2013 was 785,482,045 Riel. The difference of 127,798,705 Riels means either that not everything that we supplied was sold (yet) to the patients, or that some is sold without invoices to our members, or to other people or patients. It can be a combination of both. What is thus unaccounted for it amounts to almost 20% of the total.

FIGURE 21 INSULIN USE IN ML



The number of DM patients using insulin rose to 508 during 2013. The average use is between 5 and 6 ml per month. IN 2012, we had switched from 3 ml *donated* pens to 10 ml vials that we must purchase. MoPoTsyo supplies the insulin wrapped together with insulin syringes.

Medical Materials

The medical materials used by PE's increase steadily over the years. The majority of the medical materials is used in the projects by the peer educators for the activities that they do. The direct sales of materials to patients are only a small proportion.

TABLE 27 MEDICAL MATERIALS USED BY PEER EDUCATORS

Stock used for each projects and sold to patient							
Nr	**Items**	**Unit**	**2010**	**2011**	**2012**	**2013**	**Total**
1	BP-meter (1=30$)	set/1kit	1	71	77	50	**199**
2	BG-meter (1=27$)	set/1kit	1	85	90	50	**226**
3	Strip for BG-meter (1=10$)	box/50	43	1,075	1,081	453	**2,652**
4	Needle for BG-meter (1=2.5$)	box/100	16	634	536	259	**1,445**
5	Urine strips (1=4.5$)	box/150	0	1,035	1,048	318	**2,401**
Stock sold to patient							
1	BP-meter (1=30$)	set/1kit		45	40	50	**135**
2	BG-meter (1=27$)	set/1kit		61	53	50	**164**
3	Strip for BG-meter (1=10$)	box/50		89	86	92	**267**
4	Needle for BG-meter (1=2.5$)	box/100		43	42	72	**157**
5	Urine strips (1=4.5$)	box/150		3	3	30	**36**
Stock Used for projects							
1	BP-meter (1=30$)	set/1kit	1	26	37	0	**64**
2	BG-meter (1=27$)	set/1kit	1	24	37	0	**62**
3	Strip for BG-meter (1=10$)	box/50	43	986	995	361	**2,385**
4	Needle for BG-meter (1=2.5$)	box/100	16	591	494	187	**1,288**
5	Urine strips (1=4.5$)	box/150	0	1,032	1,045	288	**2,365**

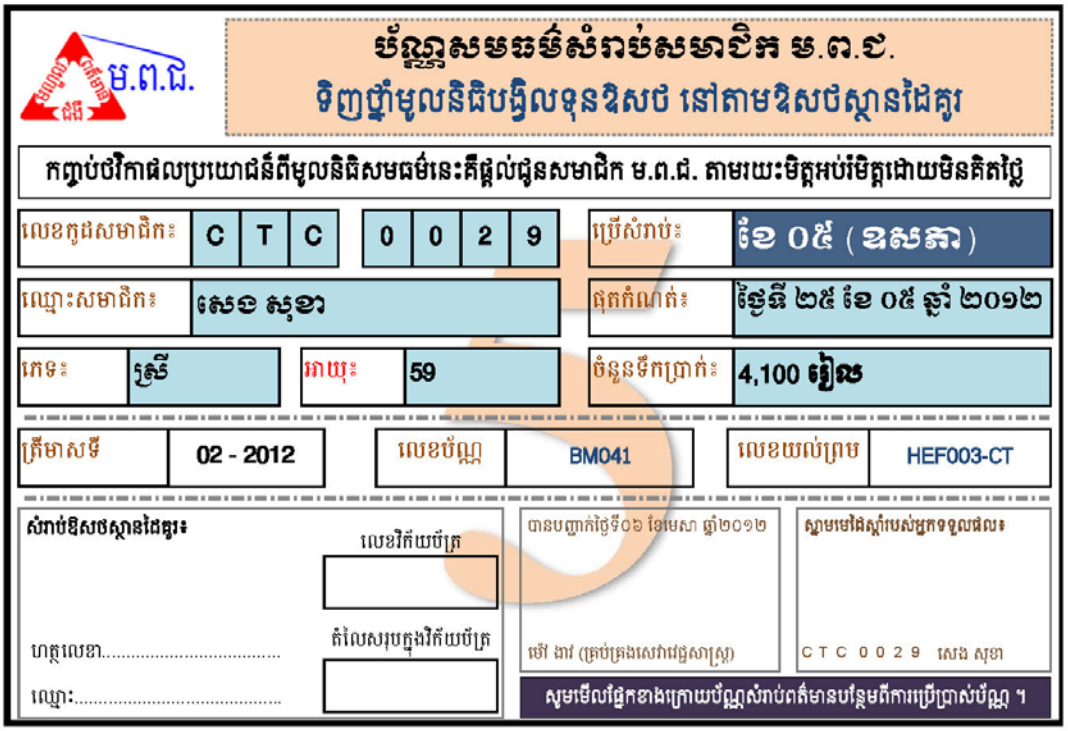
The table shows that the sales of blood glucose strips and urine glucose strips is only a small proportion of the consumption. Most strips are used as part of the follow up by peer educators and for screening.

HEALTH EQUITY FUND/VOUCHERS

For some patients the medicines are too expensive. They have already been to the Doctor who has prescribed medication. They can join the peer educator gatherings regularly and have adapted their lifestyle. Everything would be ok as long as they take their medication every day. The cost of their prescription (=the price of what they must pay at the pharmacy for one month routine medication) is too high for them. This cost varies per patient. The information is in MoPoTsyo's database and regularly updated, every time the patient visits the doctor and gets a new prescription.

For those poor diabetic patients, we have created a discount voucher, that entitles them to a 70% to 90% discount on their medication. The peer educator distributes 3 vouchers, each to be used when purchasing one month of medication. In some cases, instead of giving the voucher to the patient, the peer educators buy the medicines with the poor patient's prescriptions as this saves the patient the cost and the time to travel to the pharmacy.

FIGURE 22 EXAMPLE OF A DISCOUNT VOUCHER



Voucher distribution started on Q3 of 2011 (June 2011) to 135 poor patients living in Phnom Penh. Next quarter, this voucher system extended to other provinces Takeo, Kampong Speu and Banteay Mean Chey. There are 2 types of vouchers beneficiaries: discount vouchers for PE's and Health Equity Fund (HEF) voucher for poor members. The vouchers appear the same but have different financing sources. By letting the PE's benefit from the same system, we make them "agents" of the system so that the poor benefit from their advocacy to make the voucher system work well and on time. The number of voucher distributed to the poor increased from

135 in Q3, 2011 to 189 in Q4, 2011. Compared with 2011 the number of diabetes patients assisted with a voucher more than doubled in 2012 and from 2102 to 2013 has doubled.

The table below summarizes the experience with vouchers until end of 2013.

Discount Voucher on Routine medication Overview 10 Trimesters from 2011 Q3 through 2013 Q4

		Q3-11	Q4-11	Q1-12	Q2-12	Q3-12	Q4-12	Q1-13	Q2-13	Q3-13	Q4-13	TOTAL 10 quarters	Per patient per year
1	Issued numbers of vouchers	135	390	444	522	777	978	1083	1146	960	144	6579	12
2	Assisted numbers of Diabetes Patients	45	130	148	174	259	326	361	382	320	48	219	
3	*Amount in* ***Cambodian Riel*** *made available for assistance*	*2,363,333*	*6,558,758*	*7,729,138*	*8,909,418*	*13,517,261*	*16,416,969*	*18,536,504*	*19,578,335*	*16,078,491*	*1,310,670*	*110,998,876*	**202,460**
4	Amount in **USD** made available for assistance	**$591**	**$1,640**	**$1,932**	**$2,227**	**$3,379**	**$4,104**	**$4,634**	**$4,895**	**$4,020**	$328	**$27,750**	**$ 50.62**
5	Nr of voucher used	82	318	404	428	621	776	887	921	378	53	4868	
6	Nr of Diabetes patients who used their voucher	41	119	148	165	243	303	336	343	242	28	197	
7	*Total amount in riels of voucher-assistance used by the patients in Riels*	*1,443,130*	*5,636,800*	*7,227,650*	*7,706,100*	*11,246,300*	*13,105,200*	*14,565,254*	*16,066,233*	*6,043,623*	*478,072*	*83,518,362*	
8	Total amount in USD of voucher-assistance used by Diabetes patients	**$361**	**$1,409**	**$1,807**	**$1,927**	**$2,812**	**$3,276**	**$3,641**	**$4,017**	**$1,511**	$120	**$20,880**	**$ 38.08**
9	*Total amount of the invoices for which vouchers had been issued (***Cambodian Riels***)*	*2,648,000*	*9,083,950*	*10,419,950*	*11,825,900*	*17,202,700*	*19,808,550*	*21,607,050*	*23,823,500*	*8,828,850*	*951,100*	*126,199,550*	
10	Total amount of the invoices for which vouchers had been issued (USD)	**$662**	**$2,271**	**$2,605**	**$2,956**	**$4,301**	**$4,952**	**$5,402**	**$5,956**	**$2,207**	$238	**$31,550**	
11	% of voucher used	61%	82%	91%	82%	80%	79%	82%	80%	39%	37%	**74%**	
12	% of patients who used their voucher	91%	92%	100%	95%	94%	93%	93%	90%	76%	58%	**90%**	
13	**% of co-payment by patients**	**46%**	**38%**	**31%**	**35%**	**35%**	**34%**	**33%**	**33%**	**32%**	50%	**34%**	

RE-ASSESSMENTS AND OUTCOME MEASUREMENT

In 2013 there was no re-assessment done as we had last done in~~The~~ 2011~~ re-assessments were done in July 2011~~.where we re-assessed ~~I~~n 44 areas, samples of 19 patients were randomly selected among patients with diabetes and patients with High Blood Pressure. Both types of patients were separately re-assessed by PE's from other provinces. In 14 areas, the sample of diabetics was not complete. HBP patients were assessed in 20 areas, but only 3 could complete the sample of 19.

15 indicators on Physical outcomes
Nr of patients with improved Blood Glucose level compared with the patients BG at time of their registration (irst assessment)
Is the BG normal (FBG<126mg/dl and PPBG<180 mg/dl) at time of this reassessment's or not
Average: BP (Systolics<130) of the last 3 months in the follow up
Average: BP (Diastolics<80 of the last 3 months in the follow up\
At reassessment: the number of BP-with Systolic <130mmHg
At reassessment: the number of patients with BP-Diastolic <80mmHg
Nr patients with improved Systolic BP compared to at time of their registration/assessment's
Nr of patients with improved Diastolic BP compared to time of their registration assessments
Nr of patients with Pulse<100 at time of re-assessment
Nr of patients with improved Pulse compared to their pulse at the time of registration (first assessment)
Nr of patients with Normal BMI (<23, >18.5) at time of re-assessment
Proportion of patients who have normal BMI compared to the proportion at time of assessment
The proportion of those with improved BMI compared to their assessment BMI
No protein in urine
No food wounds
Average

3 indicators on Record Keeping by the patient
recorded urine test result
recorded blood glucose test result
recorded BP measured result
Average

7 indicators on Nutrition / diet by people with Diabetes
Eats less white rice compared to before registering as patient
Last lunch contained vegetables
Has been eating whole rice during the last 3 months
Has been eating any kinds bean during the last 3 months (but not as sweetened dessert)
Knows that some kind of foods raised/not raise BG (morning glory, watermelon, grilled bread, white rice, fish, egg) (average of detailed questions)
has pyramid food picture in house
Found pyramid is useful
Average

4 indicators on Physical Activity
Last 6 days: AT least 3 hours of exercises/physical activities
Yesterday: AT least 30 minutes of exercises/physical activities
Doing enough exercise/ physical activities
Doing more exercise than before registered
Average

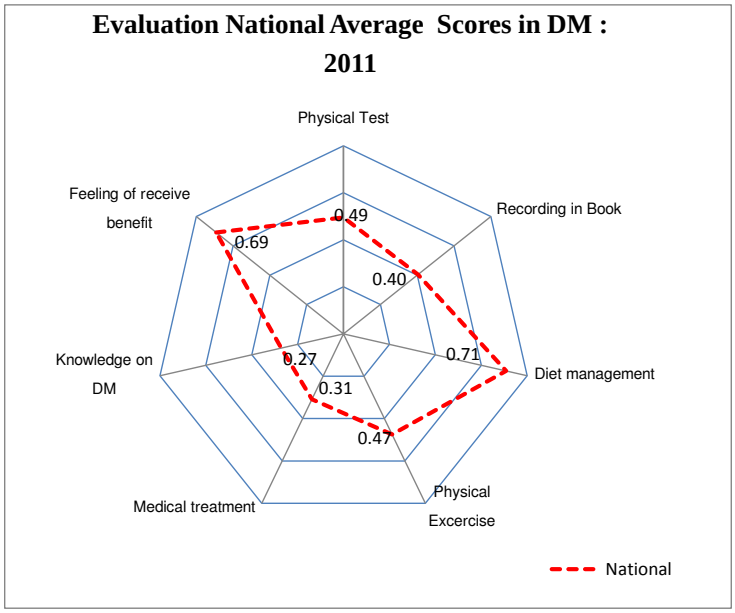
6 indicators on medical care/treatment
Used Lab service at least once during last 12 months
Used medical consultation with doctor at least once during last 12 months
Knows at least 1 name of their DM medicine
has at least 1 urine strip for self test at home at time of reassessment
Knows meaning of changing color of urine strip
can explain process of how to do 24 hours urine-strip-test
Average

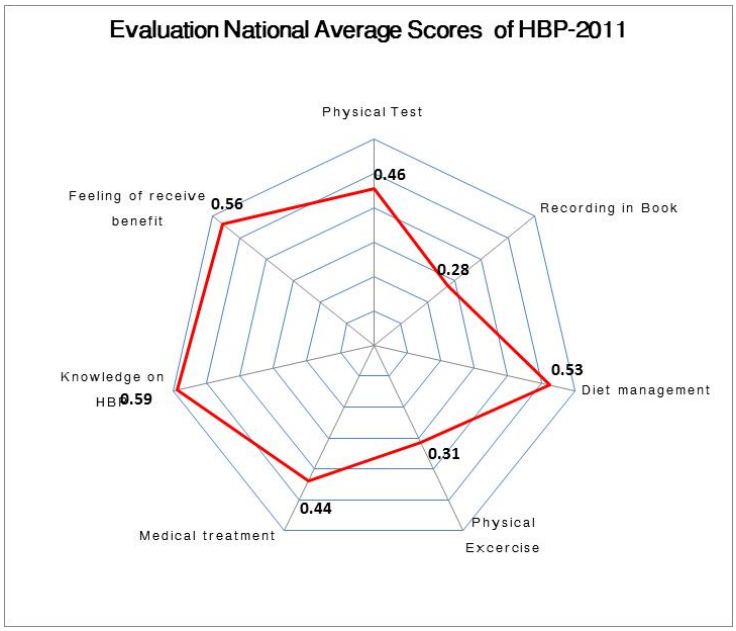
3 indicators on Disease knowledge
Know the two organs functions relates to BG control (Liver and pancreas)
Know the 3 ways to control diabetes
Know the impacts of diabetes
Average

5 indicators on patient's feeling of benefit
Spent out of pocket money less than before registering
Reports to be in better health than before registering
Has learned how to self manage diabetes with PEERs at least once
Finds the informations from Peer Ecucators helpful
Report to be able to control DM better than before registering
Average

In 2011 total, 765 randomly selected Diabetic patients were re-assessed and 229 high blood pressure patients, so that is 17.4 DM patient and 11.4 HBP patient per area. There is good cooperation from the diabetics but it more difficult to mobilise the High Blood Pressure patients. The relationship between PE and the High Blood Pressure patients, who do not have diabetes, is not as strong.

FIGURE 23 DM EVALUATION SCORE 2011





The two spider diagrams give the national average of the all the results. Some PE have a high score, while others have a low score. Some OD's have PE's with high scores and in other OD's the average score per OD is low, or province it is low. It is our aim to reward OD's for better

outcomes and make training and funds available for PE's so they can and will do a better job. It is a system of payment for performance that is measured by comparing health outcomes.

Below is an example of how the results of the physical test of Diabetic members is measured through the re-assessment in every health center area with a PE, indicated by the rows that begin with a 3 letter code for rural areas and a 2 letter code for the urban slum areas.

Detail of each indicator		Results of Physical test															
		The Better result of BG (FBG and PPBG) compare to Assessment's	The comparation of Normal result of BG (FBG<126 and PPBG<180) at reassessment's (19 cases)	Average: BP (Sistolics<130) of the last 3 months	Average: BP (Diastolics<80 of the last 3 months	At reassessment: the comparation of BP-Systolics<130	At reassessment: the comparation of BP-Dastolics<80	The Better result of BP-Systolics<130 compares to assessment's	The Better result of BP-Diastolics<80 compares to assessment's	At reassessment: Pulse<100	The Better result of Pulse<100 compares to assessment's	At reassessment: Normal BMI (<23, >18.5)	The Better result of Normal BMI compares to assessment's	The Tendency toward Normal BMI compares to assessment's	No protein in urine	No food wounds	Average
	ARA	0.34	0.41	0.44	0.50	0.59	0.59	0.91	0.98	0.95	0.95	0.47	0.11	0.79			0.62
	ARB	0.27	0.42	0.53	0.35	0.43	0.57	0.95	0.95	0.81	0.84	0.32	0.00	0.67			0.55
	ARD	0.48	0.33	0.67	0.58	0.55	0.53	0.77	0.73	0.95	0.89	0.32	0.00	0.63			0.57
	ARE	0.50	0.28	0.67	0.22	0.53	0.45	0.18	0.18	0.92	0.89	0.26	0.00	0.58			0.44
	ARF	0.91	0.68	0.39	0.06	0.34	0.26	0.93	0.91	0.89	0.89	0.37	0.00	0.58			0.56
	ARG	0.14	0.61	0.68	0.63	0.50	0.55	0.68	0.55	0.84	0.84	0.26	-0.16	0.42			0.50
	ARH	0.68	0.47	0.44	0.78	0.53	0.66	0.80	0.75	0.92	0.95	0.47	-0.11	0.74			0.62
	ARI	0.93	0.33	0.43	0.29	0.62	0.54	0.43	0.36	0.92	0.95	0.32	-0.05	0.79			0.53
	ARJ	0.59	0.74	0.63	0.42	0.55	0.53	0.86	0.89	0.92	0.89	0.32	0.05	0.68			0.62
		0.54	0.48	0.54	0.43	0.52	0.52	0.72	0.70	0.90	0.90	0.35	-0.02	0.65	#DIV/0!	#DIV/0!	0.56
	ADA	0.64	0.42	0.60	0.33	0.57	0.41	0.89	0.84	0.76	0.68	0.32	0.16	0.78		0.95	0.60
	ADJ	0.45	0.37	0.27	0.55	0.37	0.42	0.59	0.27	0.84	0.84	0.53	-0.05	0.63		1.00	0.51
	ADK	0.80	0.45	0.56	0.33	0.41	0.27	0.23	0.16	1.00	1.00	0.45	0.00	0.64		1.00	0.52
	ADO	0.52	0.44	0.14	0.14	0.28	0.22	0.98	0.93	0.72	0.67	0.89	0.22	1.00		1.00	0.58
		0.60	0.42	0.39	0.34	0.41	0.33	0.67	0.55	0.83	0.80	0.55	0.08	0.76	#DIV/0!	0.99	0.55
	AVD	0.25	0.00	0.58	0.58	0.29	0.55	0.11	0.09	0.78	0.78	0.32	0.00	0.52	0.71	0.78	0.42
	AVG	0.30	0.35	0.20	0.34	0.21	0.63	0.36	0.52	0.74	0.74	0.26	-0.21	0.58	0.87	1.00	0.46
	AVL	0.16	0.32	0.54	0.43	0.39	0.63	0.64	0.77	0.74	0.74	0.42	-0.16	0.63	0.89	1.00	0.54
	AVO	0.66	0.32	0.43	0.70	0.22	0.32	0.30	0.11	0.78	0.81	0.43	0.05	0.76	0.70	0.97	0.51
	AVR	0.20	0.11	0.65	0.65	0.14	0.24	0.27	0.45	0.73	0.70	0.37	0.05	0.60	0.76	0.97	0.46
		0.31	0.22	0.48	0.54	0.25	0.48	0.34	0.39	0.75	0.75	0.36	-0.05	0.62	0.79	0.94	0.48
	ABB	0.07	0.32	0.33	0.22	0.32	0.21	0.07	0.00	0.84	0.84	0.37	0.16	0.72		0.53	0.36
	ABF	0.86	0.32	0.45	0.45	0.42	0.45	0.82	0.41	0.76	0.79	0.26	-0.21	0.49		0.95	0.51
	ABH	0.75	0.42	0.45	0.56	0.24	0.34	0.45	0.50	0.77	0.78	0.42	0.05	0.74		0.79	0.52
Are	ABJ	0.89	0.11	0.29	0.29	0.34	0.34	0.16	0.20	0.84	0.84	0.32	0.16	0.81		0.79	0.46
as	ABL	0.23	0.36	0.62	0.56	0.39	0.45	0.09	0.80	0.81	0.84	0.30	-0.06	0.60		0.00	0.43
		0.56	0.30	0.43	0.41	0.34	0.36	0.32	0.38	0.81	0.82	0.33	0.02	0.67	#DIV/0!	0.61	0.45
	APG	0.73	0.22	0.48	0.70	0.37	0.61	0.37	0.43	0.68	0.68	0.26	-0.21	0.47	0.84	0.95	0.51
	APJ	0.00	0.22	0.57	0.32	0.29	0.39	0.33	0.33	0.87	0.84	0.47	0.05	0.79	0.66	1.00	0.47
	APH	0.32	0.32	0.73	0.66	0.34	0.42	0.41	0.33	0.92	0.89	0.37	0.05	0.68	0.89	0.95	0.55
	APL	0.02	0.11	0.61	0.14	0.42	0.34	0.37	0.50	0.66	0.63	0.42	0.11	0.89	0.70	1.00	0.46
	APM	0.41	0.45	0.00	0.07	0.25	0.28	0.37	0.31	0.72	0.72	0.50	0.11	0.67	0.78	0.95	0.44
	APN	0.05	0.11	0.52	0.86	0.33	0.49	0.44	0.11	0.66	0.66	0.11	0.11	0.44	0.55	0.66	0.41
		0.25	0.24	0.48	0.46	0.33	0.42	0.38	0.33	0.75	0.74	0.36	0.04	0.66	0.74	0.92	0.47
	CTA	0.55	0.16	0.34	0.41	0.37	0.61	0.75	0.61	0.71	0.74	0.32	-0.11	0.47		0.95	0.49
	CTB	0.82	0.39	0.50	0.43	0.54	0.62	0.39	0.57	0.73	0.76	0.49	0.22	0.76		0.97	0.58
	CTC	0.09	0.00	0.51	0.38	0.23	0.23	0.02	0.02	0.61	0.61	0.08	-0.08	0.53		0.69	0.28
	CTD	0.57	0.28	0.67	0.67	0.61	0.66	0.20	0.43	0.87	0.89	0.53	-0.05	0.68		0.84	0.56
	CTE	0.39	0.00	0.49	0.49	0.39	0.51	0.66	0.82	0.72	0.72	0.36	0.18	0.60		0.89	0.51
	CTF	0.36	0.27	0.84	0.71	0.63	0.79	0.41	0.64	0.76	0.74	0.42	0.05	0.58		0.95	0.58
	CTL	0.77	0.26	0.74	0.56	0.51	0.63	0.50	0.59	0.84	0.84	0.30	-0.18	0.42		0.84	0.54
		0.51	0.19	0.58	0.52	0.47	0.58	0.42	0.53	0.75	0.76	0.35	0.00	0.58	#DIV/0!	0.88	0.51
	DKD	0.18	0.11	0.32	0.52	0.32	0.39	0.55	0.23	0.79	0.84	0.32	0.00	0.84	1.00	0.97	0.49
	DKL	0.95	0.16	0.00	0.00	0.49	0.49	0.84	0.39	0.61	0.57	0.33	-0.16	0.33	0.57	0.65	0.42
	DKN	0.43	0.32	0.65	0.70	0.45	0.32	0.70	0.48	0.79	0.84	0.42	-0.05	0.58	0.79	1.00	0.56
		0.52	0.19	0.32	0.41	0.42	0.40	0.70	0.36	0.73	0.75	0.35	-0.07	0.58	0.79	0.88	0.49
	AK	0.70	0.42	0.45	0.45	0.24	0.42	0.25	0.25	0.84	0.79	0.32	0.14	0.46	0.74	0.95	0.49
	BB	0.98	0.47	0.81	0.65	0.57	0.43	0.32	0.34	0.89	0.92	0.32	-0.05	0.53	0.63	1.00	0.59
	BK	0.84	0.53	0.47	0.63	0.29	0.35	0.05	0.05	0.88	0.87	0.05	-0.11	0.42	0.37	1.00	0.45
	BR	0.11	0.24	0.50	0.72	0.36	0.42	0.14	0.30	0.84	0.89	0.42	0.06	0.78	0.60	0.89	0.48
	BS	0.61	0.58	0.63	0.42	0.24	0.39	0.34	0.68	0.84	0.89	0.21	-0.11	0.47	0.74	1.00	0.53
		0.65	0.45	0.57	0.57	0.34	0.40	0.22	0.32	0.86	0.87	0.26	-0.01	0.53	0.61	0.97	0.51
VERAGE per Nationa		0.48	0.32	0.49	0.45	0.39	0.44	0.46	0.46	0.79	0.79	0.35	0.00	0.62	0.69	0.86	0.49
AVERAGE per Takeo		0.46	0.36	0.46	0.40	0.40	0.41	0.52	0.50	0.80	0.79	0.36	0.02	0.65	0.63	0.78	0.49

The average results very per Operational District, as can be seen in the figure below. Interestingly the Phnom Penh slum areas are the best performing.

FIGURE 24 PERFORMANCE BY OD

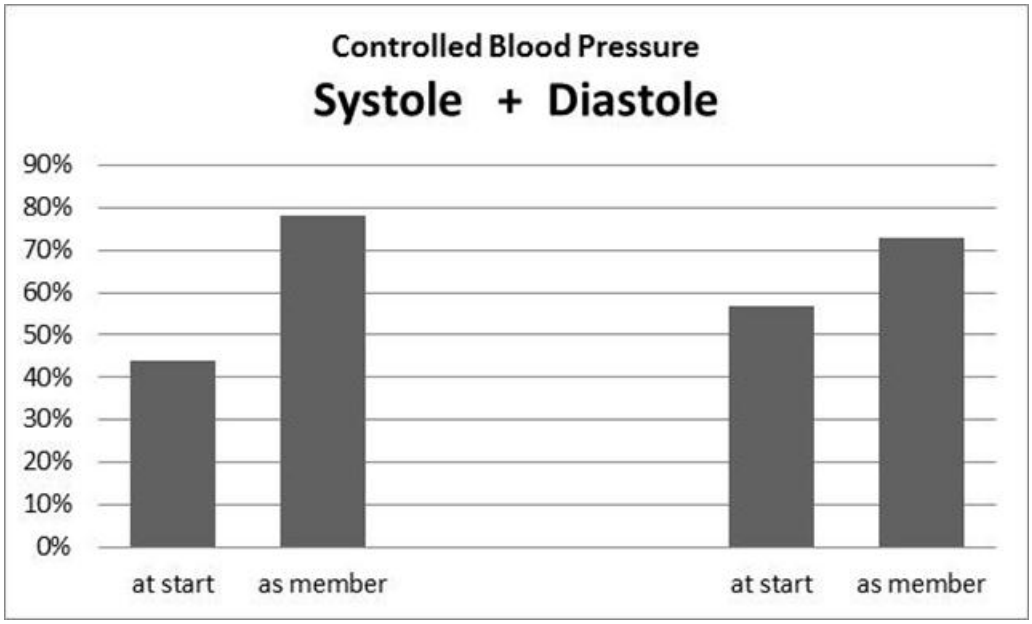
Blood Glucose: new diabetes patients when they register, they have on average Fasting Blood Glucose (FBG) of 200 mg/dl and or Postprandial BG (PPBG) of 300 mg/dl. After 6 months in the program the average FBG and PPBG are reduced significantly to much lower levels at around 130 mg/dl and 220 mg/dl respectively. This has been consistent over the years among all the diabetic members who are in follow up of the peer educators.

For Blood Pressure among people with Diabetes there is also a significant reduction, see table below showing the sum and average Systoles and Diastoles of randomly selected 170 Diabetics who are re-assessed independently, and then have their Blood Pressure values compared with their own data at the time when they registered as member of MoPoTsyo, so at least 6 months earlier.

Jul-11	Random Sample of 170 Members with Diabetes			
Ang Roka OD	Total BP		Average BP	
Blood Pressure	mm / Hg		mm / Hg	
	Systole	Diastole	Systole	Diastole
at enrolment	22,608	14,256	133	84
re-assessment	21,983	13,355	129	79

Another way to present the results is to look at the percentage of diabetics with Blood Pressure under control. Below is a random sample of 481 Diabetics with blood pressure under control, comparing the proportion at the time of the re-assessment with their blood pressure at the time when they became member of MoPoTsyo. The message is that 2 out of 3 patients with diabetes have controlled BP when they remain in follow up.

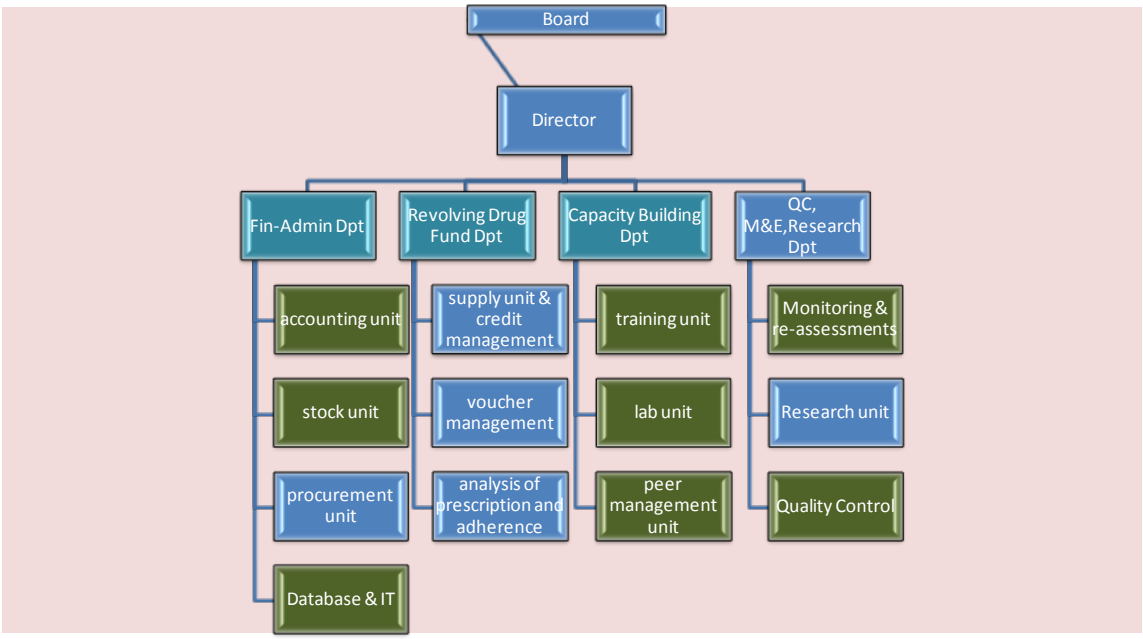
FIGURE 25IMPROVED BLOOD PRESSURE CONTROL



INTERNAL ORGANIZATION

In 2012, we changed the organization of our units and departments. The former organogram is in the annex for comparison with the new one below. The Access to Medical Services Department, which had to ensure coherent service delivery of "Medical Consultations", Revolving Drug Fund, and Laboratory Services, was abolished. Instead the Revolving Drug Fund became a separate department, but the Medical Consultations and Laboratory Services Units were moved to the Capacity Building Department, formerly the Program Department. Quality Management, Monitoring and Research remain separate units. The Capacity Building Department now manages the Peer Educator Networks PLUS the coordination and planning of medical consultations and laboratory services . These are responsibilities of which we can foresee that they will be shifted to Operational District Health Directors in the near future.

FIGURE 26 ORGANIZATIONAL CHART MOPOTSYO



The new set up appears to be an improvement.

At the end of 2012, MoPoTsyo has 36 salaried staff, of whom 30 are full time, and 6 are part timers. There are 12 DM patients among the 36, so one third of our staff is a chronic patient. The average salary of the staff is USD 198 per month.

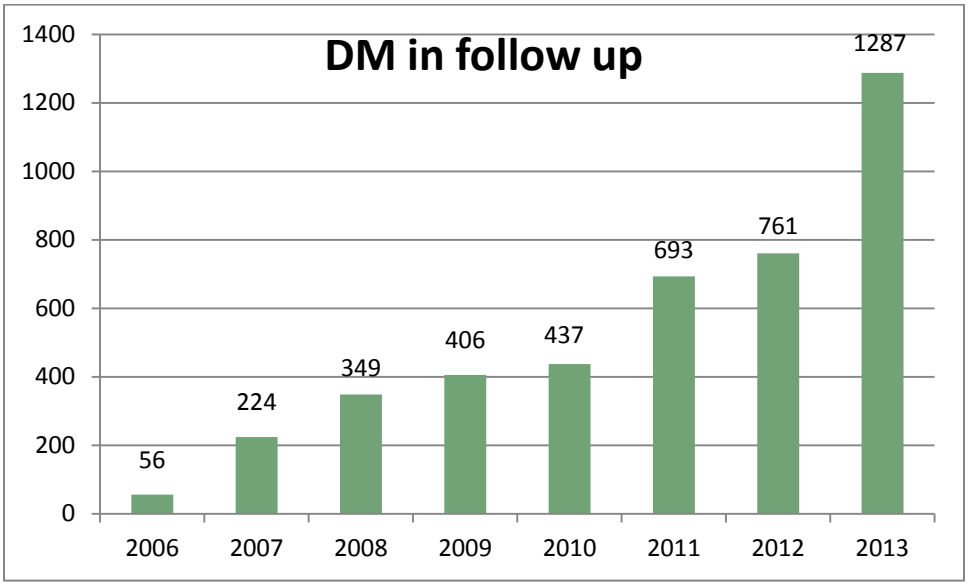
DETAILS PER PEER EDUCATOR NETWORK

THE URBAN SLUMS

Membership growth

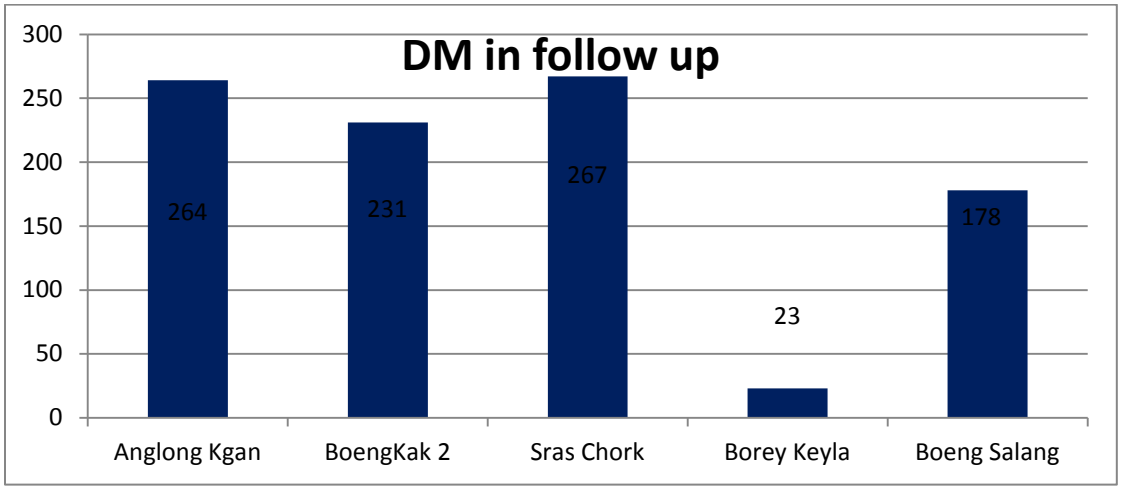
At the end of 2013, there areas 1287 people with Diabetes in follow up. in Phnom Penh. Among these 1287, there are 324 with code PX, which means they are not resident of the slum areas.

FIGURE 27 GROWTH OF URBAN COHORT OF PATIENTS IN FOLLOW-UP



The total number of Diabetics in follow up by PE in the 5 slum areas is (761 – 125=) 636.

FIGURE 28 DIABETICS IN SLUM AREAS IN FOLLOW UP



Peer Education in urban areas

Peer Education for 324 PX coded members, not residing in slum areas, happens at our office, by 2 experienced diabetic salaried Peer Educators.

The PE in Borey Kelaa stopped in 2011 and no replacer was identified. The patients were redistributed among PE in 2 other areas for follow up.

One more PE was trained to start to work in the slum area Borey Santhepheap, where many evicted people from Sras Chork and Boeungkak have been moved to.

Use of Medical Services facilitated by MoPoTsyo

Laboratory services in urban area:

Despite 2 attempts we have not been able to get an adequate popular hypertension service going. The intervention is in the urban area strongly focused on Diabetes. This is reflected in the use of all the services. MoPoTsyo's own laboratory service started in 2010, as explained above.

TABLE 28 USE OF LAB SERVICES BY URBAN NETWORK

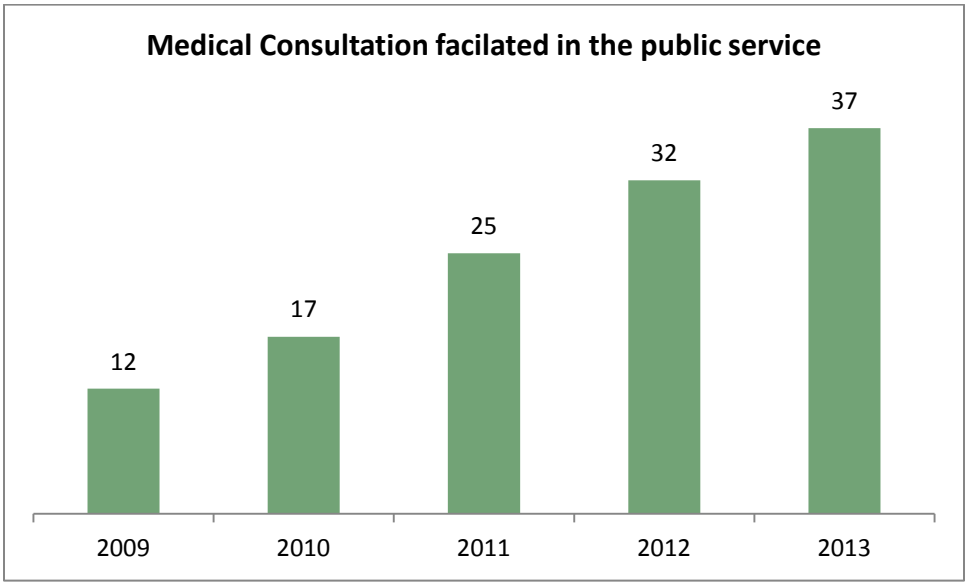
Yearly used of lab services			
Urban network	**Patients with lab test**	Diabetic	non Diabetic HBP
2007	**5**	5	0
2008	**7**	7	0
2009	**17**	17	0
2010	**457**	444	13
2011	**441**	423	18
2012	**1063**	1005	58
2013	**1377**	1284	93

A total of 1990 lab profiles belonging to urban members are in our database. They belong to 1102 individuals: 1040 Diabetics and 62 non-diabetic Hypertensive members.

Another way of dividing this group of 1102 individual members is: 738 inhabitants of the 5 slum areas and 364 members who are not living in the slum areas, but who have been admitted anyway. These members get as a code PX.

In the urban area, the laboratory tests are done at our office. There is no blood collection in the community, as in the rural areas. The advantage of doing the blood collection at the office is that we can also do a more complete urine-analysis, instead of the single proteinuria test.

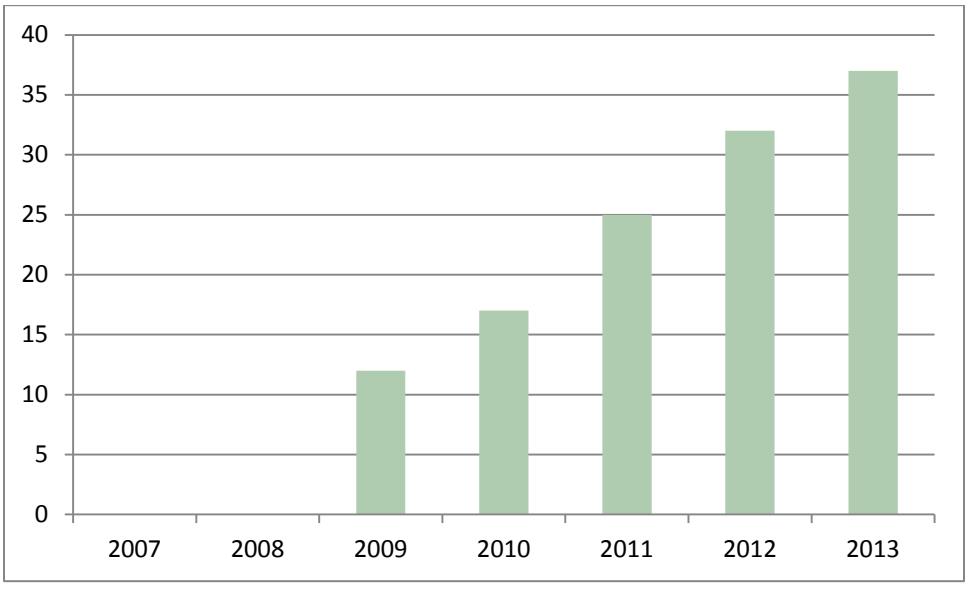
FIGURE 29 DIABETES PATIENTS USING MEDICAL CONSULTATION AT POCHENTONG RH



The 2047 consultations at the Pochentong Referral Hospital in 2013 were provided by the medical doctor to 995 individually registered diabetics during 46 sessions, usually on a Monday or a Tuesday. It is crowded: the doctor sees on average 45 patients.

The average number of monthly "first prescriptions" in the urban area is rising since we have allowed some diabetics to become member although they do not live inside the slum areas but who want to use the services.

FIGURE 30 RISING NUMBER OF MONTHLY FIRST PRESCRIPTIONS



Revolving Drug Fund and Adherence to treatment

There are 1093 diabetics with a first prescription and 38 Hypertensive (non Diabetics) with a prescription in the database since 2009. They should buy, according to their prescription 193,891,942 Riel and 6,788,350 Riel respectively, to a total of 200,680,292 Riels (about USD 50,000) of routine medication.

There are 2 pharmacies that we have contracted in Phnom Penh. They sold 152,694,970 Riels according to 6309 Pharmacy invoices to 932 registered urban diabetic members in 2012. The average invoice was 24,203 Riels. For their medication, these 932 registered diabetics paid on average 163,836 Riel in the year 2012. These diabetic patients bought **79%** of what they should have bought, so good adherence.

These 2 pharmacies also sold 3,790,500 in 247 invoices to 52 registered urban hypertensive members of MoPoTsyo. The average invoice was 15,347 riels. These 52 high blood pressure patients paid on average 72,894 riel for their medication in 2012. Their adherence was **56%**, lower than of diabetics, despite the fact that the cost of their medication is less than half.

Screening for Diabetic Retinopathy

Our collaboration with the NGO Children Surgical Centre (CSC) in Phnom Penh resulted in screening of 452 urban diabetic patients during 2013. Among them 22.18% were found to have early stages of Diabetic Retinopathy. CSC provides free laser treatment to our patients if that is necessary. Identification of these patients in early stage can help to prevent or delay progress to later stages through information and counseling and regular follow up.

TABLE 29 DIABETIC RETINOPATHY PREVALENCE

Count of Diagnosis 2013			
Area	**DR**	**NO SIGN OF DR**	**Grand Total**
AK	11	91	102
BB	36	110	146
BK	13	106	119
BP	5	25	30
BR	5	3	8
BS	29	100	129
PX	90	228	318
Grand Total	**189**	**663**	**852**
	22.18%		

~~Equity Fund/Voucher(in2013 there is no equity fund)~~

~~(below is equity fund work datas in 2012)~~

~~FIGURE 31 VOCHER DISPENSING IN PHNOM PENH IN 2012~~

Phnom Penh Only	The year 2012				
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	entire year 2012 Phnom Penh
Issued numbers of vouchers	171	192	303	357	**1023**
Assisted numbers of Diabetes Patients	57	64	101	119	**57 to 119**
Amount in **Cambodian Riel** made available for assistance	3,895,290	4,397,678	6,010,373	7,014,805	**21,318,145**
Amount in **USD** made available for assistance	**$974**	**$1,099**	**$ 1,503**	**$1,754**	**$5,330**
Nr of voucher used	167	187	282	327	**963**
Nr of Diabetes patients who used their voucher	56	64	98	113	**56 to 113**
Total amount in riels of voucher-assistance used by the patients in Riels	3,713,000	4,260,700	5,616,700	6,303,300	**19,893,700**
Total amount in USD of voucher-assistance used by Diabetes patients	**$928**	**$1,065**	**$ 1,375**	**$1,576**	**$4,944**
Total amount of the invoices for which vouchers had been issued (**Cambodian Riels**)	5,450,300	6,503,500	8,947,200	9,607,000	**30,508,000**
Total amount of the invoices for which vouchers had been issued (USD)	**$1,363**	**$1,626**	**$ 2,195**	**$2,402**	**$7,585**
% of voucher used	98%	97%	93%	92%	**95%**
% of patients who used their voucher	98%	100%	97%	95%	**98%**
% of co-payment by patients	**32%**	**34%**	**37%**	**34%**	**35%**

~~Table: number of dietetic member who followed up with PEN each year~~

Order	location of slum		Total DM registered	2013	2012	2011	2010	2009	2008	2007	2006	2005
	Phnom Penh	start date		new DM	new DM	new DM	new DM	new DM	new DM	new DM	new DM	new DM
1	Anlong Kangan.AK	2005-Jul-01	312	60	60	29	1	20	25	35	62	20
2	Boeung Kak2.BB	2006-Jan-01	330	80	53	25	4	20	21	44	83	-
3	Srash Chork.BK	2005-Jun-01	372	65	65	33	2	41	47	28	49	42
4	Borei Kela.BR	2007-Apr-01	137	2	12	22	10	21	34	36	-	-
5	Boeung Salang.BS	2007-Apr-01	198	57	53	17	3	10	8	49	1	-

6	Borei Santepheap 2.BP	2013-Nov-01	1	1	-	-	-	-	-	-	-	-
	PX		497	146	131	102	96	2	0	0	15	5
			1849	**413**	**374**	**228**	**116**	**114**	**135**	**192**	**210**	**67**
still in follow up/Yearly	2006		**56**									56
	2007		**223**								176	47
	2008		**349**							161	148	40
	2009		**405**						113	135	124	33
	2010		**438**					96	95	114	105	28
	2011		**693**			228	97	80	80	96	88	24
	2012		**1205**		409	219	165	104	85	99	92	32
	2013		**1457**	455	350	185	134	73	68	79	84	29

According to the data of PEN there is drop out from the follow-up service with PE since 2005 ~~to 2011~~. The PX group is not included in the calculation of the drop-out rate. Drop out is influenced by the evictions in the slum areas Sras Chork (BK) and Boeungkak2 (BB) because the patients had to move out to areas far away where there is no PE follow up yet such as Borey Santhepheap (7NG). However, in 2012 and 2013 rate of follow-up increased a bit because of better data management of NGO and coming back of some patients who had abandoned follow-up before.

TAKEO PROVINCE WITH 5 OD'S

Screening

New patient screenings in the whole Takeo province were completely finished before 2013. Thus, there is no screening anymore. However there are still new DM and HBP patients come to register with PEN.

Membership growth

FIGURE 31 MEMBERS WITH DIABETES IN TAKEO PROVINCE (MONTHLY GROWTH)

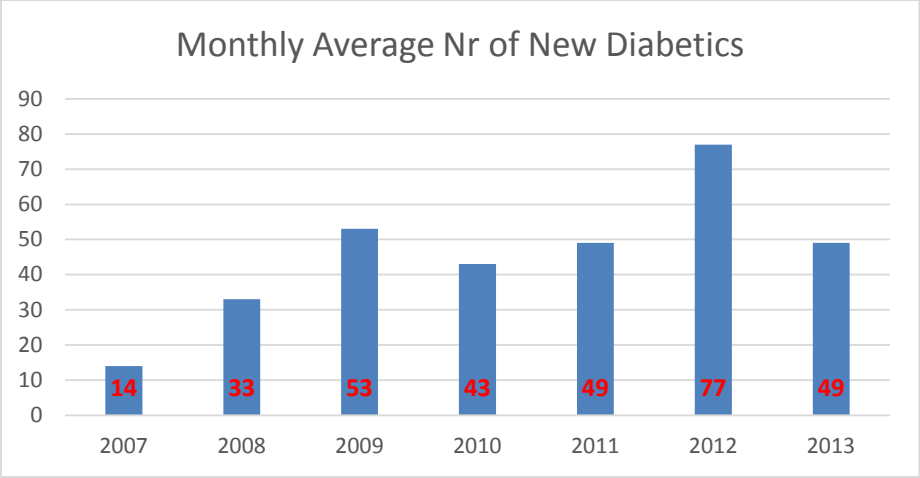
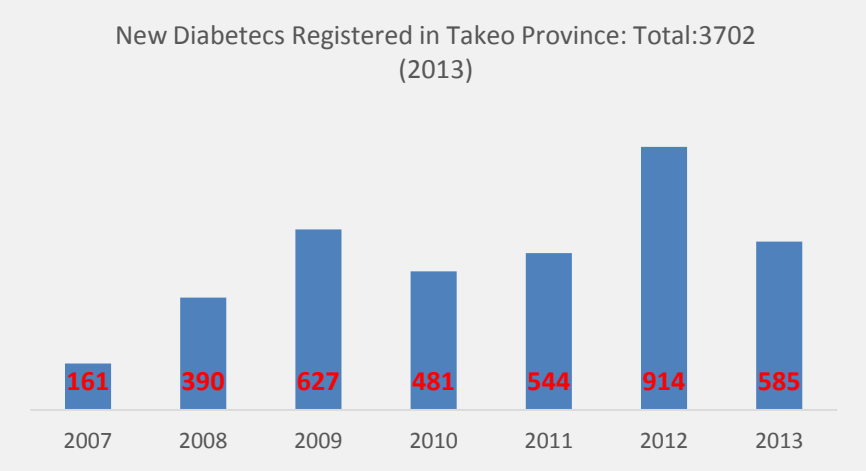


FIGURE 32 YEARLY GROWTH MEMBERSHIP INCREASE TAKEO SINCE 2007



The variation in numbers of new DM year on year is a result of screening activity, except in 2009 when we registered many patients after MSF Belgium closed the Chronic Disease Care clinic in the provincial capital. Without the WDF grant (WDF09-463) we would have registered less people with DM into our continuum of care in 2012. Until 2013, numbers of registers decreased because we have finished patient screening already, causing new registrations go normally.

TABLE 30 NEW DIABETICS REGISTERED BY OD IN TAKEO

By OD	Diabetics Registered By Year								
	2007	2008	2009	2010	2011	2012	2013	Grand Total	% By OD
OD Ang Roka	161	309	142	76	108	134	65	995	**26.9%**
OD Kirivong	-	52	124	119	165	217	207	884	23.9%
OD Doun Keo	-	22	88	81	93	250	106	640	17.3%
OD Prey Kabas	-	7	127	75	83	116	66	474	12.8%
OD Bati	-	-	146	126	92	197	141	702	19.0%
Outside Takeo	-	-	-	4	3	-	-	7	0.2%
Total by OD	**161**	**390**	**627**	**481**	**544**	**914**	**585**	**3702**	

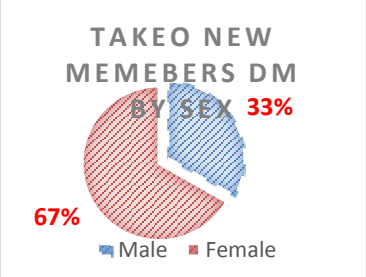
For High Blood Pressure, a first strategy was tried out in 2008 in Ang Roka, then adapted and re-tried in 2010.

TABLE 31 NEW HBP REGISTERED BY OD IN TAKEO

By OD	Hypertension Registered By Year								
	2007	2008	2009	2010	2011	2012	2013	Total in Whole in Takeo	% By OD
OD Ang Roka	0	104	0	827	269	115	34	1349	**29.9%**
OD Kirivong	0	0	0	335	248	295	226	1104	24.4%
OD Doun Keo	0	0	0	122	94	391	111	718	15.9%
OD Prey Kabas	0	0	0	410	159	96	43	708	15.7%
OD Bati	0	0	1	290	184	115	48	638	14.1%
Total by OD	**0**	**0**	**1**	**1984**	**954**	**1012**	**462**	**4517**	

The effort of the peer educators to register people with diabetes and hypertension shows the same respective proportions, with most registrations in Ang Roka OD, although it has the smallest population. We have been able to keep the proportion of patients from other provinces using the services in Takeo as low as possible, at least according to our data. Apart from a few exceptions we did not admit people who are not resident of Takeo. Anyone who wants to register must present the family book that shows residence in Takeo. However, as everywhere, mostly women are registering as member.

FIGURE 33 DM MEMBERS IN TAKEO BY SEX

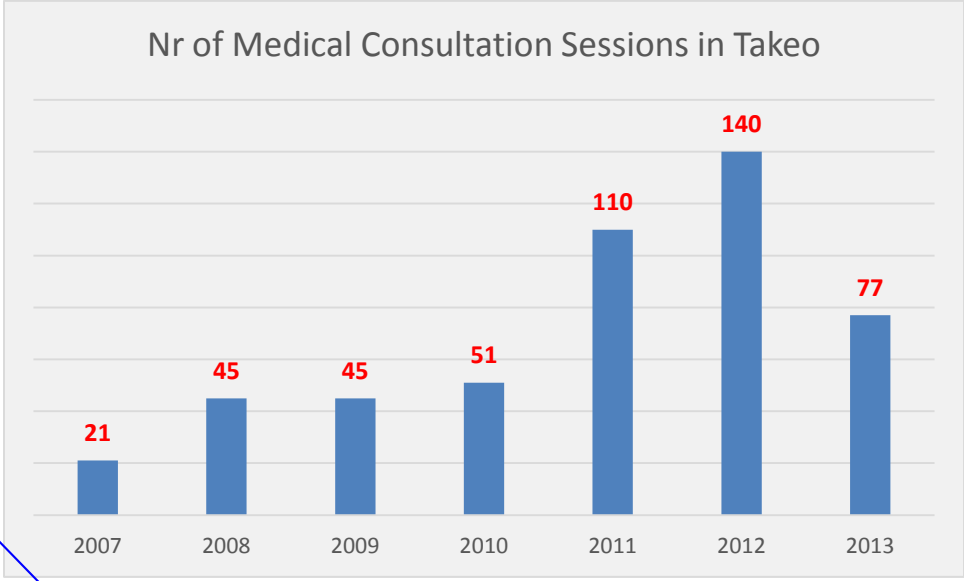


Medical Services

Medical Consultations:

The use of the medical consultations has gradually been increasing over the years in Takeo in each OD, so we have gradually been increasing the number of sessions with an experienced Medical Doctor from Phnom Penh to travels to Takeo for the appointment with 30 to 35 patients. The session is facilitated by the Peer Educator Network at the public hospital in their OD, so the travel costs are relatively low.

FIGURE 34 ANNUAL NUMBER OF CONSULTATION SESSIONS IN ALL OF TAKEO'S PUBLIC HOSPITALS



First we look at the Diabetics, and after that at the non-Diabetic High Blood Pressure patients.

TABLE 32 DIABETIC MEMBERS CONSULT THEIR DOCTOR IN TAKEO BY OD 2007 UNTIL 2013

By OD	Nr of times DM members of MoPoTyso consulted with Medical Doctor								
	2007	2008	2009	2010	2011	2012	2013	Total in Whole in Takeo	% By OD
OD Ang Roka	131	680	511	237	394	559	329	2841	**62.9%**
OD Kirivong	0	0	156	306	881	1277	1058	3678	81.4%
OD Doun Keo	0	1	92	211	376	772	111	1563	34.6%
OD Prey Kabas	0		72	136	333	461	345	1347	29.8%
OD Bati	0	0	138	122	257	548	475	1540	34.1%
Outside TK				11	12	13	18	54	1.2%
Total by OD	**0**	**0**	**1**	**1984**	**954**	**1012**	**462**	**11023**	

TABLE 33 NON DIABETIC HIGH BLOOD PRESSURE PATIENTS CONSULTING THEIR DOCTOR IN TAKEO BY OD 2008-2013

By OD	Nr of times HBP members of MoPoTyso consulted with Medical Doctor								
	2007	2008	2009	2010	2011	2012	2013	Total in Whole in Takeo	% By OD
OD Ang Roka	0	8	2	67	183	162	78	500	**16.7%**
OD Kirivong	0	0	2	8	217	453	406	1086	**36.2%**
OD Doun Keo	0			42	65	338	203	648	**21.6%**
OD Prey Kabas	0			55	136	150	124	465	**15.5%**
OD Bati	0	0	2	13	116	101	65	297	**9.9%**
Total by OD	**0**	**8**	**6**	**185**	**717**	**1204**	**876**	**2996**	

By OD	Nr of HBP members of MoPoTyso consulted with Medical Doctor for first time								
	2007	2008	2009	2010	2011	2012	2013	Total in Whole in Takeo	% By OD
OD Ang Roka	0	6	2	61	90	82	33	274	**18.0%**
OD Kirivong	0	0	2	7	135	155	133	432	**28.3%**
OD Doun Keo	0			38	46	211	73	368	**24.1%**
OD Prey Kabas	0			53	98	68	48	267	**17.5%**
OD Bati	0	0	2	9	95	44	35	185	**12.1%**
Total by OD	**0**	**6**	**6**	**168**	**464**	**560**	**322**	**1526**	

It is the idea that the Medical Doctor already has the lab profile of the patient at his disposal when he first examines the patient in order to decide on the first therapy. Among those who come for consultation, a larger proportion of diabetics have the lab profile than the non-diabetic High Blood Pressure patients. The details of this problem is shown in the table below.

TABLE 34 NUMBERS OF DIABETICS ARRIVING AT CONSULTATION WITHOUT LAB PROFILE

Nr of times Diabetic Member of MoPoTsyo consulted without the medical Doctor but WITHOUT having al LAB PROFILE							
Year	**Takeo all**	**Bati OD**	**Donkeo OD**	**Prey Kabass OD**	**Ang Roka OD**	**Kirivong OD**	*from outside Takeo*
2009	244	23	34	21	152	14	0
2010	304	28	79	39	75	61	22
2011	718	90	130	120	161	179	38
2012	1,415	234	397	197	226	353	8
2013	2,455	414	582	431	536	490	2
	5,136	**789**	**1,222**	**808**	**1,150**	**1,097**	**70**

The proportion of diabetic patients arriving at the medical consultation without a lab result has sharply increased in 2013. The problem varies per OD and highest in Daunkeo OD where half of the Diabetics have not used the laboratory as shown in the table below.

TABLE 35 PROPORTION OF DIABETICS ARRIVING AT MEDICAL CONSULTATION BUT WITHOUT LAB PROFILE

% Diabetic Member of MoPoTsyo consulting without the medical Doctor but WITHOUT having al LAB PROFILE							
Year	**Takeo all**	**Bati OD**	**Donkeo OD**	**Prey Kabass OD**	**Ang Roka OD**	**Kirivong OD**	*from outside Takeo*
2009	24%	17%	36%	29%	29%	9%	NA
2010	34%	22%	37%	28%	31%	20%	67%
2011	41%	33%	34%	35%	39%	20%	84%
2012	40%	42%	51%	41%	40%	27%	36%
2013	35%	31%	43%	32%	40%	36%	25%

The laboratory service is available for registered members with Diabetes or High Blood Pressure. In the years 2008 and 2009 we facilitated HbA1c test for some members but our own laboratory service that creates our standard biochemistry profile for our members with Diabetes and or High Blood Pressure did not start until the end of 2009, as can be seen in the table below. The use of the service by patients with high blood pressure is much lower than by diabetics. There was some improvement in 2012 but most patients have not yet been reached in Takeo.

TABLE 36 USE OF LABORATORY SERVICES IN TAKEO

		DIABETIC members getting laboratory profiles					
Year	**Takeo**	**Bati OD**	**Donkeo OD**	**Prey Kabass OD**	**Ang Roka OD**	**Kirivong OD**	*from outside Takeo*
2008	12	0	1	0	10	1	0
2009	49	7	7	4	22	9	0
2010	932	157	59	137	421	158	0
2011	229	9	19	7	102	92	0
2012	1,091	191	172	131	276	321	5
2013	672	109	136	37	151	238	1
Total	**2,985**	**473**	**394**	**316**	**982**	**819**	**6**

	Year 2013	**Diabetic members of MoPoTsyo in each OD in Takeo of whom we have at least 1 Lab profile in our database**					
Year	**Takeo**	**Bati OD**	**Donkeo OD**	**Prey Kabass OD**	**Ang Roka OD**	**Kirivong OD**	*from outside Takeo*
has lab profile	1,669	299	256	170	482	457	5
Nr of DM registered	3,695	702	640	474	995	884	
% with lab profile	45%	43%	40%	36%	48%	52%	

	Year 2013	(Non-diabetic) High Blood Pressure members of MoPoTsyo in each OD in Takeo of whom we have at least 1 Lab profile in our database					
Year	**Takeo**	**Bati OD**	**Donkeo OD**	**Prey Kabass OD**	**Ang Roka OD**	**Kirivong OD**	*from outside Takeo*
has lab profile	726	64	105	105	140	312	0
Nr of HBP registered	4,516	638	717	708	1,349	1,104	
% with lab profile	16%	10%	15%	15%	10%	28%	

		(Non-diabetic) High Blood Pressure members getting laboratory profiles					
Year	**Takeo**	**Bati OD**	**Donkeo OD**	**Prey Kabass OD**	**Ang Roka OD**	**Kirivong OD**	*from outside Takeo*
2008	0	0	0	0	0	0	0
2009	1	1	0	0	0	0	0
2010	125	39	2	57	2	25	0
2011	158	1	6	0	107	44	0
2012	449	34	68	57	57	233	0
2013	178	8	37	9	18	106	0
Total	**911**	**83**	**113**	**123**	**184**	**408**	**0**

TABLE 37 USE & COST OF MEDICAL CONSULTATIONS IN 6 REFERRAL HOSPITALS IN TAKEO IN 2012 AND 2013

Takeo province in 2013	
Total cost of consultations in Takeo	$10,667.00
Number of consultations 6 Hospitals	4809
Cost per consultation in Takeo	$2.22
consultation sessions (mornings)	107
nr of patient per session	45
Our cost per session in Takeo	**$99.69**

The costs vary between Operational Districts. In Kirivong OD, we held consultation at 2 different locations: at the Referral Hospital but also at Rominh Hospital, a former District Hospital.

TABLE 38 COST OF MEDICAL CONSULTATION BY OD IN TAKEO

year 2013	Ang Roka	Don Keo	Bati	Prey Kabass	Kirivong	Total
1. Nr of patients who consulted Doctor	243	393	293	261	690	**1,880**
2. Cost [(nr3+nr4)*nr5]	$972.00	$1,134.00	$1,134.00	$1,694.00	$2,783.00	**$7,717.00**
3. Transportation expenses	$45.00	$45.00	$45.00	$85.00	$85.00	**$305.00**
4. Fee for Doctor per consult session	$36.00	$36.00	$36.00	$36.00	$36.00	**$180.00**
5. Nr of consultation sessions	12	14	14	14	23	**77**
6. Average Nr of patients per session	20	28	21	19	30	**118**
cost per consulting patient (nr2/nr1)	**$4.00**	**$2.89**	**$3.87**	**$6.49**	**$4.03**	**$4.10**

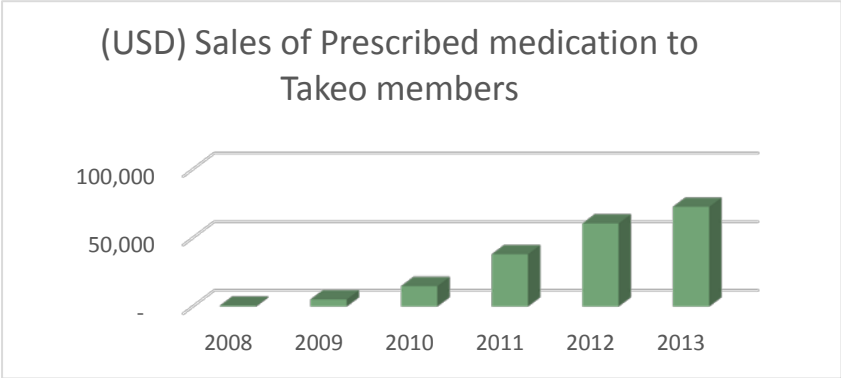
Nr of consulting patient per session (nr1/nr5)	20	28	21	19	30	24

By involving Peer Educator Networks in the referral mechanism and in the planning and organisation of the medical consultations, both overcrowding and underutilization of the specialised Physician who travels to the hospital to prescribe can be avoided.

Revolving Drug Fund in Takeo

There are 9 pharmacies contracted by MoPoTsyo in the province. The graph above, shows the revenue that MoPoTsyo should receive from these pharmacies. However, some pharmacies try to use MoPoTsyo as a bank by delaying payments.

FIGURE 35 REVOLVING DRUG FUND GROWTH IN TAKEO (5 OD)



The average price has not risen and that is probably because the proportion of people with a prescription for high blood pressure is increasing.

This compensates the fact that an older cohort of people with DM needs more medication.

TABLE 39 FREQUENCY OF SALES AND AVERAGE PRICE 2008 - 2013

Year	Members boght	Numbers of invoices	Average Price per invoice
2008	3,902,800	204	19,131
2009	20,576,800	1,307	15,744
2010	58,542,500	3,533	16,570
2011	141,886,490	9,052	15,675
2012	242,453,900	14,371	16,871
2013	290,354,600	16,068	18,070
Total	**757,717,090**	**44,535**	***17,010***

The total value of invoices of the medicines sold to our members in Takeo since 2008 is 757,717,090 Riels or USD 189,429 (if 4000 Riel is 1 USD). This figure is not the same as what the pharmacies in Takeo received because some patients go to buy in Kampong Speu province is that pharmacy is closer. Also some patients who are not from Takeo, go to Takeo to buy their medicine there.

As soon as MoPoTsyo hands over all 5 Peer Educator Networks, the whole intervention in Takeo, including the Revolving Drug Fund to the Ministry of Health, then this means an annual loss in revenue of at least 300,000,000 riels (USD 75,000) or more if the growth has continued in 201.

We compare the volume of our supply to each pharmacy, with the volume shown on the invoices that we receive back from those pharmacies.

TABLE 40 COMPARISON OF SUPPLY AND INVOICES IN 9 PHARMACIES IN TAKEO OD

Year 2013	MoPoTsyo supplied to pharmacies in 2013	Name of Pharmacy	Value of Patient Invoices in 2013	Nr Invoices	Average amount per invoice	Difference between our invoices produced by pharmacies (Negative means MISSING	Estimated number of missing invoices	% of clients who did not get invoice from pharmacy
1	31,141,250	Ang Roka	31,045,690	1,324	23,448	(95,560)	-4	0%
2	6,429,750	Prey Rodoul	1,612,200	94	17,151	(4,817,550)	-281	-299%
3	18,373,750	Pet Hem	19,786,350	1,471	13,451	1,412,600	105	7%
4	8,148,750	Thida Pao	8,620,250	591	14,586	471,500	32	5%
5	52,970,250	Osot Tep	50,262,830	3,244	15,494	(2,707,420)	-175	-5%
6	47,983,600	Rominh	49,775,650	2,622	18,984	1,792,050	94	4%
7	37,907,250	Sok San	28,405,700	1,293	21,969	(9,501,550)	-433	-33%
8	42,674,050	Sorya	44,899,090	2,312	19,420	2,225,040	115	5%
9	42,392,500	Ang Sing	47,109,750	2,538	18,562	4,717,250	254	10%
Total	**288,021,150**		**281,517,510**	**15,489**				

Year 2013	MoPoTsyo supplied to pharmacies in 2013+5%	Name of Pharmacy	Value of Patient Invoices in 2013	Nr Invoices	Average amount per invoice	Difference between our invoices produced by pharmacies (Negative means MISSING	Estimated number of missing invoices	% of clients who did not get invoice from pharmacy
1	32,698,313	Ang Roka	31,045,690	1324	23,448	(1,652,623)	-70	-5%
2	6,751,238	Prey Rodoul	1,612,200	94	17,151	(5,139,038)	-300	-319%
3	19,292,438	Pet Hem	19,786,350	1471	13,451	493,913	37	2%
4	8,556,188	Thida Pao	8,620,250	591	14,586	64,063	4	1%
5	55,618,763	Osot Tep	50,262,830	3244	15,494	(5,355,933)	-346	-11%
6	50,382,780	Rominh	49,775,650	2622	18,984	(607,130)	-32	-1%
7	39,802,613	Sok San	28,405,700	1293	21,969	(11,396,913)	-519	-40%
8	44,807,753	Sorya	44,899,090	2312	19,420	91,338	5	0%
9	44,512,125	Ang Sing	47,109,750	2538	18,562	2,597,625	140	6%
Total	**302,422,208**		**281,517,510**	**15,489**				

The difference between the 2 tables is that the lower includes a 5% profit margin on all the medicines sold by MoPoTsyo to the pharmacies. In fact this margin is between 5 and 15% depending on the kind of medicine. If we do not add this, we cannot make the comparison between the volumes. It shows that in fact only pharmacies 2 and 7 are not writing invoices as they should, but all the other ones are normally writing them. As these 2 non-compliers are small this means that our analysis on adherence should be reliable in Takeo.

Therefore that we can analyze adherence by patients in Takeo

If the pharmacies fill out the invoices, we can we measure adherence overall and per patient.

We also compare the adherence per patient per OD. Some OD's do a good job and other OD's do not such a good job. The red figures in the tables below on DM and on HBP show that these OD's are performing below the provincial average in Takeo.

It is the role of the Ministry of Health and of the Provincial Health Department to make sure that OD's try to do a good job with regards to adherence and improve the situation in Takeo with regards to adherence to High Blood Pressure medication.

TABLE 41 ADHERENCE DIABETICS IN TAKEO

	Adherence to prescribed treatment by Diabetic Members of MoPoTsyo who come to buy their medicines prescribed by the Doctor in their patient book in Takeo OD							
	Diabetics and Diabetics who also have high blood pressure	OD Bati	OD Daunkeo	OD Prey Kabas	OD Ang Roka	OD Kirivong	Among all the diabetics who are member of MoPoTsyo	
	Diabetics	AB	AD	AP	AR	AV	Total time per year	
	2008	-	-	-	202	-	202	Times they bought
	2009	241	140	47	511	356	1,295	
	2010	682	499	297	877	778	3,133	
	2011	1,281	1,016	844	1,951	1,852	6,944	
	2012	2,288	2,239	1,424	2,283	2,814	11,048	
	2013	2,889	2,291	1,708	2,352	2,945	12,185	
	Total per OD	**7,381**	**6,185**	**4,320**	**8,176**	**8,745**	**34,807**	
6 years	Nr of Diabetics who bought during 6 years	601	542	383	662	744	2,932	Diabetic people
	Average per Diabetic in 6 years	12.3	11.4	11.3	12.4	11.8	11.8	Times they bought
The year 2013	Nr of Diabetics who bought in 2013	457	397	299	409	550	2,112	Diabetic people
	Average per diabetic in 2013	6.3	5.8	5.7	5.8	5.4	**5.8**	Times they bought
	Diabetics spent at pharmacy in 2013	54,086,400	42,056,480	37,837,110	45,017,040	68,604,750	**247,601,780**	Cambodian Riels
	Average expenditure per diabetic person (2013)	118,351	105,936	126,546	110,066	124,736	**585,634**	
	If 100% adherent to 1st prescription	70,087,118	61,413,440	45,533,750	55,912,343	93,177,200	**326,123,851**	
	adherent % 2013	77%	68%	83%	81%	74%	**77%**	Average in Takeo
	Nr of Diabetics with 1st prescription	391	372	283	372	519	1,937	Diabetic people
	If 100% adherent they should spend	179,251	165,090	160,897	150,302	179,532	**835,072**	Cambodian Riels

The table above shows adherence to the first prescription instead of adherence to the last prescription, so the actual adherence level may be lower. On the other hand, maybe some pharmacies are not filling out all the invoices for us, so the adherence may also actually be better.

The table below shows the same figures but for High Blood pressure, among those who do not have diabetes.

TABLE 42 ADHERENCE HBP PATIENTS IN TAKEO

	Adherence to prescribed treatment by HBP Members of MoPoTsyo who come to buy their medicines prescribed by the Doctor in their patient book in Takeo OD							
	HBP Patients	**OD Bati**	**OD Daunkeo**	**OD Prey Kabas**	**OD Ang Roka**	**OD Kirivong**	**Among all the HBP who are member of MoPoTsyo**	
	Diabetics	**AB**	**AD**	**AP**	**AR**	**AV**	**Total time per year**	
	2008	-	-	-	1	-	1	
	2009	3	-	-	7	-	10	
	2010	43	70	59	96	69	337	
	2011	262	132	302	601	380	1,677	Times they bought
	2012	466	683	498	725	951	3,323	
	2013	480	808	621	784	1190	3,883	
	Total per OD	**1,254**	**1,693**	**1,480**	**2,214**	**2,590**	**9,231**	
6 years	Nr of HBP who bought during 6 years	212	350	268	288	**451**	1,569	HBP people
	Average per HBP in 6 years	5.9	4.8	5.5	7.7	**5.7**	5.9	Times they bought
The year 2013	Nr of HBP who bought in 2013	98	191	131	149	**297**	866	HBP people
	Average per HBP in 2013	4.9	4.2	4.7	5.3	**4.0**	**4.6**	Times they bought
	HBP spent at pharmacy in 2013	5,548,550	7,380,150	7,615,350	7,785,650	**14,423,150**	**42,752,850**	Cambodian Riels
	Average expenditure per HBP person (2013)	56,618	38,640	58,132	52,253	**48,563**	**254,205**	
	If 100% adherent to 1st prescription	9,081,748	15,117,023	9,968,150	12,448,873	**27,714,268**	**74,330,062**	
	adherent % 2013	61%	49%	76%	63%	**52%**	**60%**	Average in Takeo
	Nr of HBP with 1st prescription	77	173	112	124	**261**	747	HBP people
	If 100% adherent they should spend	117,945	87,382	89,001	100,394	**106,185**	**500,907**	Cambodian Riels

Primary Prevention

In Takeo province our Primary Prevention team of 6 PE's has organised primary prevention sessions in every commune in Ang Roka OD. 408 local authorities were exposed to information about risk factor control. This was one in 10 communes.

Also the same group of PE's held primary prevention sessions in 49 schools, reaching more than 800 teachers of the more than 1000 who will be reached when this activity ends. It is funded by the World Diabetes Foundation. Both these types of activities are successful and will be replicated to other areas in the coming years when funding becomes available. A second round of primary prevention started in December 2012, to prepare for 2 drawing competitions held in 2013 just before the end of the WDF09-463 grant (ended on 30 June 2013). Another 9 Schools were covered in Ang Roka (833 teachers) and another 28 schools in Prey Kabas (328 teachers). The second primary prevention team for Prey Kabas was trained in order to prepare for this second round.

BANTEAY MEANCHEY PROVINCE WITH 1 OD: THMAR POUK

During the year 2013, the membership grew from 908 chronic patients to 1064 members in total. Among all the members there are 309 patients with High Blood Pressure (up from 249). There are 755 Diabetics (up from 659) registered. 76% of members are women. That is of course disproportionate. It indicates a problem with the screening process in the sense that the men may not have access to it. This in turn may be the result of the fact that this is a district that is bordering Thailand. There is a lot of migration. More than 65% reports to be farmer when they register. There are 26 insulin patients among the diabetics in this area.

Peer Educators

There were no more peer educators were trained, so there are 10 peer educators active in Thmar Pouk OD in 2013 and the network is complete.

Screening

The number of villages where screening was completed is 100, with a total of 52,100 adults having benefited from diabetes screening. There was no screening during 2013. The set up of Village High Blood Pressure Groups was not part of the project in this area. Yet 6 of such groups have been set up.

Use of the Medical Services organized by MoPoTsyo

Laboratory Services

TABLE 43 USE OF THE LAB SERVICES BY PATIENTS IN THMAR POUK OD

Yearly used of lab services			
	Patients with lab test	Diabetic	non Diabetic HBP
2009	**4**	4	0
2010	**153**	124	29
2011	**7**	7	0
2012	**143**	101	42
2013	**72**	52	20

The percentage of chronic patients who have used the lab service remained 28% in 2013, , still a low proportion of the total: only 317 of the 1064 registered patients have a lab profile in our database.

Medical Consultations

In 2012 the number of consultation sessions remained roughly the same as in 2011, usually 2 or 3 times per month.

2010: 21 sessions

2011: 30 sessions

2012: 32 sessions

2013: 24 sessions

TABLE 44 USE OF MEDICAL CONSULTATION SERVICE IN THMAR POUK OD

use of the medical consultation by type		
	Diabetics	Non Diabetic HBP
2010	262	73
2011	452	142
2012	864	213
2013	655	159

Contact rate per Registered Diabetic Member			
	Diabetics patients coming for consultations	1st prescriptions	Contact rate per diabetic per year
2010	262	163	1.6
2011	452	201	1.2
2012	864	200	1.5
2013	655	87	0.87

Contact rate per Registered HBP Member			
	HBP patients coming for consultations	1st prescriptions	Contact rate per diabetic per year
2010	73	56	1.3
2011	46	102	0.3

2012	213	200	0.6
2013	159	32	0.51

When we compare our supply to the 4 pharmacies with the invoices that we receive back from them, we can see that number 3 have the negative result because of they are busy with their job and have no time to dispense medicine for us, so we decide to finish contract with them at the middle of the year.

TABLE 45 FOUR PHARMACIES IN THMAR POUK OD

Year 2013	MoPoTsyo supplied to pharmacies in 2013	Name of Pharmacy	Value of Patient Invoices in 2013	Nr Invoices	Average amount per invoice	Difference between our invoices produced by pharmacies (Negative means MISSING	Estimated number of missing invoices	% of clients who did not get invoice from pharmacy
1	26,804,400	Thmor Pouk	28,947,190	1,844	15,698	2,142,790	137	7.4%
2	18,082,950	Svay Chek	20,575,550	1,336	15,401	2,492,600	162	12.1%
3	*5,352,700*	*Banteay Chhmar*	*5,601,300*	*441*	*12,701*	*248,600*	*20*	*4.4%*
4	*4,563,000*	*Boeng Trakoun*	*6,594,250*	*498*	*13,241*	*2,031,250*	*153*	*30.8%*
Total	**54,803,050**		**61,718,290**	**4,119**			**471**	

Year 2013	MoPoTsyo supplied to pharmacies in 2013+5%	Name of Pharmacy	Value of Patient Invoices in 2013	Nr Invoices	Average amount per invoice	Difference between our invoices produced by pharmacies (Negative means MISSING	Estimated number of missing invoices	% of clients who did not get invoice from pharmacy
1	28,144,620	Thmor Pouk	28,947,190	1844	15,698	802,570	51	2.8%
2	18,987,098	Svay Chek	20,575,550	1336	15,401	1,588,453	103	7.7%
3	*5,620,335*	*Banteay Chhmar*	*5,601,300*	*441*	*12,701*	*(19,035.00)*	***-1***	***-0.3%***
4	*4,791,150*	*Boeng Trakoun*	*6,594,250*	*498*	*13,241*	*1,803,100*	*136*	*27.3%*
Total	**57,543,203**		**61,718,290**	**4,119**			**289**	

For the calculation method of the adherence figures below see the detailed explanation in the annex.

TABLE 46 ADHERENCE AND EXPENDITURE ON PRESCRIBED MEDICATION BY DIABETICS IN THMAR POUK OD

% adherence by Diabetics	The DM patients should have spent if 100% adherent	Year	Riels spent by Diabetics on medication	yearly growing cohort of DM	Riels average per actual buying DM	Nr of Actual DM Buyers	Nr of times they bought
48%	22,841,518	**2010**	10,909,700	198	69,489	157	919
67%	52,432,615	**2011**	35,111,950	366	105,126	334	2330
73%	69,471,910	**2012**	50,561,720	520	103,398	489	3519
74%	71,398,015	**2013**	53,158,440	549	106,744	498	3332

TABLE 47 ADHERENCE AND EXPENDITURE ON PRESCRIBED MEDICATION BY HBP IN THMAR POUK OD

% adherence by HBP	The HBP patients should have spent if 100% adherent	Year	Riels spent by HBP on medication	yearly growing cohort of DM	Riels average per actual buying DM	Nr of Actual DM Buyers	Nr of times they bought
31%	4,061,538	**2010**	1,276,100	63	27,741	46	182
39%	13,344,583	**2011**	5,155,700	134	40,596	127	579
52%	13,465,945	**2012**	6,937,850	142	51,391	135	743
59%	11,781,835	**2013**	6,975,900	149	54,077	129	687

The adherence to prescribed medication in Thmar Pouk by Diabetics is better (74%) than by non-diabetic High Blood Pressure patients (59%), despite that the medication is double the cost for diabetics.

TABLE 48 USE OF RDF BY SEX IN THMAR POUK OD

Female	76%	730
Male	24%	230
	100%	960

Clearly, the men in Thmar Pouk OD have problems accessing and using the Revolving Drug Fund service and are seriously disadvantaged when compared to access by women.

KOMPONG SPEU PROVINCE

By September 2012, we had spent all the funds of the AusAID grant that we had received in 2010 to set up the first Peer Educator Network in that province, namely in Kong Pisey OD.

On October 1, 2012 the GIZ funding for this area began (as one of 4 Peer Educator Networks in 4 Operational Districts in Cambodia). This allowed us to continue to fund the activity. This is necessary because it was not yet completely self-financing.

Also, it allowed us to start a second Peer Educator Network: in Kampong Speu OD.

Membership growth in Kampong Speu Province

Per 31 December 2013, there are 1437 DM- and 999 HBP-patients (who are not diabetic) registered, up from 812 and 370 respectively at the start of 2013. These patients are divided over 2 Operational Districts.

Per 31-12-2013:
Kong Pisey OD: 924 Diabetics and 767 Hypertensives (not diabetic)
Kampong Speu OD: 513 Diabetics and 232 Hypertensives

Peer Educators

The existing Peer Educator Network of 19 PE's in Kong Pisey received support. We trained 1 PE to maintain the network. In order to create a new Peer Educator Network in Kampong Speu OD, 19 suitable candidates had to be found to be trained as peer educators in Kampong Speu OD. This was done: they have been trained and equipped during 2013. One has become the Manager of the Peer Educator Network in each Operational District. Only 8 (20.5%) were women, although we actively tried to find female candidates for the positions.

Screening

During the year 2013, 43,547 adults were screened for Diabetes, so that at the end of December 2013, a total of 152,060 adults have been reached directly.

Per 31-12-2013: 122,538 adults had been screened in Kong Pisey OD (up from 108,513 at the start of the year 2013)

Per 31-12-2013: 29,522 adults had been screened in Kampong Speu OD, all during 2013;

Medical Services

Use of Laboratory Services in Kong Pisey OD is proportionally and absolutely better by the diabetics than by the non-diabetic HBP patients.

TABLE 49 USE OF LAB SERVICES IN KAMPONG SPEU PROVINCE

Yearly used of lab services			
Kong Pisey OD	**Patients with lab test**	Diabetic	non Diabetic HBP
2010	**113**	66	47
2011	**248**	150	98
2012	**454**	324	130
2013	**327**	276	51

Yearly used of lab services			
Kampong Speu OD	**Patients with lab test**	Diabetic	non Diabetic HBP
2013	**204**	151	53

In both ODs at the end of 2013, 632 Diabetics **(43%)** have a lab profile in our database, compared with only 308 **(30%)** pf the registered members with High Blood Pressure.

Use of Medical Consultation Service :

TABLE 50 USE OF MEDICAL CONSULTATION BY DM IN KAMPONG SPEU PROVINCE

Kong Pisey OD use of Medical Consultations					
year	Medical consultation sessions	DM patients	Average DM patients per session	First time Prescription for DM patient	Consultation rate per DM patient
2010	10	63	6.3	58	1.1
2011	44	1082	24.6	322	2.8
2012	59	1648	27.9	254	2.6
2013	48	1331	27.7	200	1.4

Kampong Speu OD use of Medical Consultations					
year	Medical consultation sessions	DM patients	Average DM patients per session	First time Prescription for DM patient	Consultation rate per DM patient
2013	28	816	29.1	460	1.45

As expected, the use of the consultation service by Diabetics is better than by non-diabetic hypertensives (HBP). What was not expected is that the use (consultation rate) would deteriorate in 2013 compared with 2012 for both DM and HPB.

TABLE 51 USE OF MEDICAL CONSULTATION BY HBP IN KAMPONG SPEU PROVINCE

Kong Pisey OD use of Medical Consultations					
year	Medical consultation sessions	HBP patients	Average HBP patients per session	First time Prescription for HBP patient	Consultation rate per HBP patient
2010	10	28	2.8	28	1.0
2011	44	439	10.0	239	1.6
2012	59	515	8.7	177	1.2
2013	48	303	6.3	84	0.4

Kampong Speu OD use of Medical Consultations					
year	Medical consultation sessions	HBP patients	Average HBP patients per session	First time Prescription for HBP patient	Consultation rate per HBP patient
2013	28	250	8.9	162	1.0

In 2013 in Kong Pisey OD it happened more often that there were no High Blood Pressure patients (non Diabetics) using the session, despite the great medical needs in for better hypertension control in the district.

TABLE 52 SESSIONS NOT USED BY HYPERTENSION PATIENTS IN KAMPONG SPEU PROVINCE

Kong Pisey OD Medical Consultation Sessions			
year	Nr sessions	DM present	HBP present
2010	10	100%	20%
2011	44	100%	89%
2012	59	100%	81%
2013	48	100%	40%

Kampong Speu OD Medical Consultation Sessions			
year	Nr sessions	DM present	HBP present
2013	28	100%	100%

Revolving Drug Fund & Adherence

During the year 2013 the registered members with a prescription bought 4,895 times their medication at one of the 2 pharmacies, contracted by MoPoTsyo in Kong Pisey OD. Together they spent 98,991,165 to buy their medication from the Revolving Drug Fund. Because our database has the data on prescription, and the cost of the prescription and the sales of the pharmacies to each patient, thanks to the invoice system, we can analyse adherence.

TABLE 53 ADHERENCE TO ROUTINE MEDICATION IN KONG PISEY OD

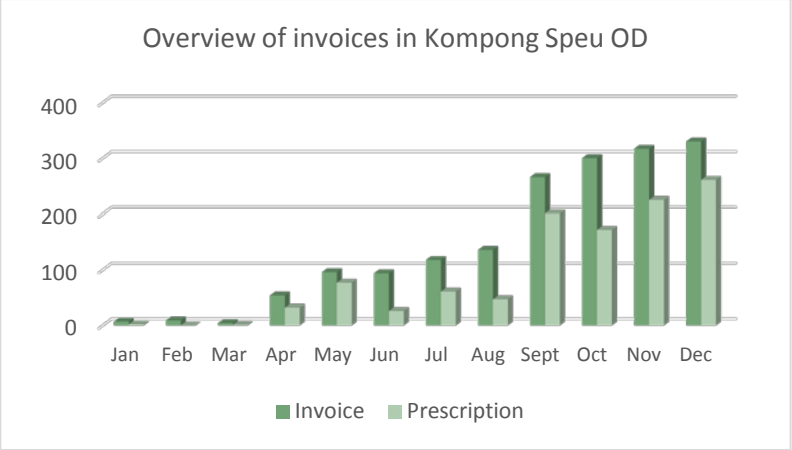
% adherence by Diabetics	The DM patients should have spent if 100% adherent	Year	Riels spent by Diabetics on	yearly growing cohort of	Riels average per actual	Nr of Actual DM Buyers	Nr of times they bought
16%	11,808,115	**2010**	1,903,530	62	36,606	52	103
54%	67,732,685	**2011**	36,502,950	352	107,047	341	1807
82%	81,768,760	**2012**	67,164,220	530	131,953	509	3420
80%	106,241,280	**2013**	85,172,385	647	140,317	607	3873
% adherence by HBP	**The HBP patients should have spent if 100% adherent**	**Year**	**Riels spent by HBP on medication**	**yearly growing cohort of**	**Riels average per actual**	**Nr of Actual DM Buyers**	**Nr of times they bought**
9%	3,575,905	**2010**	321,050	25	13,959	23	26
25%	38,344,528	**2011**	9,612,800	227	43,894	219	576
51%	25,090,283	**2012**	12,694,250	261	52,026	244	961
59%	23,352,335	**2013**	13,818,780	247	62,528	221	1022

As everywhere, there is a large difference in adherence among diabetics and non-diabetic hypertensive patients. The precise reasons must be investigated so the Ministry of Health can begin to do something about it.

Kampong Speu OD:

The activity is new.

BUYING AT PUBLIC HEALTH CENTRE PHARMACY IN KOMPONG SPEU OD



It is not meaningful to make an analysis of adherence to prescribed treatment based on such a short period, so this will first become available during the year 2014.

KAMPONG THOM PROVINCE

Baray Santuk OD:

At the end of 2011 we had signed a partnership agreement with Louvain Coopération to set up a Peer Educator Network in Baray Santuk OD in Kampong Thom. In total 19 health center areas to cover in that OD. After completing their six week training in Phnom Penh and Takeo, and after the exam, 18 PE's are already active.

The screening by peer educators distributing urine glucose strips has started at the end of June 2012: 33,561 adults were screened for diabetes by the end of December 2013, so they screen at around 3500 per month on average. The screening has been done in 194 villages so far. We have begun to establish Village High Blood Pressure Groups. There are now 63 villages with such a group. They have to facilitate self-screening for HBP by people in the village so people will come forward and register as HBP patient. This requires concerted public health campaign work.

TABLE 54 MEMBERSHIP INCREASE IN KAMPONG THOM PROVINCE

New Casess	Baray Santuk	41456	41487	41518	41548	41579	41609
Diabete	per month plan	31	31	31	31	31	31
	accumulative plan	31	62	93	124	155	186
	in reality accum	42	86	118	166	221	262
	%of LD taget	135%	139%	127%	134%	143%	141%
	Glucose Screened	943	1788	3463	4318	5741	4574
HBP Groups	**Baray Santuk**	**41456**	**41487**	**41518**	**41548**	**41579**	**41609**
	per month plan	23	23	23	23	23	23
New cases	accumulative plan	23	46	69	92	115	138
High Blood	in reality accum	37	86	142	180	220	262
Pressure	%of LD taget	161%	187%	206%	196%	191%	190%

New Casess	Stoung	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
Diabete	per month plan	44	44	44	44	44	44
	accumulative plan	44	88	132	176	220	264
	in reality accum	**25**	46	66	88	113	134
	%of LD taget	57%	52%	50%	50%	51%	51%
	Glucose Screened	1896	1717	1033	1546	530	853

HBP Groups	Stoung	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
	per month plan	34	34	34	34	34	34
New cases	accumulative plan	34	68	102	136	170	204
High Blood	in reality accum	14	49	94	120	131	145
Pressure	%of LD taget	41%	72%	92%	88%	77%	71%

At the end of December 0./1, there are in total 0/34 patients registered as member. Among them there are /.53 DM registered and in total /.6/ HBP patients registered.

Medical Consultations were first organized at the end of July 2012. The OD Baray Santuk is the first OD where the medicines are being dispensed in the public sector: at the Referral Hospital Pharmacy, after a contract was signed between MoPoTsyo, the OD and the Hospital Pharmacist.

MoPoTsyo has been working with 3 different Doctors hired to train the local Doctor in Baray Santuk OD. These external trainers are hired in a private capacity to train the counterpart plus perform the consultation. This occurs several times per month, usually on a weekend. The hired consulting doctor travels to the referral hospital in Baray Santuk OD from Phnom Penh, in a journey that takes about 5 hours. That creates an extra cost to the program for which a solution must be found in the future. The preferred solution is that 2 Hospital Doctors at Baray Santuk will have received sufficient training from the visiting consultant that they can do the consultations themselves. One Doctor now feels confident to do the consultations by himself.

05.6 Medical consultations were given during 0./1 (counting from start at end of July 2012) and reached a total of /137 different individual patients, so it shows a ratio of 1.3 per 5 months and this appears efficient: Only 28% came again to see the Doctor. We aim for an average of 1 to 2 times per year per patient.

/137 individually registered patients received medical examination and a prescription for routine medication from our Revolving Drug Fund. Among the 05.6 medical consultations there were 1809 for diabetes and 899 for High Blood Pressure patients who are not diabetic. Among the 2708 medical consultations, there were 2009 for women (74%). This is not unusual when compared to other project locations. It suggests that women are more risk averse when it comes to their health than men. Counting from August 201*1*, in total 2003 invoices for medicine

dispensing have been paid by 666 different members of MoPoTsyo based on their prescription that they have received from the medical doctor.

The tables below are a comparison of what all Diabetic members should have bought in 2013 according to their first prescription since 2012 and what they actually bought in the year 2013: that is 82%. Among 772 patients who have 1st prescription, there are 682 patients who bought medicine in 2013. So there are 32% did not even buy once in. Perhaps they have died, and that means that the actual adherence among the smaller number of actual buyers is a slightly better. As a group they bought 2,808 times. It means that on average these 682 diabetics paid USD 20.88 for their medication in the year 2013.

TABLE 55 ADHERENCE TO ROUTINE MEDICATION IN BARAY SANTUK OD

Year 2013	DM should spend	**69,603,933**	If 1 USD = 4000 riel
		$ 17,401	
Year 2013	DM did spend	**56,963,360**	**82%**
		$ 14,241	

For non diabetic Hypertension patients the situation does not look as good :

Year 2013	HBP should spend	**24,718,253**	If 1 USD = 4000 riel
		$ 6,180	
Year 2013	HBP did spend	**10,898,140**	**44%**
		$ 2,725	

MoPoTsyo Peer Educator Network organized regular blood drawings at the local health centers. In 2013 in total 54. different patients gave blood. In total 771 laboratory profiles were created for the registered patients.

MoPoTsyo has negotiated contracts with 3 public facilities in Baray Santuk for dispensing RDF medicines to the members. Firstly the pharmacy at the referral hospital and similar contracts with 2 other Health Centers located far away from the referral hospital, namely at HC Kreul and HC Taing Krasang to dispense the prescribed medication to patients who live close by their health center. We have put the first automated system in place with a bar code reader in one HC only. The internet and VPN system has been problematic and we have been working on the technical solution in quarter 4 but the issue is not solved yet.

FIGURE 36 REWARD FOR PUBLIC HOSPITAL PHARMACY BARAY-SANTUK

គណនាប្រាក់លើកទឹកចិត្តសំរាប់ការចែកចាយថ្នាំក្នុងមន្ទីរពេទ្យបន្ទែក បារាយណ៍-សន្តុក ថ្ងៃទី ០១ សីហា ២០១២ ដល់ ថ្ងៃទី ៣១ កក្កដា ២០១៣			
A	B	C	D
សូចនាករ	**ទឹកប្រាក់សរុប ជារៀល**	**ទឹកប្រាក់សរុប ជាដុល្លា**	**គិតជា ភាគរយ**
១. ចំនួនទឹកប្រាក់សរុប ដែល**គួរតែទិញថ្នាំ** (សំរាប់អ្នកជំងឺ 1,763 នាក់) *Value of medicines that patients should have bought (for 1,763 Patients)*	56,200,075	$13,707	**100%**
២. ចំនួនទឹកប្រាក់សរុប ដែល**បានទិញថ្នាំ** (សំរាប់អ្នកជំងឺ 1,024 នាក់) *Medicines bought (for 1,024 Patients)*	45,347,350	$11,060	81%
៣. ប្រាក់លើកទឹកចិត្ត **អប្បបរមា** *(=B2*D11)* *Minimum incentive*	2,267,368	$553	**5%**
៤. ប្រាក់លើកទឹកចិត្ត **អតិបរមា** *(=B2*D4)* *Maximum incentive*	6,802,103	$1,659	**15%**
៥. ចំនួនអ្នកមានវេជ្ជបញ្ជា ដែល**មិនបានទិញថ្នាំ**គិតជាទឹកប្រាក់សរុប *(=B4*D5)* *Non-adherence %*	1,313,545	$320	19%
៦. **លទ្ធផលវាយតំលៃ**ពីតំរិយៈបងអ្នកចែកចាយថ្នាំ *(=B4*D6 (ល្អ = 0%))* *Dissatisfaction result*	1,496,463	$365	22%
៧. **ប្រាក់លើកទឹកចិត្តសរុប**ដែលត្រូវបើងចែកជល់អ្នកពាក់ព័ន្ធ *(=B4-((B5+B6)/2))* *Available reward*	5,397,099	$1,316	

ការបែងចែកប្រាក់លើកទឹកចិត្តជល់អ្នកពាក់ព័ន្ធសំរាប់ការចែកចាយថ្នាំក្នុងសេខាសាធារណៈ			
៨. មន្ទីរសុខាភិបាលខេត្ត *for PHD (=B11*D8)*	53,971	$13	**1%**
៩. ស្រុកប្រតិបត្តិ *for ODO (=B11*D9)*	161,913	$39	**3%**
១០. អ្នកចែកចាយថ្នាំ *for the Pharmacist (=B11*D10)*	3,238,259	$790	**60%**
១១. សេវាហិរញ្ញប្បទានសំរាប់មន្ទីរពេទ្យ *for the user fees (=B11*D11)*	1,942,955	$474	**36%**

Pharmacy hospital Baray-Santuk is the first public hospital that we start to pay the rewards. This reward is calculated by evaluation of the performance of the pharmacist and the adherence to prescribed medication by the patients in this OD.

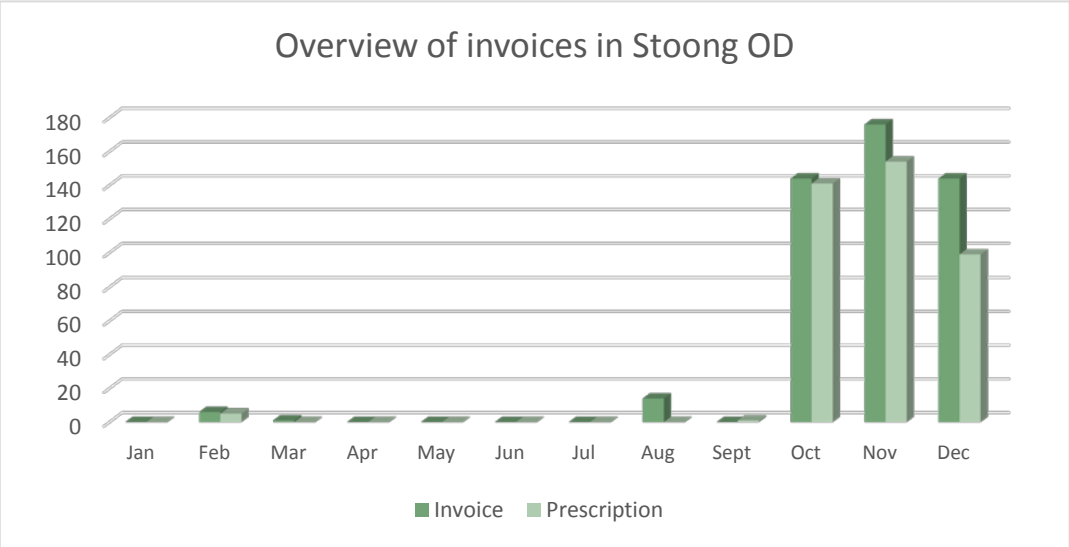
STOUNG OD:

The financial support from GIZ at the end of 2012 allowed us to set up a Peer Educator Network in Stoung OD. At the end of 2013, we had trained 8 Peer Educators, out of 10 Health Center areas that must be covered.

These 8 had screened 8,902 adults for diabetes in 92 villages at the end of 2013. Also 12 Village High Blood Pressure Groups had been set up.

At the end of 2013, there were 173 Diabetics registered, and 149 Hypertensives (not diabetic). During 2013 also the Revolving Drug Fund system had been set up in Stoung at the Referral Hospital. The Hospital does not have a pharmacist so the treating Hospital Doctor is doing the dispensing on 1 day per week.

FIGURE 37 BUYING AT PUBLIC HOSPITAL PHARMACY STOONG OD



It is not meaningful to make an analysis of adherence to prescribed treatment based on such a short period, so this will first become available during the year 2014.

PLANNING FOR 2014

- Create new PEN program in Angkor Chey OD Kompot province
- Create new PEN program in Chamkar Ler OD Kompong Cham province
- Install pharmacy automation system program into public service
- Reform selling of Medical Consulting voucher for continuity of Medical Consultation program
- Negotiate with MoH about setting up PEN in other Cambodian OD's
- Develop web based solution for pharmacy automation system for OD's
- Expand patient database with Revolving Drug Fund management
- Reform the Financial & accounting system
- Strengthen data collection for database
- Second assessment of the Bridges research on the effect of SMS on Diabetes outcomes
- Start research on screening methodologies in collaboration with PATH USA.

ANNEXES

Annex on Adherence Calculation

How to calculate adherence over a one year period until a specific date of analysis in the past:

Database of MoPoTsyo contains the data on prescription (P), and on Invoices (I).

P: The record of a prescription contains Patient ID, a code D, H or DH, indicating whether the patient is diabetic or non-diabetic hypertensive, date of the prescription, the daily cost of the medicine that is prescribed, the types of medicine and dosages per day, the name of the contracted pharmacy.

I: The invoice contains the ID of the patient, the date of buying medicines, the name of the pharmacy, the amount spent that day at the pharmacy.

The analysis is done by :

STEP 1: exporting the data to EXCEL by period and by area in 2 different files P and I.

The records can be connected through the patient ID. Every patient has her/his own ID. This ID consists of 3 letters (province, OD, Health Center area) and followed by a 4 digit number.

The Excel file P:

1. Note the total number of prescriptions for all patients in the area of study.
2. Split the files in 2 by Disease Type in to Diabetic and Non-Diabetic Hypertensive
3. Note the total number of Diabetics, sort by date of prescription from old to new
4. Note the total number of non Diabetic Hypertensives, sort by date of prescription, from old to new
5. Remove duplicates in file Diabetics and keep : 1st prescription DM, sort by date of prescription
6. Remove duplicates in file Hypertensives and keep: 1st prescription HBP, sort by date of prescription
7. insert 3 empty columns left of the total amount spent at the pharmacy by the patient
8. First column put as Header date of analysis: in the first column if more than one year ago, put nothing. If one year or less than one year ago, type the date until which you want to analyse the adherence;
9. copy the same data of analysis until the last row.
10. Second column at the top of the file put Header : Number of consumption days. Put number 365 in the top row, because the date of prescription is more than one year ago and we analyse over one year,
11. Draw down (copy formula) until you reach the row at the left of which you have typed the date of analysis. Then type subtract the date of prescription from the date of analysis so that it appears in column 2 there. It will be number less than 365.

12. Copy the cells until the last row of the file.
13. At the top of empty column 3 put header : Should have Spent: and in the first cell multiply the daily cost by the number of days (normally 365 at the top) and then copy the formula down until the last row.
14. Sum all the amounts in column 3. You now have the amount of what the patients should have spent during one year until the date of analysis.
15. You do this for DM, and also for HBP.
16. Now you finished with P and you go to work on Invoices so you will be able to compare this with what they really spent, based on the invoices I.
17. Make sure you compare the same category of patients, the same period, the same ID's from the same area;
18. Sum the total
19. Compare by dividing the total P by total I = ….%.

What this method does not do, is adjust for patients who have died, for patients who have received a second prescription that instructs to take more medicine than the first prescription. It compares money so strictly speaking it is possible that a pharmacy sells other things instead of the medication, but this does not appear to happen. Also, it is possible that pharmacies do not always provide an invoice when they dispense invoices. That has happened a lot in the past but it is improving. We can control it by comparing the volume and amounts of what we sell to the pharmacies with the value of the invoices that they produce.

The method above just explains how to calculate adherence. There are many other things can be studied because there are many more columns with important data, such as the name of the prescribing Doctor, the number of laboratory tests that are available, the age, sex of the patient, the BMI etc.

ACTIVITIES EXPENSES	EXPENSES Vs BENEFICIARY BY YEAR										TOTAL (exp Vs product)
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
1. Earlier Diagnosis & awareness of NCD	$0	$179	$3,500	$11,268	$13,139	$31,380	$37,872	$29,739	$64,909	$79,229	$271,215
Actions that benefit the general population;											
PE doing Screening (Diabetes)			$1,475	$1,882	$3,339	$5,187	$9,500	$6,096	$26,098	$9,112	$62,690
PE doing Screening (Hypertension)					$342			$1,205	$2,095	$1,329	$4,970
Equipments and Materials for Screening		$179	$1,321	$2,614	$1,716	$9,113	$10,462	$4,624	$6,560	$29,983	$66,571
Primary prevention (Community Leader)					$4,883	$7,625	$1,711	$2,933	$1,354	$6,773	$25,279
Primary prevention (Primary School Teacher)									$3,321	$6,641	$9,962
Primary prevention (Primary School Child)										$6,506	$6,506
Events and World Diabetes Day			$704	$6,771	$2,861	$9,456	$16,199	$14,881	$25,481	$18,885	$95,237
2. Capacity of Peer Educators & their networks	$0	$0	$566	$5,591	$10,899	$19,002	$24,446	$34,595	$54,532	$73,851	$223,481
Building the network;											
Training of new Peer Educators (PE)				$806	$1,990	$3,204	$4,032	$2,412	$7,198	$8,469	$28,111
PE doing Patient follow up (Diabetes)				$3,510	$5,710	$8,943	$12,125	$18,795	$17,605	$23,176	$89,865
PE doing Patient follow up (Hypertension)								$3,436	$503	$792	$4,732
Village High Blood Pressure Group created									$150	$485	$635
Capacity Building Peer Educator Networks (PEN)			$566	$1,274	$3,199	$6,854	$8,290	$9,952	$29,075	$40,930	$100,139
3. Delivery of Continuum of Care	$0	$500	$4,217	$12,217	$29,422	$58,835	$90,382	$207,551	$141,550	$264,695	$809,370
All materials for self-management, consumables and equipment and the expenses related to the Revolving Drug Fund and Laboratory Services;											
Materials for patient follow up (DM)		$500	$4,217	$8,982	$14,838	$19,038	$28,051	$23,548	$25,964	$12,008	$137,147
Materials for patient follow up (HBP)										$608	$608
Laboratory services						$4,710	$12,020	$5,892	$32,626	$13,075	$68,324
Consultation services				$3,235	$4,399	$4,054	$10,978	$19,456	$15,508	$34,811	$92,441
Revolving Drug Fund (only medication)					$8,947	$20,473	$32,130	$150,436	$23,821	$179,121	$414,929
Material and Equip for sales to members						$6,747			$26,416	$4,750	$37,913
Others support to RDF project and distribution					$1,237	$3,812	$7,204	$8,218	$17,215	$20,321	$58,008
4. Equity Fund Provision	$0	$1,002	$3,808	$4,037	$7,481	$3,933	$3,185	$3,139	$5,157	$10,777	$42,518
Paying health services for poor patients (vouchers);											
***5. Capacity building to manage risk factor control**	$7,361	$8,236	$11,958	$26,696	$70,784	$76,623	$104,560	$147,120	$238,173	$237,165	$928,678
OD Capacity building to manage risk factor control in primary care;											
Staff		$705	$6,199	$14,484	$28,509	$41,154	$49,847	$66,992	$97,398	$115,084	$420,373
Administration & Equiptment	$7,361	$7,531	$5,759	$11,803	$25,185	$28,586	$43,990	$70,570	$108,722	$70,995	$380,502
Evaluation				$408	$6,740	$5,883	$8,922	$7,794		$3,767	$33,515
Research & Study							$601	$565	$24,003	$32,661	$57,830
Audit					$1,000	$1,000	$1,200	$1,200	$8,050		$12,450
Others					$9,350					$14,658	$24,008
TOTAL EXPENSES	**$7,361**	**$9,917**	**$24,049**	**$59,808**	**$131,725**	**$189,773**	**$260,446**	**$422,145**	**$504,321**	**$665,717**	**$2,275,263**

The numbers of beneficiaries show yearly only the new ones added, but this is a chronic care system so most patients from the earlier years still benefit in the years after they join as new patient. In the table above the expenses per product or per beneficiary is presented as it was accounted in the bookkeeping and it excludes the NGO office cost, see whole category 5 (on previous page) which is the total expenses for the NGO's office since the year 2004 (USD 689,217) must be also allocated to each of the products. For a real unit cost calculation see the next pages.

Numbers of BENEFICIARIES	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	TOTAL
Early diagnosis/People who have self-screened for ***DM*** (1)	1	2,479	5,505	21,351	41,904	28,600	57,021	83,690	219,690	110,521	570,762		
Early diagnosis/People who have self-screened for ***HBP*** (2)							28,511	41,845	109,845	55,261	235,461		
Commune leaders *exposed to* ***primary prevention*** (3)							37	408	521	2,190	3,156		
School teachers *exposed to* ***primary prevention*** (4)							161	202	798		1,161		
School Child *exposed to* ***primary prevention*** (5)										37,026	37,026		
Member has invited for World Diabetes Day (6)				450		700		750	1,000	1,000	3,900		
*Village High Blood Pressure Group (****VHBPG****)* ***created*** (7)									495	83	578		
Members ***registered/counseled/trained DM*** *each year* (8)		60	199	359	525	722	695	1,397	3,635	2,695	10,287		
Members ***registered/counseled/trained HBP*** *each year* (9)							2,298	1,821	3,680	1,644	9,443		
Total DM + HBP registered each year (8+9)	***0***	***60***	***199***	***359***	***525***	***722***	***2,993***	***3,218***	***7,315***	***4,339***	***19,730***		
Accumulate number of ***Staff Employed*** (10)	2	4	5	6	14	20	28	31	36	43	189		
Accumulate number of ***Peer Educators trained*** (11)	0	2	3	11	17	29	58	74	108	138	440		
Total Staff + Peer Educaotrs each year (8+9)	***2***	***6***	***8***	***17***	***31***	***49***	***86***	***105***	***144***	***181***	***629***		
Accumulate members registered ***follow up DM*** (12)		52	225	538	994	1,623	2,227	3,443	5,390	5,787	20,279		
Accumulate members registered ***follow up HBP*** (13)							1,999	3,584	5,201	5,014	15,797		
Total Accumulate of DM + HBP follow up (12+13)	***0***	***52***	***225***	***538***	***994***	***1,623***	***4,226***	***7,026***	***10,591***	***10,801***	***36,076***		
Members ***receiving Lab Test*** *at least once* (14)				8	19	43	1,481	968	3,881	3,400	9,800		
Members ***receiving Medical Consultation*** *at least once* (15)				26	85	284	687	2,593	2,853	5,805	12,333		
Members ***Buying Prescription Medication*** *at least once* (16)					180	652	1,334	3,365	4,729	5,901	16,161		
Accumulate members who ***Injected Insulin*** (17)					14	14	14	108	257	701	1,108		
Accumulate members ***receiving monthly HEF*** (18)				110	86	86	130	216	110	738			
Accumulate number of ***OD covered*** (19)		1	1	2	6	7	8	8	11	13	57		
Expenses per BENEFICIARY (US$)													
Early diagnosis*/People who have self-screened for* ***DM*** (1)		$0.51		$0.21	$0.12	$0.50	$0.35	$0.13	$0.15	$0.35	$0.23		
Early diagnosis*/People who have self-screened for* ***HBP*** (2)								$0.03	$0.02	$0.02	$0.02		
Commune leaders *exposed to* ***primary prevention*** (3)							$46.26	$7.19	$2.60	$3.09	$8.01		
School teachers *exposed to* ***primary prevention*** (4)											N/A		
School Child *exposed to* ***primary prevention*** (5)										$0.18	$0.18		
Member invited for World Diabetes Day (6)				$15.05		$13.51		$19.84	$25.48	$18.89	$24.42		
*Village High Blood Pressure Group (****VHBPG****)* ***created*** (7)									$0.30	$5.84	$1.10		
Members ***registered/counseled/trained DM*** *each year* (8)				$34.80	$39.14	$38.76	$57.81	$30.31	$11.99	$13.06	$22.07		
Members ***registered/counseled/trained HBP*** *each year* (9)								$1.89	$0.14	$0.85	$0.57		
Total DM + HBP registered each year (8+9)								***$32.20***	***$12.12***	***$13.91***	***$22.63***		
Accumulate number of ***Staff Employed*** (10)	$176.25	$1,239.84	$2,414.05	$2,036.36	$2,057.70	$1,780.26	$2,161.04	$2,705.51	$2,676.36	$2,224.19			
Accumulate number of ***Peer Educators trained*** (11)		$73.29	$117.06	$110.49	$69.51	$32.59	$66.65	$61.37	$63.89				
Total Staff + Peer Educaotrs each year 10+11)		***$2,487.34***	***$2,153.42***	***$2,168.19***	***$1,849.77***	***$2,193.63***	***$2,772.16***	***$2,737.73***	***$2,288.08***				
Accumulate members registered ***follow up DM*** (12)		$6.53	$5.74	$5.51	$5.44	$5.46	$3.27	$4.00	$4.43				
Accumulate members registered ***follow up HBP*** (13)							$0.96	$0.10	0.16	0.30			
Total Accumulate of DM + HBP follow up (12+13)							***$6.42***	***$3.36***	***$4.16***	***$4.73***			
Members ***receiving Lab Test*** *at least once* (14)				$109.54	$8.12	$6.09	8.41	3.85	$6.97				
Members ***receiving Medical Consultation*** *at least once* (15)		$124.42	$51.75	$14.28	$15.98	$7.50	$5.44	$6.00	$7.50				
Members ***Buying Prescription Medication*** *at least once* (16)			$56.58	$37.25	$29.49	$47.15	$8.68	$33.80	$29.26				
Accumulate members who ***Injected Insulin*** (17)										N/A			
Accumulate members ***receiving monthly HEF*** (18)			$68.01	$45.73	$37.03	$24.15	$23.87	$97.97	$57.61				
Accumulate number of ***OD covered*** (19)	$1,681	$12,091	$16,556	$10,157	$16,164	$19,486	$34,378	$24,195	$32,966	$23,624			

COSTING ANALYSIS

MoPoTsyo-Patient Information Centre (2011)

Cost Description	Total Expenditure	1 Mgt. and Admin. /HQ	2 Peer Education / ODs	3 Laboratory	4 Medical Consultation	5 Revolving Drug Fund	i. Diabetes Screening	ii. Peer Education	iii. Treatment Diabetes	iv. Treatment Hypertension
a Personnel cost	$71,425	$42,655.04	$15,209.34	$3,054.02	$7,591.38	$2,915.40				
b Training	$2,789	$377.00	$2,411.61							
c Materials (Non Med + Med)	$31,432	$4,572.17	$18,343.41	$5,892.49			$2,624.25			
d Depreciation ($22,314.9 X 20%)	$4,463	$2,242.18		$2,220.80						
e Rent Office	$11,520	$11,520.00								
f Drugs incl Insulin&syringes	$46,016								$45,008.17	$1,007.77
g Travel and delivery	$23,218	$1,663.64	$3,541.47		$11,865.00	$6,148.14				
h Allowances Peer Educators	$31,368		$25,272.32				$6,095.52			
i Other Cost	$56,123	$49,816.72	$4,593.83			$1,712.35				
Total Expenditure	**$278,354**	**$112,846.75**	**$69,371.98**	**$11,167.31**	**$19,456.38**	**$10,775.89**	**$8,719.77**	**$0.00**	**$45,008.17**	**$1,007.77**
Mgt. and Admin. /HQ		-$112,846.75	$28,211.69	$28,211.69	$28,211.69	$28,211.69				
		$0.00	$97,583.67	$39,379.00	$47,668.07	$38,987.58	$8,719.77	$0.00	$45,008.17	$1,007.77
Peer Education / ODs			-$97,583.67					$97,583.67		
			$0.00	$39,379.00	$47,668.07	$38,987.58	$8,719.77	$97,583.67	$45,008.17	$1,007.77
Laboratory				-$39,379.00					$29,534.25	$9,844.75
				$0.00	$47,668.07	$38,987.58	$8,719.77	$97,583.67	$74,542.42	$10,852.51
Medical Consultation					-$47,668.07				$30,030.88	$17,637.18
					$0.00	$38,987.58	$8,719.77	$97,583.67	$104,573.30	$28,489.70
Revolving Drug Fund						-$38,987.58			$32,749.57	$6,238.01
Total cost of service units:						$0.00	$8,719.77	$97,583.67	$137,322.87	$34,727.71
Number of Service Units:							**83,690**	**74**	**3,159**	**2,066**
Cost per Service Unit per year:							$0.10	$1,318.70	$43.47	$16.81
cost per Service Unit per month:								**$109.89**	**$3.62**	**$1.40**

Definitions of service units

Definitions

i. A Diabetes screening unit is the adult who through the action of the peer educator has received knowledge and materials for self measurement of presence of urine glucose (one urine glucose strip per adult in the household + pregnant women of any age) and who, if one of the adults in the household has positive urine glucose, receives without charge a confirmation blood glucose test from the peer educator who uses a handheld glucometer and about which the peer educator reports using the standard screening form to fill the screening result with all the adults' name, age, sex and full address of the household he has visited and provided the opportunity to self screen for diabetes.

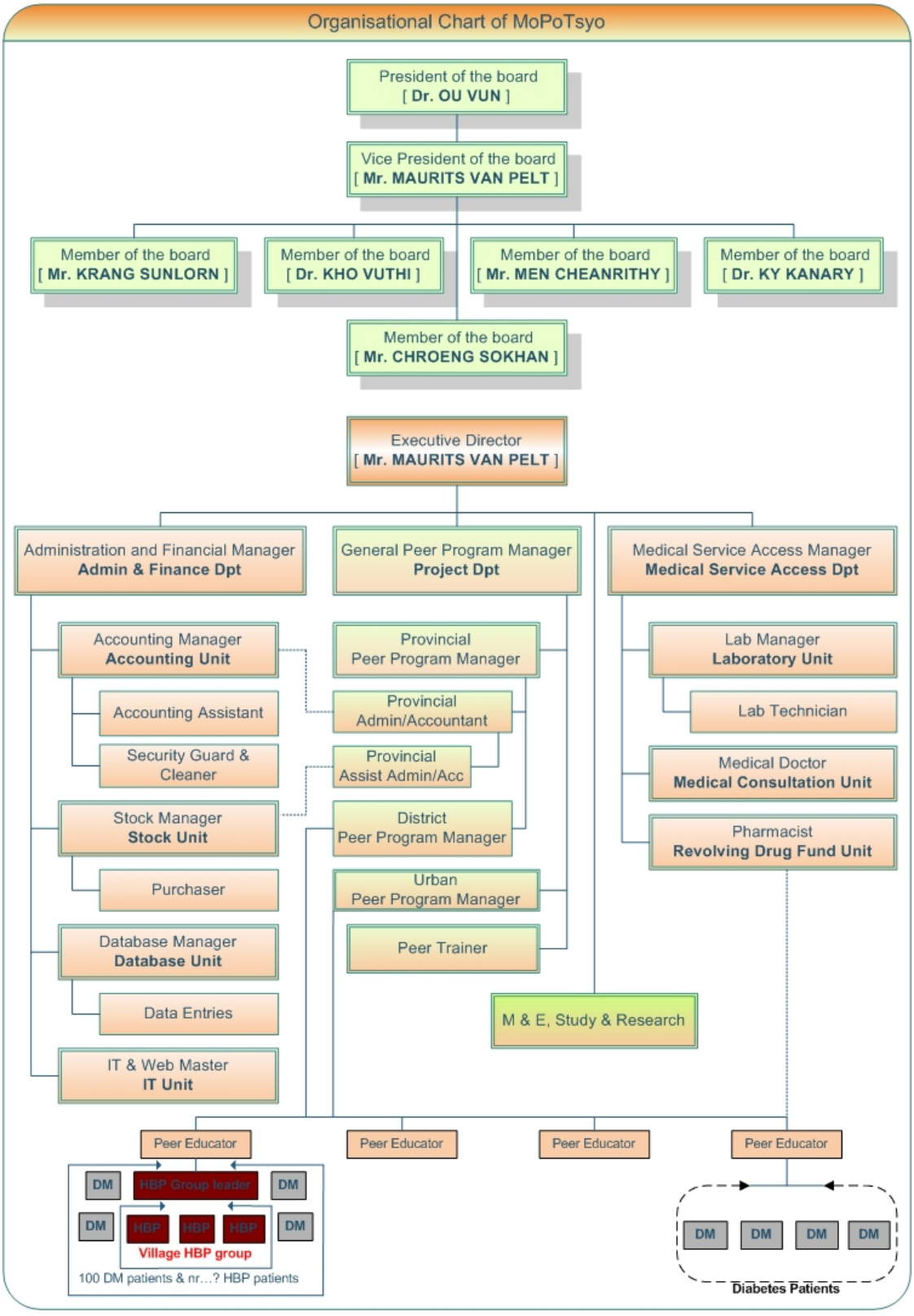
ii. Peer Education unit is the collective of services provided by 1 Peer Educator (PE) to all his/her patients (=new patients + old patients getting counseling, registration, training, materials for self-management plus peer educator's explanation on how to use it and encouragement individually and in groups) who are in their follow-up according to the database, getting check-up services from peer educator according to the peer educator training manual and reported in detail by PE invoice signed by PE and approved by the OD. It includes the maintenance (not set up) of the Village High Blood Pressure Groups. This excludes activities for the general population such as screening and primary prevention and it also excludes activities that are related to the organisation of the laboratory team work and the revolving drug fund monitoring;

iii. Treatment Diabetes unit is the combined total of 3 medical services (medical consultations, laboratory tests and routine prescribed medication, plus the related cost to organize the delivery of these services to the Diabetes patient **per registered Diabetic patient who has used medical service least 1 time during 2011.** It includes special tasks of peer educators who monitor the pharmacies and/or deliver medicines to pharmacies as part of the Revolving Drug Fund distribution and monitoring and revenue collection system. For the laboratory services it includes the special tasks carried out to organize blood draw sessions at local health centers at convenient times for the patients to give venous blood, spin it on location and separate serum from whole blood and put the collected samples in the rightly labelled tubes on ice and transport them to the central laboratory for testing and for creating the biochemistry lab profile, enter the results into database, print the results together with previous results of the patient so they can be compared and explain the results and the trend in results to the patient who has given blood so they are motivated to use the medical consultation service and the revolving drug fund service to treat their health problems.

iv. Treatment Hypertension unit is the combined total of 3 medical services (medical consultations, laboratory tests and routine prescribed medication, plus the related cost to organize the delivery of these services to the hypertension patient per registered Hypertension patient **who has used medical service at least 1 time during 2011.** It includes special tasks of peer educators who monitor the pharmacies and/or deliver medicines to pharmacies as part of the Revolving Drug Fund distribution and monitoring and revenue collection system. For the laboratory services it includes the special tasks carried out to organize blood draw sessions at local health centers at convenient times for the patients to give venous blood, spin it on location and separate serum from whole blood and put the collected samples in the rightly labelled tubes on ice and transport them to the central laboratory for testing and for creating the biochemistry lab profile, enter the results into database, print the results together with previous results of the patient so they can be compared and explain the results and the trend in results to the patient who has given blood so they are motivated to use the medical consultation service and the revolving drug fund service to treat their health problems.

ANNEX

Organisational Chart in 2011, including the Board



Laboratory test application form, with consent formula at the bottom

ផ្នែកសេវាវេជ្ជសាស្ត្រមិនស្វែងរកប្រាក់ចំណេញ Not for profit laboratory service

ផ្នែកមន្ទីរពិសោធន៍ Laboratory Unit

លេខកូដសមាជិក Member ID		កាលបរិច្ឆេទ (Date) :………………/………………/………………	
ឈ្មោះសមាជិក Member Name		លេខប័ណ្ណ voucher Nr	
ភេទ Sex		អាយុ Age	លេខទូរស័ព្ទ Telephone

លរ	បរិយាយតេស្ត Description	ស្នើសុំ	បរិមាណ Unit	តម្លៃ Price in Riels	ផ្សេងៗ
01	កូលេស្តេរ៉ុលសរុប (Total Cholesterol)	☐	1 តេស្ត	1,500 រៀល	
02	អេចដអិលកូលេស្តេរ៉ុល (HDL Cholestero	☐	1 តេស្ត	3,000 រៀល	
03	គ្រេអាទីនីន (Creatinine)	☐	តេស្ត+លទ្ធផល eGFR	2,000 រៀល	
04	ស្ករក្នុងឈាម មុនហូប (FBG)	☐	1 តេស្ត	1,000 រៀល	
05	ប៉ូតាស្យូម (Potassium)	☐	1 តេស្ត	4,000 រៀល	
06	ទ្រីគ្លីសេរីដ (Triglyceride)	☐	1 តេស្ត	2,500 រៀល	
07	ត្រង់សាមីណាស (Transaminase)	☐	2 តេស្ត(SGOT&SGPT)	4,000 រៀល	
08	ប្រូតេអ៊ីនក្នុងទឹកនោម (Proteinuria)	☐	1 ស៊ីប	500 រៀល	
09	តេស្តទឹកនោមលើដោយមីក្រូអាល់ប៊ុយមីនួរី (Urinalys	☐	1 ស៊ីប (មានលទ្ធផល4 តេស្តប្រូតេអ៊ីន គ្រេអាទីនីន អាល់ប៊ុយមីន និង Ratio A:C)	4000 រៀល	
លទ្ធផលប្រូតេអ៊ីនក្នុងទឹកនោម: ResultUrine Protein Test (crosses):			សរុបទាំងអស់ជារៀល total		

ផ្នែកមន្ទីរពិសោធន៍ជាផ្នែកមួយនៃសេវាវេជ្ជសាស្ត្រមិនស្វែងរកប្រាក់ចំណេញរបស់អង្គការ ម.ព.ជ. ដើម្បីអោយការពិនិត្យមានគុណភាពល្អ ដោយបង់ថ្លៃសមរម្យ សម្រាប់សមាជិក… The laboratory service is a not profit service organised by MoPoTsyo for the members to have good quality laboratory results for affordable prices so that the service can be sustained in the future through revenue generation .

សូមភ្ជាប់ប័ណ្ណនេះមកវិញដើម្បីយកលទ្ធផល ក្នុងរយៈពេល ៤ ថ្ងៃ Please bring your proof of payment in order to collect your lab result within 4 days from blood collection	ហត្ថលេខា ឬស្នាមមេដៃសមាជិកបង់ប្រាក់៖ thumb of Member	ហត្ថលេខាអ្នកទទួលប្រាក់៖ sign by receiver of the money	ហត្ថលេខាអ្នកបំពេញប័ណ្ណនេះ sign by the filler of this application
Designed by Medical Services Access Dept Form L01	ឈ្មោះ…………………………	ឈ្មោះ…………………………	ឈ្មោះ…………………………

សូមផ្តិតមេដៃនៅទីនេះ ប្រសិនបើយល់ព្រម I agree	លទ្ធផលតេស្តមន្ទីរពិសោធន៍របស់ខ្ញុំមានអត្ថប្រយោជន៍សម្រាប់ការស្រាវជ្រាវ ដើម្បីពង្រឹងប្រព័ន្ធថែទាំ… The result of my lab tests has utility for research so evidence is generated to strengthen our care system so we can use this result and share with researcher who collaborates with MoPoTsyo but MoPoTsyo must guarantee that any information or data related to my identity (such as my name and address) is removed and the researcher cannot contact me directly . **តើអ្នកយល់ព្រមអោយអង្គការ ម.ព.ជ. ប្រើប្រាស់លទ្ធផលរបស់អ្នកទេ? Do you agree that MoPoTsyo uses your result ?**	សូមផ្តិតមេដៃនៅទីនេះ ប្រសិនបើមិនយល់ព្រម I do not agree