
MoPoTSYO PATIENT INFORMATION CENTRE

ANNUAL REPORT 2011

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1. KEY DEVELOPMENTS DURING 2011

- With a grant from WHO Geneva, the Alliance for Health Policy and Health Systems Research, we documented the experience with Peer Educator Networks over the period 2005 to 2010. The file (150 pages) can be downloaded from <http://www.mopotsyo.org/ILR-PEN-24.pdf> . It describes why and how the Peer Educator Networks developed into their current form, what they exactly do, the profile of the people they assist and the results of the intervention. Based on this it makes a series of recommendations to decision makers to help Cambodian chronic patients cope better with the growing epidemic of chronic NCD.
- Based on the documentation, we created a policy brief for the Ministry of Health and its Development Partners. This was translated into Khmer and widely circulated to influence healthy policy for NCD.
- Our policy brief was highlighted in Newsletter of the Alliance for Health Policy and Health Systems Research, see http://www.who.int/alliance-hpsr/alliancehpsr_newsletter21.pdf
- The report of an independent evaluation of the first rural peer educator network was published: http://www.mopotsyo.org/Highlight/Aug_to_Dec_2011/Thesis%20Natalie_MoPoTsyo%20evaluation.pdf This evaluation was quantitative and qualitative.
- A delegation of WHO and WorldBank visited Cambodia in April 2011 to give advice on policy for NCD. The delegation advised against single disease clinics and in favor of a primary health care approach and peer educator networks.
- MoPoTsyo contributed to MEDICAMs position paper on NCD and assisted in the Joint Annual Program Review. During this JAPR, the Ministry of Health and Development Partners decide that Peer Educator Networks are a priority intervention strategy in Cambodia.
- MoPoTsyo contributed with working group facilitation, abstracts and posters [numbers 363 and 371] to the 3rd International Conference for Improving Use of Medicines (ICIUM), organized by WHO and Harvard in November 2011 (Antalya Turkey), see <http://www.inrud.org/icium/icium-2011.cfm> and search "MoPoTsyo" in the search box. The study "I wish I had AIDS" which highlights the plight of people with Diabetes made it into the conference summary.
- A biochemist anthropologist, Jacqueline Green, published her report "I do diet: the construction of a Cambodian Diabetic Patient and the Management of Diabetes in Cambodia" http://www.mopotsyo.org/Highlight/Aug_to_Dec_2011/Management%20of%20Diabetes-Final.pdf
- A partnerships was signed with CARITAS for diabetic retinopathy screening
- With partners in Belgium (the Institute for Tropical Medicine) in Philippines and DR Congo, we began to prepare a multi country study on SMS messages to support diabetics with their self-management. It is the first time we participate in a prospective Randomized Control Trial. statement: *"This project is supported by a BRIDGES Grant from the International Diabetes Federation. BRIDGES, an International Diabetes Federation project, is supported by an educational grant from Lilly Diabetes."*
- We had a visit from Nephrologist Dr Bernadette Thomas from the University of Washington in Seattle, USA, to help us orient our activities for the early diagnosis and treatment of chronic kidney disease.
- We began to use vouchers to help our services reach the beneficiaries.

2. THE YEAR 2011 IN PERSPECTIVE

During 2011 MoPoTsyo continued its steady growth in terms of beneficiaries, expenditures, and human resources for health, gradually covering a larger adult population with the services of the Peer Educator Networks.

Thanks to the financial resources we have been able to reward human resources so we could reach more and more beneficiaries.

TABLE 1 BENEFICIARIES VS COST TREND 2007 - 2011

Beneficiaries/costs trend fom 2007 to 2011, [in adults covered through the Peer Educator Networks]					
Years	2007	2008	2009	2010	2011
End of month December					
Beneficiaries Annual growth %		143%	40%	57%	53%
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
Number population at NCD risk (=adults)	554,644	554,644	733,107	1,161,131	1,161,131
Nr of covered&screened adults	29,335	71,329	99,839	156,860	240,550
Coverage of Total Population	2.6%	6.4%	6.8%	6.8%	10.4%
Coverage of target population at risk	5.3%	12.9%	13.6%	13.5%	20.7%
Total Cost Annual growth %		120%	44%	37%	62%
Total Annual costs [in USD]	\$ 59,808	\$ 131,725	\$ 189,773	\$260,446	\$ 422,145
Accumulated costs of whole intervention		\$ 191,533	\$ 381,307	\$641,752	\$1,063,897
Unit cost per beneficiary [in USD]					
per population	\$0.05	\$0.12	\$0.13	\$0.11	\$0.18
per population at risk (all adults) of NCD	\$0.11	\$0.24	\$0.26	\$0.22	\$0.36
per covered & screened adult	\$2.04	\$1.85	\$1.90	\$1.66	\$1.75

The cost per adult is broken down in different types of benefits that these adults receive, depending on their individual situation, as can be seen in the table below. These benefits depend the needs of the individual. 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, the village population is covered, whether they are 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.

TABLE 2 TARGETS REACHED BY END 2011

MoPoTsyo achieved by Production Target until 2011		Phnom Penh slums			Takeo Province all 5 OD's					B.Meanchey	K.Speu	TOTAL
No.	Item	West OD #1	Central OD #2	North OD #3	Ang Roka OD #4	Doun Keo OD #5	Bati OD #6	Prey Kabass OD #7	Kirivong OD #8	Thmar Pouk OD #9	Kong Pisey OD #10	
1	Training of a new Peer Educator (5 weeks)	2	1	2	8	11	10	8	9	7	16	74
2	Early diagnosis / Adult screened for DM	3,584	1,764	9,164	65,423	9,166	19,941	24,224	23,850	38,798	33,991	229,905
3	Early diagnosis / Adult screened for HBP	1,792	882	4,582	32,712	4,583	9,971	12,112	11,925	19,399	16,996	114,953
4	Commune leader exposed to primary prevention	-	-	5	435	-	-	-	-	-	-	440
5	School teacher exposed to primary prevention	-	-	1	210	-	-	-	-	-	-	211
6	Village High Blood Pressure Group (VHBPG) creation	-	-	6	138	31	71	59	44	5	30	384
7	New DM Patient registered+counseled	336	126	516	786	247	306	259	434	395	324	3,729
8	OLD&NEW DM patient trained & in follow up during 2011	289	108	444	676	212	263	223	373	340	279	3,207
9	New HBP Patient registered+counseled	13	12	154	1,264	272	508	557	584	190	404	3,958
10	OLD&NEW HBP patient trained & in follow up during 2011	11	10	132	1,087	234	437	479	502	163	347	3,404
11	Poor Patients getting HEF support in year 2011 (prescribed Medicin	21	3	25	10	6	8	7	9	-	15	104
12	Patients receiving Lab tests profile in 2011	178	57	206	466	71	163	160	276	155	321	2,053
13	Patients getting a Medical Consultations during 2011	172	37	319	618	241	327	260	408	434	480	3,296
14	Patients buying prescribed medication during 2011	200	61	358	470	216	349	234	395	347	462	3,092

TABLE 3 ASSETS & LIABILITIES 2008 - 2011

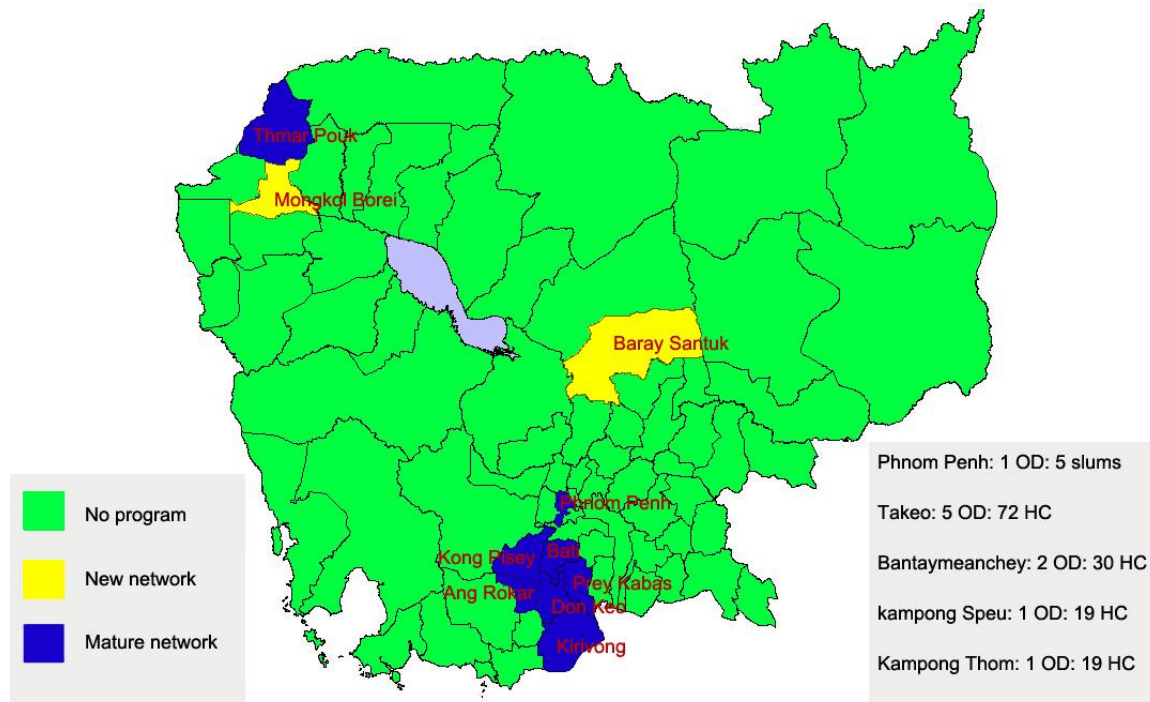
Years End of month December	2008 Audited	2009 Audited	2010 Audited	2011 Unaudited
I. Assets				
Current assets (income & expenditure)	95,382	262,427	381,387	173,411
Non-current assets	28,448	82,226	178,083	315,586
Sub-total	123,830	344,653	559,469	488,996
II. Liabilities				
Current liabilities	-	-	-	-
Non-current liabilities	-	-	-	-
Sub-total	-	-	-	-
III. Net assets (I-II)	123,830	344,653	559,469	488,996
V. Total funding				
Initial capital	-	-	-	-
Reserves	-	-	-	-
Annual surplus (deficit)	123,830	344,653	559,469	488,996
Total	123,830	344,653	559,469	488,996

TABLE 4 EXPENDITURE 2007 - 2011

years	2007	2007 & 2008	2007 - 2009	2007 - 2010	2007 - 2011
Nr of covered & screened adults	29,335	71,329	99,839	156,860	240,550
Accumulated costs of whole intervention		\$191,533	\$381,307	\$641,752	\$1,063,897

FIGURE 1 MAP - LOCATION OF 9 PEER EDUCATOR NETWORKS IN 9 LOCATIONS IN CAMBODIA

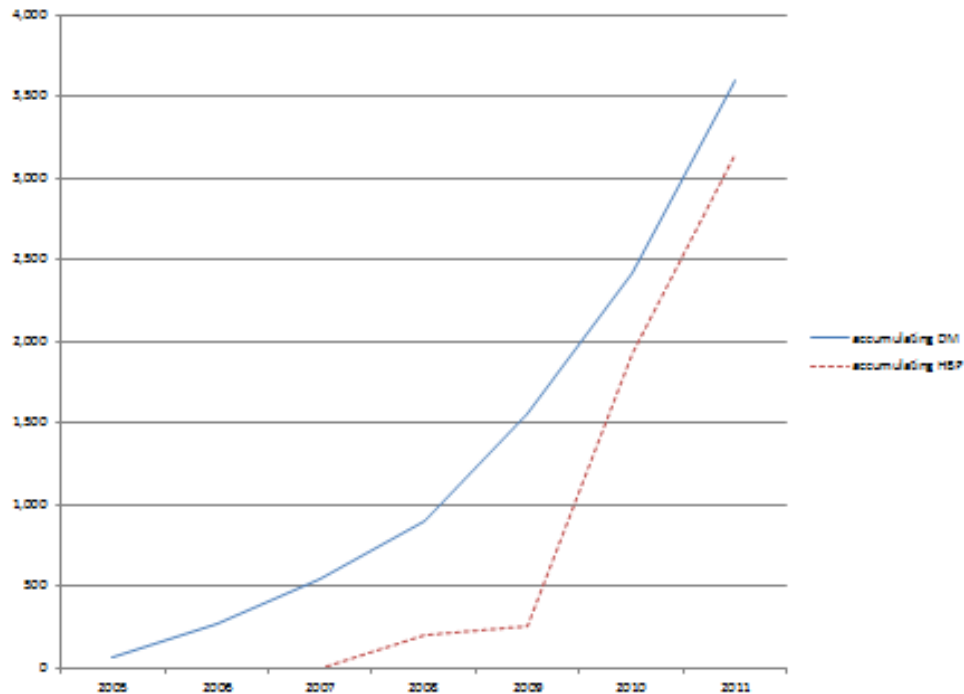
Peer Educator Networks



The agreement for a Peer Educator Network in Mongkol Borei has not yet been signed but one Peer Educator was selected for training and negotiations have begun. At the end of 2010 there are in Banteay Meanchey not yet 2 OD with a PEN but only 1 OD, namely Thmar Pouk OD. In total there are 9 PEN at the end of 2011. The Peer Educator Network in Phnom Penh is counted as 1 but the slums are located in 3 different OD's. The OD West is too large and will be split in 2 OD's in 2012.

The numbers of chronic patients who register as member of MoPoTsyo have been sharply increasing.

FIGURE 2 GROWING MEMBERSHIP

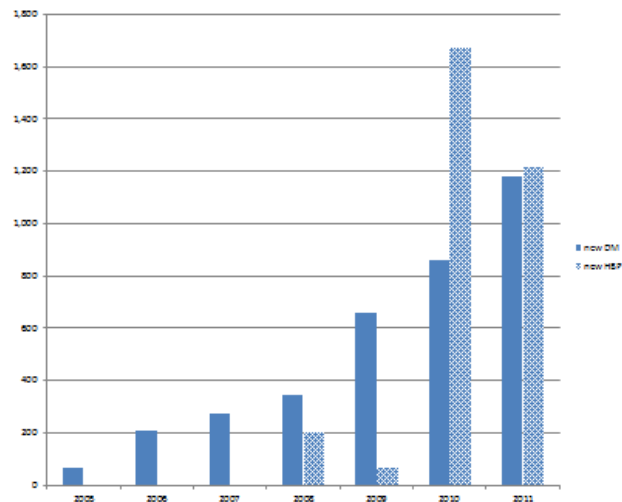


The MoPoTsyo Peer Education began in urban slums in mid 2005 with screening in for patients with diabetes (DM). In mid 2007 the intervention was for the first time tried in a rural area, when peer educators began to be trained in Ang Roka OD in Takeo province with funding from the World Diabetes Foundation, Swiss Red Cross and others. That is when the speed in membership suddenly increases.

Hypertension: A first small group of members with hypertension, without diabetes, were admitted in 2007 in urban slums. It did not work well, so it was tried in rural area, which initially also did not work well, but later a modus operandi was found which promises better results. The hypertension intervention's design is still not optimal. The challenge is not to detect and register members but to make them adhere to treatment.

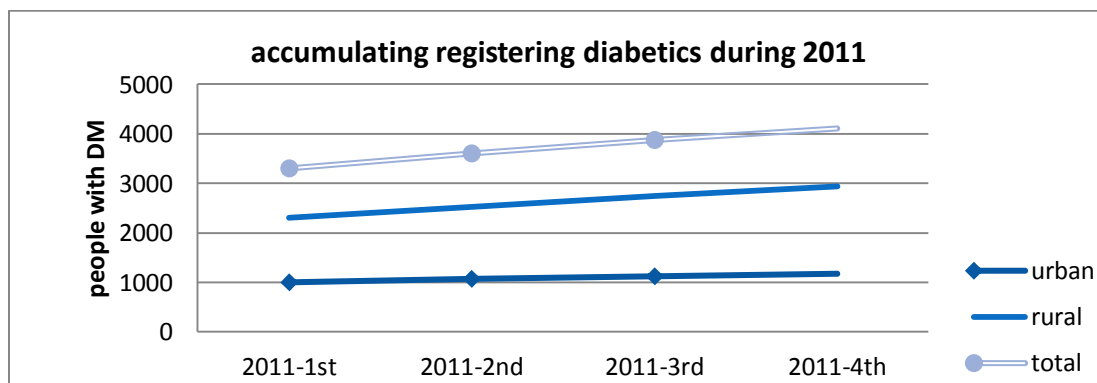
From the figure below it yearly growth of people with DM is more gradual than the yearly growth of the members with hypertension. Hypertension intervention design still requires more work and closer collaboration with the public service before simply scaling up.

FIGURE 3 YEARLY GROWTH IN MEMBERSHIP



During 2011 the rural membership grew faster than the urban membership, see graph below: There is no active screening in urban areas. Also, there are only 5 peer educators compared to more than 60 rural peer educators.

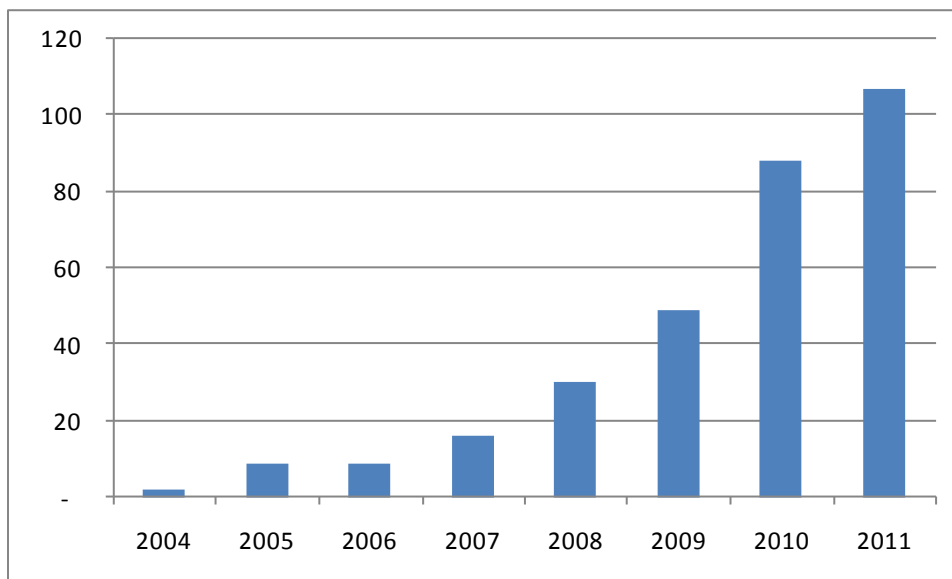
FIGURE 4 COMPARING URBAN AND RURAL GROWTH IN REGISTERING DIABETICS



Human Resources for Health

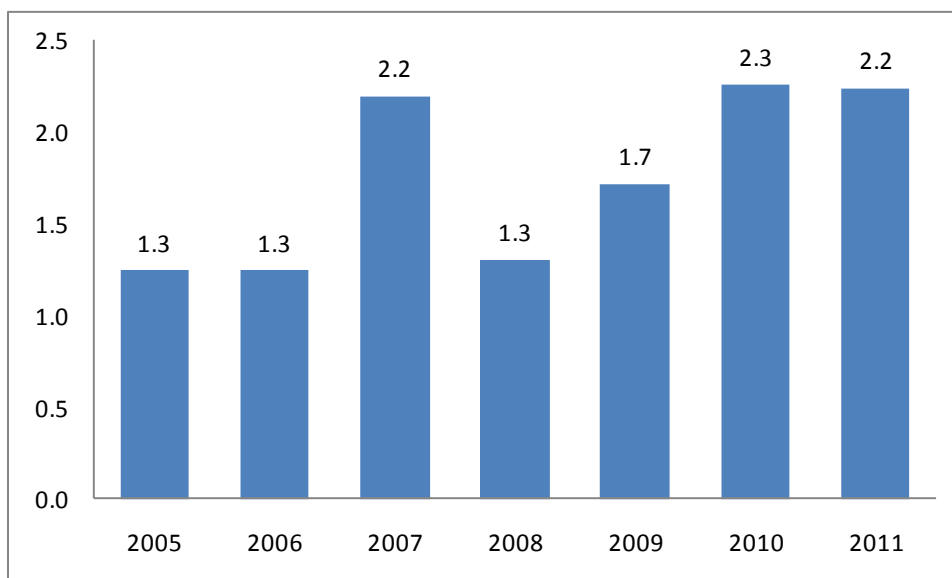
The numbers of salaried staff and volunteers working for MoPoTsyo has gradually risen to over 100 persons in 2011.

FIGURE 5 VOLUNTEERS AND SALARIED STAFF



MoPoTsyo remains an organisation mainly of volunteers. The ratio of volunteers to salaried staff has always been bigger than 1 and is more than 2 to 1 (at the end of 2011).

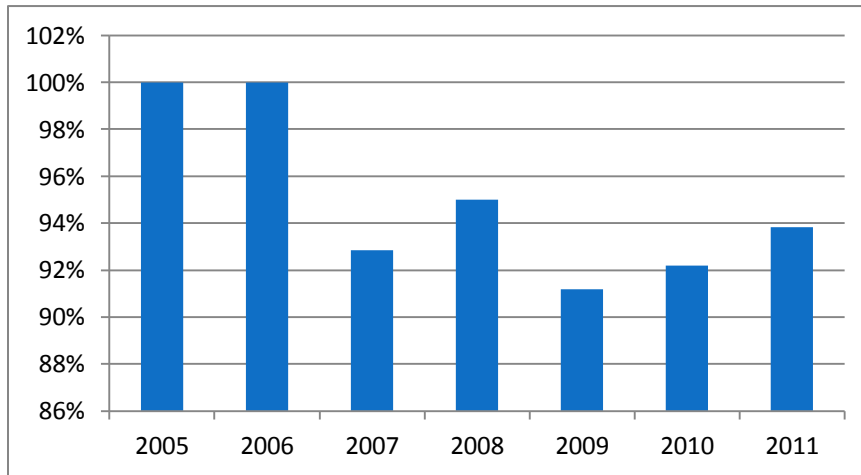
FIGURE 6 RATIO OF VOLUNTEERS TO SALARIED STAFF



Peer Educators

Every year MoPoTsyo is training new Peer Educators (PE). From 2005 to 2011 there were **81** PE's trained by MoPoTsyo. The percentage of PE that is still working with MoPoTsyo remains very high: almost **94%** (76 PE's out of 81). Although there is no sign of attrition until now, with climbing of their age, this must be factored in for the future.

FIGURE 7 PERCENTAGE OF PEER EDUCATORS STILL WITH MOPOTSYO

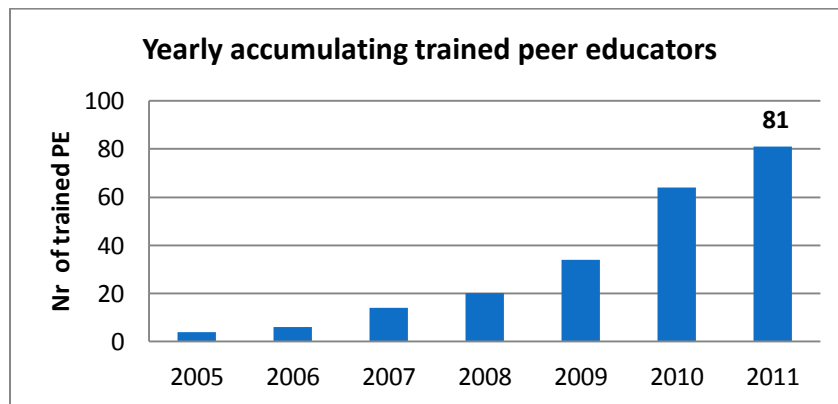


But not everyone remains Peer Educator over time and there are different reasons:

In 7 years only 4 peer educators have stopped to work for MoPoTsyo: Among them 3 resigned and 1 has died.

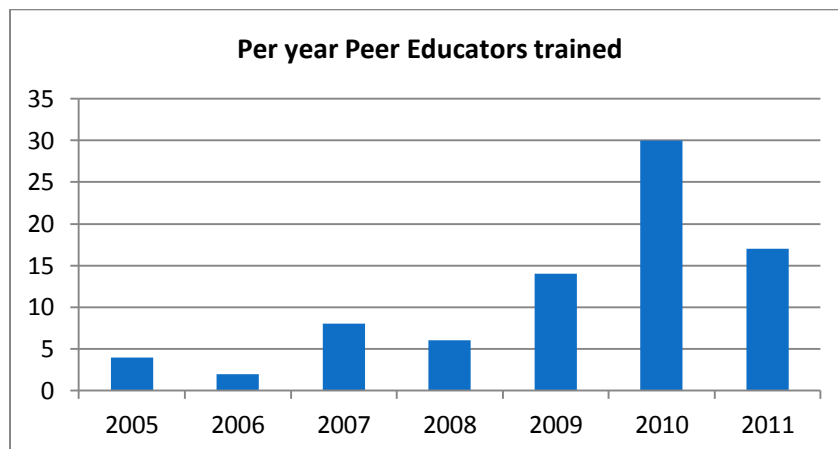
Others continue to work but change their function from being a volunteer Peer Educator to become a salaried staff member. These are peer educators who are more involved in organisational issues or training. When they become salaried staff members, a new peer educator must be found who replaces them in the community. Until the end of 2011 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 NGO's Programme Department. They strengthen the capacity of the OD Peer Educator Manager (ODPM) at the OD level to manage the networks properly and report to the OD counterpart.

FIGURE 8 YEARLY NUMBERS OF PEER EDUCATORS TRAINED



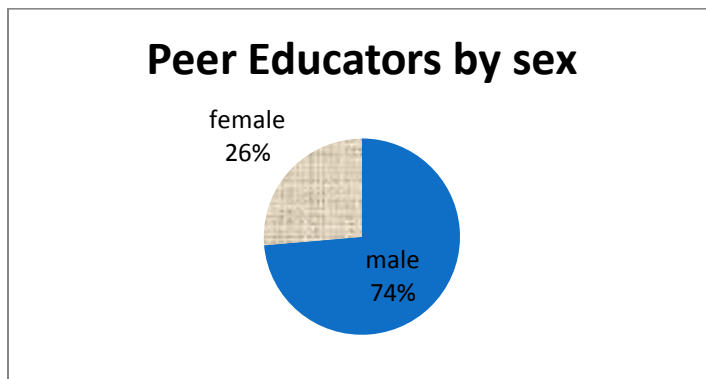
During 2010 we trained a record number of 30 Peer Educators. The figure was to 17 in 2011 because it proved difficult to find suitable candidates.

FIGURE 9 YEARLY NUMBER OF PE TRAINED



It is even more difficult to maintain a gender balance. Many husbands do not want their wife to become peer educator. It is also difficult to find women with sufficient capacity to become peer educator. The pay is low. It is a job that you do for the honor and immaterial reward. The household can be unhappy if the mother is not paying a lot of attention to them but instead is busy going around and cares for other people. The pressure can come from the children and from husbands. They want mum to be available 100% for them. The mismatch with the gender of patients continues and is even getting worse. In 2011, only 34% of the diabetics who registered were male. The proportion of 1/3 male versus 2/3 female patients has not changed since 2005. Ever since the start, we have been unable to redress the imbalance through finding and training of more female peer educators. Who has a good idea?

FIGURE 10 PEER EDUCATORS BY SEX



For the reasons mentioned above, of the total 81 Peer Educators who have been trained, results networks with a total of 74 peer educators at the end of 2011.

In the year 2011 the network itself grew from 63 to 74 peer educators, an increase of 11 Peer Educators in function. During the year 2011, MoPoTsyo had trained 17 peer educators. In 2011, we re-organised our structure in particular the “program department”.

TABLE 5 NUMBERS OF PEER EDUCATORS PER PROVINCE

	Number of Peer Educators	Takeo	Phnom Penh	Bantey Meanchey	Kompong Speu	Total
	per December 2011	46	5	7	16	74
	Per December 2010	41	5	6	11	63

These 74 peer educators are divided over 8 Operational Districts as will be explained in more detail per OD.

Screening

The screening for Diabetes: At the end of December 2011, there were more than 240,000 adults in Cambodia, who have used a urine strip to check their own urine for glucose presence to find out if they are suspected of having Diabetes more than double of what is had been at the beginning of the year 120,146. The average screening was 10,000 per month. The number of diabetics registered rose from 1969 to 3953, so 2000 new members.

TABLE 6 ACCUMULATING COVERAGE

years	2007	2007 & 2008	2007 - 2009	2007 - 2010	2007 - 2011
Nr of covered & screened adults	29,335	71,329	99,839	156,860	240,550

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. There is demand from some OD's to repeat the screening after 5 years.

The screening for High Blood Pressure: By making the machine available at village level, any villager can use the machine for example once a year to check blood pressure to find out if it is getting too high or not. Village Blood Pressure Groups are meant not just for the people who have been detected with high blood pressure but for anyone who wants to check. The village chief and "group leaders" have to be aware of the "conditions of availability" (e.g. only on Wednesday morning before 10 AM) and how and where and when they use the machine and get help from the Village High Blood Pressure Group leader to try it. It is the job of the Peer Educator to set up these groups, with a leader and then make them work. For this the Peer Educator makes a monthly round per village or "to a central village among a group of villages". In the beginning of 2011, the screening process for high blood pressure was changed from screening process that was depending exclusively on the peer educators having the automated machine to the more open system where there is one automated blood pressure machine in each village which can be used by people for self-screening and control. The peer Educators still do active screening using their own BP machine to detect hypertension patients. If a new case is found with high blood pressure (more than 140/90), the Village High Blood Pressure Group leader reports it to the Peer Educator who comes once per month to collect the results. As before, a peer educator has to meet the person to assess the blood pressure and confirm the hypertensive status. People who are found to have high blood pressure can then be formally assessed by the Peer Educator so they get a patient book, do the laboratory test and if necessary given the additional information from the lab profile, use the medical consultation service at the public referral hospital organized by the Peer Educator Network and receive the prescription. Before such a village high blood pressure group can be set up, the peer educator must do sufficient hypertension screening in the village to detect and register at least 3 people with high blood pressure who can form the group. Ideally, the Village High blood pressure group leader is diabetic with hypertension and literate but it is not always feasible to meet all these conditions. Although some villages are huge, we put only one VHBP Group per village.

The screening for Dyslipidemia: All members of MoPoTsyo can do a blood laboratory test. The test includes Total Cholesterol, HDL and Triglycerides. They are encouraged to do it but it is no obligation. The price of the tests is very low compared to other laboratories and the blood collection is in the community early morning so it is very convenient for the members.

The screening for Chronic Kidney Disease: All members of MoPoTsyo who use the laboratory service do the creatinin test and the potassium test. These 2 tests are strongly encouraged because the results are important for the prescription. Also members are encouraged to test their urine for proteinuria. This was introduced in late 2011.

Medical Services

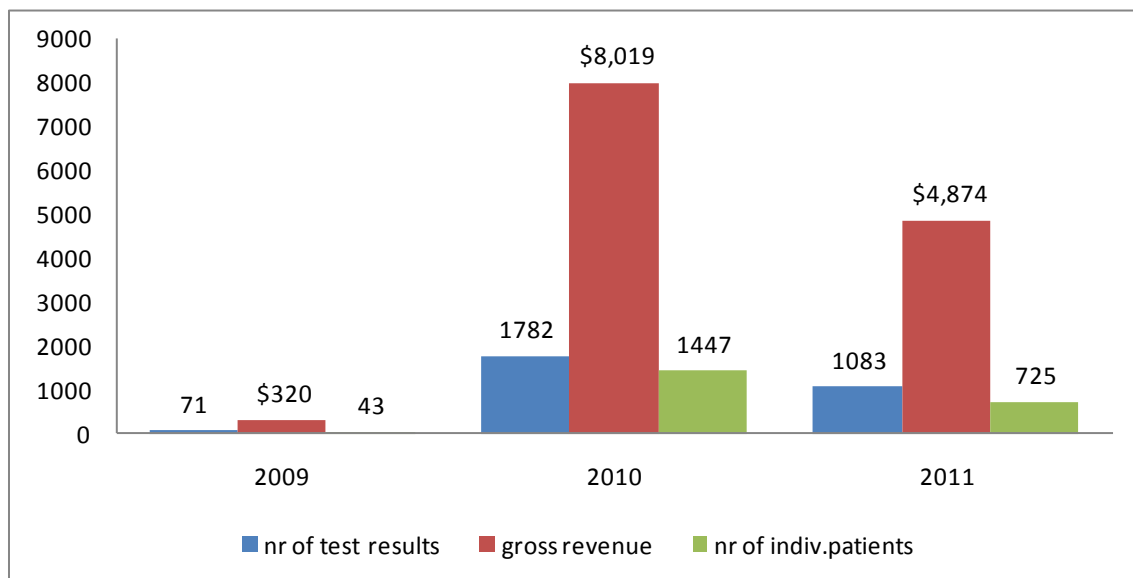
Laboratory Services overview

MoPoTsyo began to organise laboratory services in 2009. In 2010 the laboratory services were used during the re-assessments. This means that the randomized patients do not have to pay for the tests. This is too costly to continue but it is good to make the patient familiar. We stopped to do it in 2011, so the utilisation fell back, unsurprisingly. It will pick up again probably in 2012.

Laboratory service is important for different reasons. It helps to 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 diseases are “silent” and a-symptomatic.

The other reason is of course that the Doctor needs the laboratory result for prescription of appropriate medication for the patient and for adaptation of the prescription and referral.

FIGURE 11 LABORATORY SERVICES USE AND COST



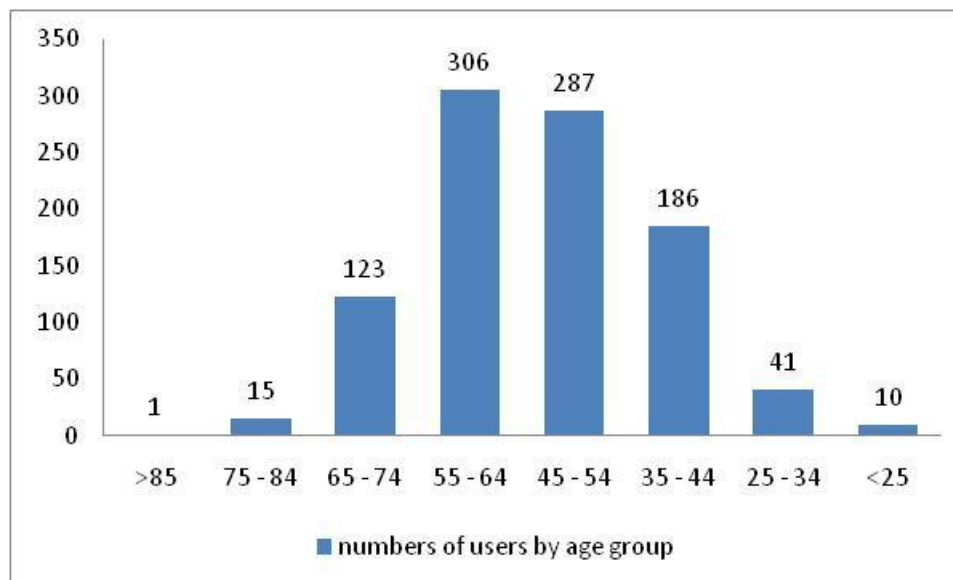
The range of laboratory tests is as shown on the example below. The name of tests are written both in Khmer and English, as well as the normal value and a basic indication of what the test measures.

FIGURE 12 A LAB RESULT IN 2011

លទ្ធផលតេស្ត / Test's results:			
Nr.	ឈ្មោះតេស្ត Test Name	លទ្ធផលតេស្ត Test Result	គោលដៅគំរូធម្មតា Target Normal
1	កូលេស្តេរ៉ូលសរុប / Total Cholesterol	226	តិចជាង 200 មីលីក្រាមក្នុងមួយដេសីលីត្រ
2	អេច ដេ អិល / HDL Cholesterol	56	ច្រើនជាង 40 មីលីក្រាមក្នុងមួយដេសីលីត្រ
3	ទ្រីគីស៊ីដ / Triglyceride	131	តិចជាង 150 មីលីក្រាមក្នុងមួយដេសីលីត្រ
4	ក្រូអាទីនីន / Creatinine	0.7	តិចជាង 1.2 មីលីក្រាមក្នុងមួយដេសីលីត្រ សំរាប់បុរស និង 1.1 មីលីក្រាមក្នុងមួយដេសីលីត្រ សំរាប់ស្ត្រី
5	អ៊ី ជី អែហ្វ អ៊ី / eGFR	>60	តិចជាង 60 មីលីលីត្រក្នុងមួយនាទី
6	ស្ករក្នុងឈាម / Blood Sugar	139	មុនហូបអាហារពេលព្រឹក៖ ច្រើនជាង 126 មីលីក្រាមក្នុងមួយដេសីលីត្រ បង្ហាញថាអ្នកមានជំងឺទឹកនោមផ្អែម ច្រើនជាង 110 មីលីក្រាមក្នុងមួយដេសីលីត្រ បង្ហាញថាអ្នកអាចមានជំងឺទឹកនោមផ្អែម ចន្លោះ 65 ទៅ 100 មីលីក្រាមក្នុងមួយដេសីលីត្រ បង្ហាញថាអ្នកមានលទ្ធផលល្អ
7	ប៉ូតាស្យូម / Potassium	4.2	ចន្លោះ 3.5 ទៅ 5.1 មីលីម៉ូលក្នុងមួយលីត្រ
8	ត្រង់សាមីនាស / Transaminase (SGPT)	33	ចន្លោះ 1 ដល់ 50 ឯកតាក្នុងមួយលីត្រ
9	ត្រង់សាមីនាស / Transaminase (SGOT)	33	ចន្លោះ 6 ដល់ 40 ឯកតាក្នុងមួយលីត្រ
10	ប្រូតេអ៊ីន / Proteinuria	0	លើសពីសូន្យ(គ្មាន)

Also older persons (14%) and young persons (5%) who are member of MoPoTsyo were among the 969 different patients who have used the laboratory services in 2011 at least once.

FIGURE 13 LABORATORY SERVICE USERS BY AGE GROUP



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.

Medical Consultation Services overview in 2011

In 2011, medical consultations were organised by MoPoTsyo in 9 public facilities in 8 Operational Districts. The cost per session was \$ 98.81. A session lasts half a day. On average 31 patients receive medical consultation.

For this MoPoTsyo hires an experienced Medical Doctor to travel to the public facility and do one consultation session. Sometimes the session is the morning, sometimes in the afternoon, but never the whole day. Some of these doctors are government staff and others are not government staff.

Only patients who are member of MoPoTsyo can see the doctor. The patients pay user fee to the hospital, not to MoPoTsyo.

The idea behind hiring a doctor is to train the doctor of the public facility to do the medical consultation but their attendance is irregular.

MoPoTsyo uses the services of 3 Medical Doctors, every one of them part-time. In total they were hired to hold 205 half day sessions in 2011 to do all the consultations.

Of course, the 205 half mornings does not include the “travel” time that is needed for the doctor to travel to the hospital. For estimating the Full Time Equivalent 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 31 patients for their travel. 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 any longer. This is not yet the case in 2011.

TABLE 7 MEDICAL CONSULTATIONS

year 2011	TOTAL	annual average per location	average monthly for 8 locations
1. Nr of patients who received Consultation	6347	793	66
2. Cost [(nr3+nr4)*nr5]	\$ 20,257	0	0
3. Transportation	\$ 478	0	0
4. Paid in Doctor fees for 8 locations	\$ 318	0	0
5. Number of consultation sessions	205	17.1	1.4
6. Nr of patients per session	31		
cost per consulting patient (nr2/nr1)	\$ 3.19		

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. However, it is much cheaper to make the doctor travel to the location, then to make 31 patients travel to the doctor. If on average 31

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.

TABLE 8 HELPING PATIENTS SAVE TRANSPORTATION COST

	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 Consult	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

Revolving Drug Fund overview

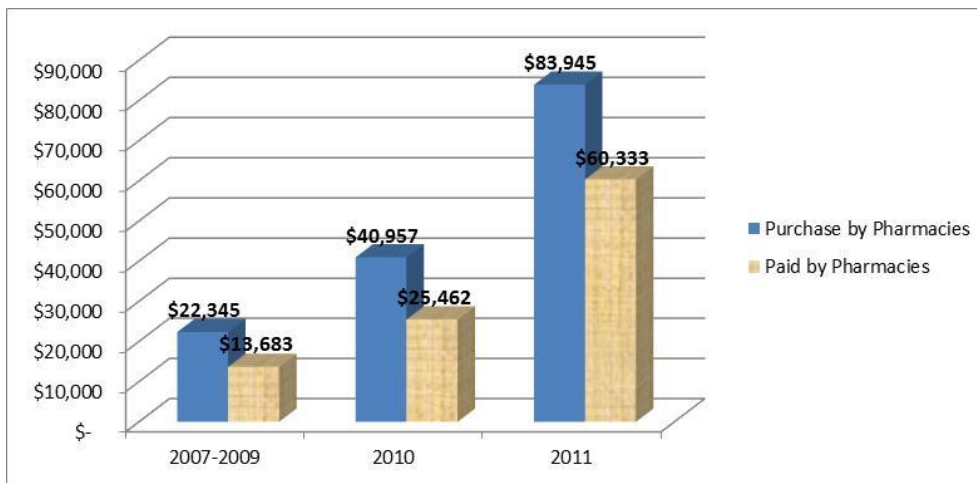
We have contracted 17 private pharmacies who get our supplies of medicines (including insulin) so they can sell it to our members. Our turn-over has been increasing steadily since we started in 2007.

TABLE 9 SALES AND CREDIT TO PHARMACIES

RDF Volume Purchased by contracted pharmacies and Paid to MoPoTsy and Outstanding Credit						
		Baseline 100	83%	105%		
		2007-2009	2010	2011	Total	
Purchase	Riel	89,380,850	163,827,300	335,780,858		
	US\$	\$ 22,345	\$ 40,957	\$ 83,945	\$ 147,247	
Paid	Riel	54,730,350	101,846,500	241,333,110		
	US\$	\$ 13,683	\$ 25,462	\$ 60,333	\$ 99,477	
Credit Balance					\$ 47,770	
		Do pharmacies pay on time...level of outstanding credit				
		2007-2009	2010	2011	Total	
	paid	61%	62%	72%		
	credit	39%	38%	28%	32%	

Right from the start 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. This was effective to some extent.

FIGURE 14 INCREASE IN MEDICINE SUPPLY TO PHARMACIES & CREDIT



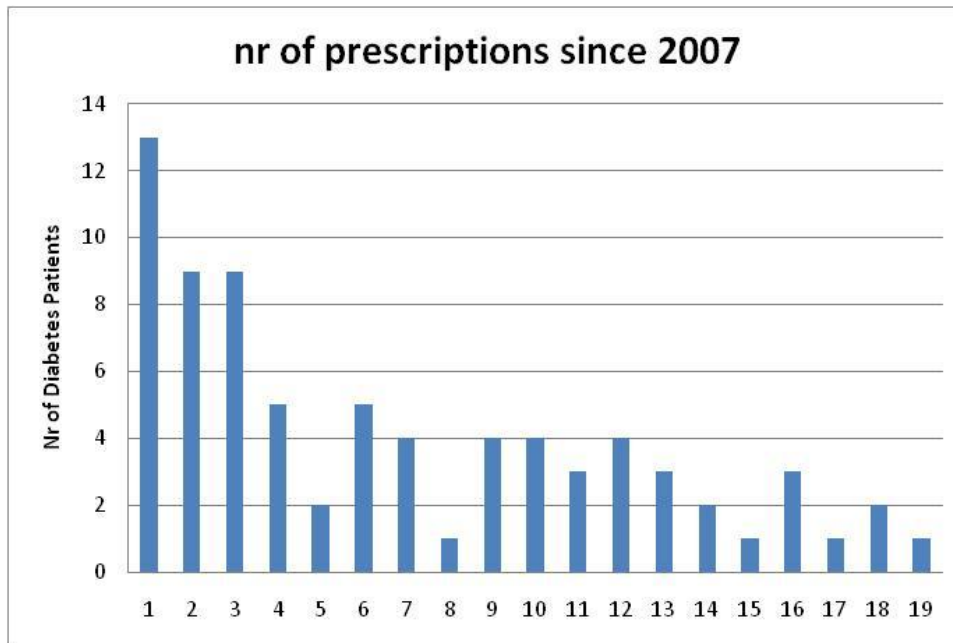
Not every member has a prescription. Until end of 2011 we have 4,180 chronic patients (DM or HBP) who have at least one prescription for the revolving drug fund since 2007, when we first began to purchase medicines. Among them are 1,660 patients older than 60 years (1,159 older than 65 years). Among the 1,660 who are over 60 years, 1,070 are older women (64.5%) with a prescription. Among the 1,660 chronic patients with a prescription 1111 have diabetes (67%) and 549 are non-diabetic high blood pressure patients (33%)..

TABLE 10 NUMBERS OF PATIENTS WITH PRESCRIPTION

Period 01-01-2007 until 31-12-2011		
Nr of Prescriptions	Nr DM	Nr HBP
1	1242	809
2	682	187
3	405	66
4	241	26
5	155	15
6	95	7
7	67	1
8	53	2
9	43	3
10	26	1
11	15	1
12	16	1
13	9	0
14	4	0
15	8	0
16	0	0
17	1	0
18	3	0
19	2	0
20	2	0
21	0	0
22	1	0
Total individuals	3070	1119

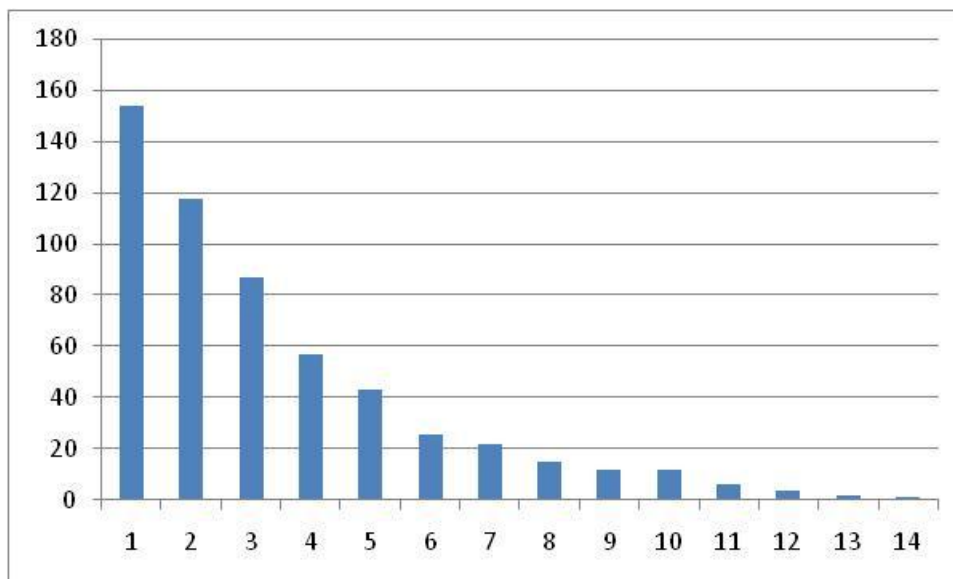
It is interesting to look at the 77 diabetes patients who registered in 2007. They have received several new prescriptions over the years until 2011. Some of whom have 1 prescription and others as many as 19.

FIGURE 15 DIABETES PATIENTS & NR OF PRESCRIPTIONS UNTIL DEC 2011



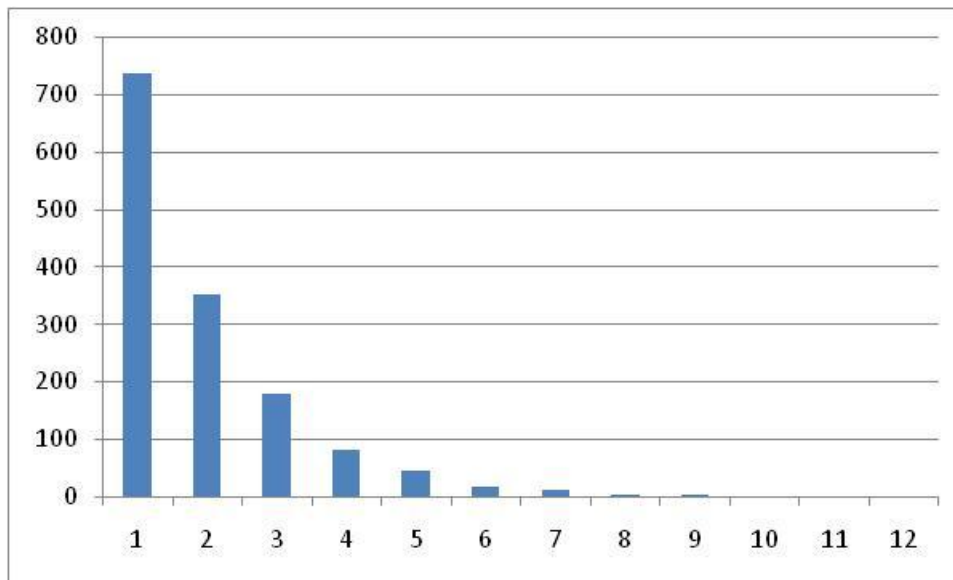
When we look at a shorter time frame, the number of prescriptions per patient is smaller. The graph below is the nr of prescriptions for the 574 Diabetics registered since 2009. It does not include the Diabetics who registered in 2007 and 2008. The vertical axis is the number of diabetics. On the horizontal axis the number of prescriptions that they have accumulated at the end of 2011.

FIGURE 16 NR OF PRESCRIPTIONS PER DM SINCE 2009



The graph below shows the numbers of 2281 Diabetics since 2011 who have accumulated prescriptions over time. The figures do not include the diabetics from previous years. 2011 shows that the majority goes just one time to consult the Doctor so they have their prescription. Together the graphs show that people accumulate prescriptions over time.

FIGURE 17 NR OF PRESCRIPTION PER DM REGISTERED SINCE 2011

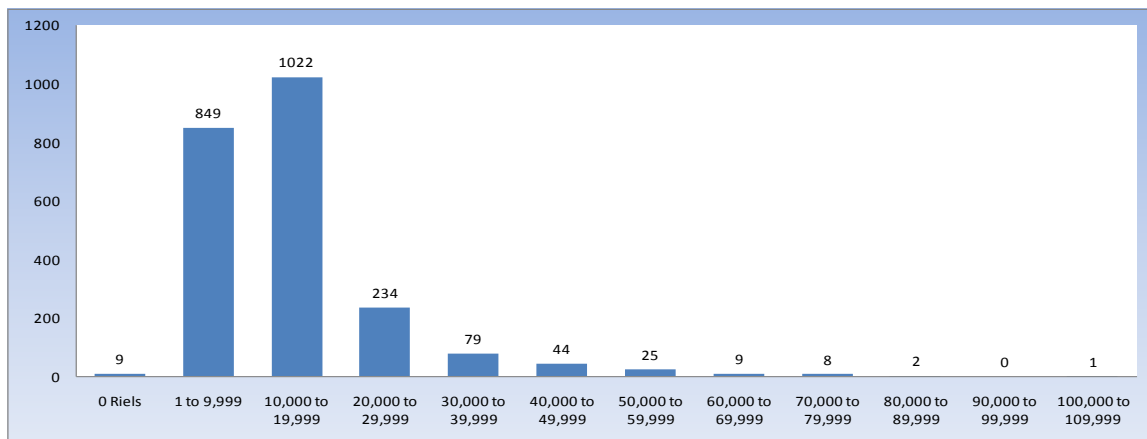


In general, only people who want to and are able to pay for their medicines have a prescription. The price of consultation is quite low compared to the price of the medicines. Through talking with other patients and their peer educator, who can usually give them a fair estimation of what it their disease 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 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 patients who should have a prescription but they do not want or they are unable to afford the medication or meet other barriers. We do not know the proportions exactly. In July 2011, we found among a small sample that on average the people without prescription are in better health than people with a prescription. The data showed that the average level of education and training among the group without a prescription is slightly higher than among the group with a prescription, but there are also poor people among this group who cannot afford the medication.

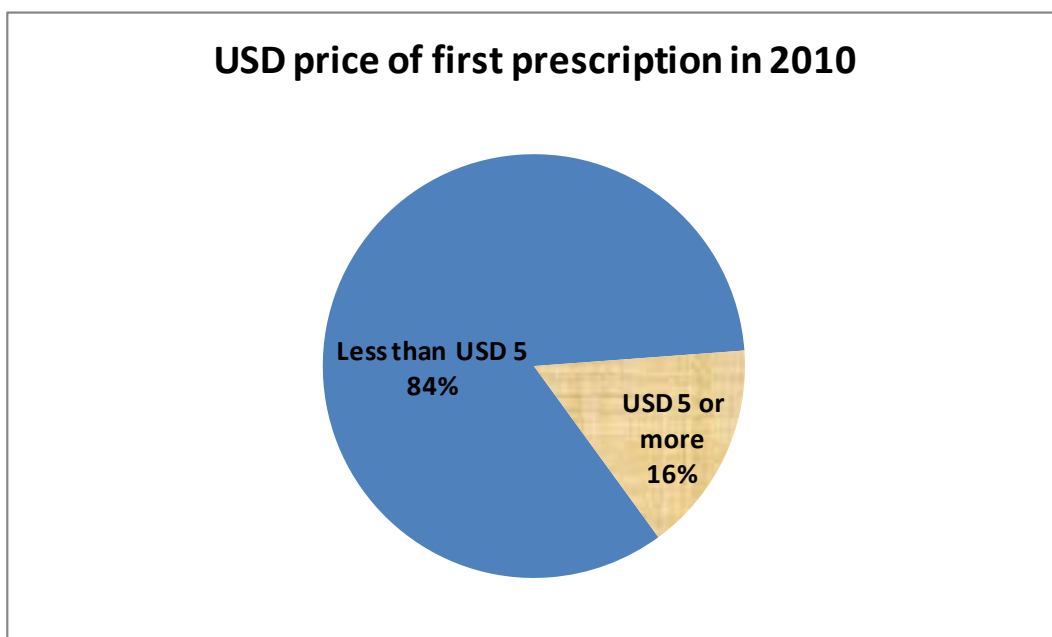
The monthly cost that the patient had to pay in 2011 for their medication when they receive their first prescription looks as in the graph below. On average it is USD 3.60 in 2011 but the variation is large as it depends on the seriousness of disease. It rangers from 0 to more than 100.000 riels (=USD 25) per month.

FIGURE 18 1ST PRESCRIPTION MONTHLY COST (N=2281 1ST PRESCRIPTIONS)



The pie chart below shows that only about 1 in 5 patients has to pay more than USD 5 per month when they get their first prescription. The figures are biased towards diabetics because there are more diabetic members with a prescription than high blood pressure patients, although the numbers registered are more or less equal.

FIGURE 19 COST OF FIRST PRESCRIPTION IN 2010



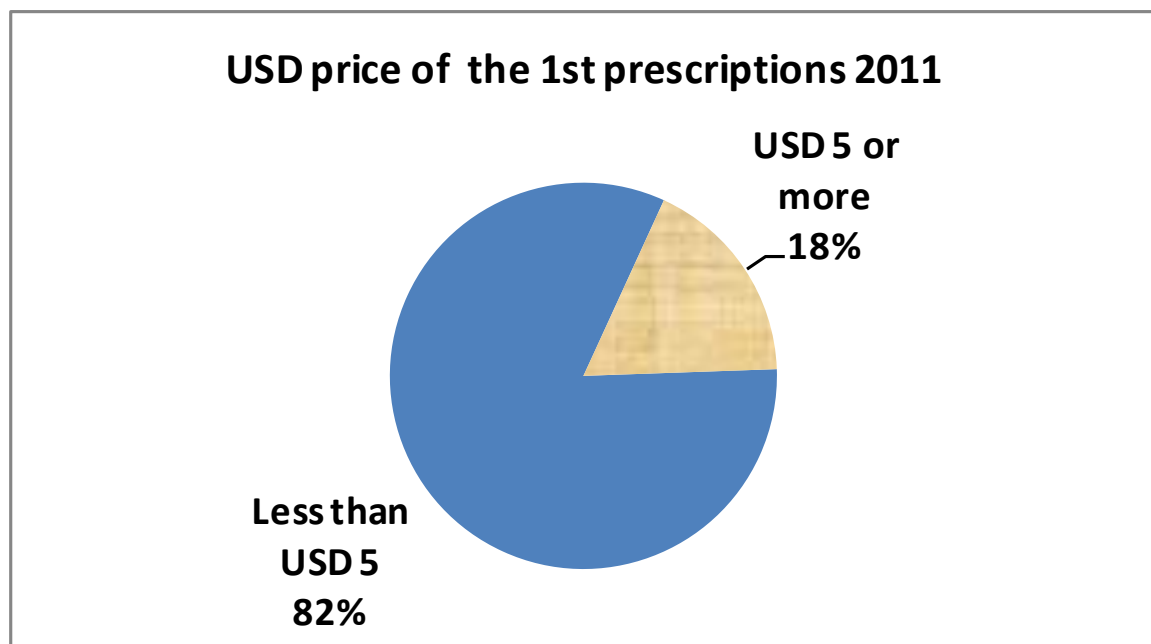
The cost of the first prescription is slightly elevated in 2011 but not much compared to 2010. 18% of patients (N=2281) paid more than USD 5 for their first prescription in 2011, see figure below. It is important to keep track of trends in pricing during the coming years, per OD. MoPoTsyo will do this together with the OD counterparts.

The number of diabetes patients who are self-injecting insulin doubled to 220 at the end of 2011. Among them 88 are in urban slums (40%) and the others (132) in the rural areas, where electricity is more problematic. It is fair to say that people who depend on insulin are extra vulnerable because they required more knowledge, skills and more equipment/consumables to be able to do successful self-management. If they make a mistake in the dosage, they can well end up in the emergency care department of a Hospital or worse than that. We have begun to wrap the insulin together with sets of sufficient syringes (100 units per ml) of the right type, to avoid that people by accident use any of the out of standard 40 units per ml which are also on the market but which are cheaper.

TABLE 11 INSULIN USERS

Type of Insulin	Patients
NPH	23
ACT RAPID	4
MIX TARD	40
LANTUS	100
ACT+MIX	35
ACT+NPH	4
ACT+LAN	13
MIX+LAN	1
Total	220

FIGURE 20 COST OF FIRST PRESCRIPTION IN 2011



Adherence to prescribed medical treatment

In 2011, 3661 patients bought 18,530 times their monthly medication. That is 5 times instead of the ideal 12 times.

Adherence is improving over the years but it is not satisfactory. The graphs below represent those patients who have a prescription. We can measure to a certain extent the adherence to prescribed treatment by our members by counting the numbers of monthly invoices and comparing these to the number of patients who have a prescription. The denominator does not exclude people who have dropped out or died, so it is normal that there are more people with a prescription than that there are people who are buying per month. What is striking is that people with diabetes adhere much better than people with high blood pressure who do not have diabetes.

Among the 3661 patients, there are 2713 Diabetics and 943 Hypertensive non-diabetics, respectively 15,275 and 2,963 invoices. This shows that the diabetics bought 5,6 times, whereas the HBP patients bought 3,1 times.


The average price of hypertension 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 people underestimate the importance of taking their daily medication and are confused by conflicting information from different sources.

Equity Fund/Vouchers

Voucher distribution started on Q3 of 2011 (June 2011) to 135 poor patient living in Phnom Penh. Next trimester, this voucher system extended to other provinces Takeo, Kompong Speu and Banteay Mean Chey. There are now 2 types of vouchers beneficiaries: also discount vouchers for peer educators besides health equity fund voucher for poor members: same voucher but different financing, different funding. By letting the peer educators 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

FIGURE 21 VOUCHER

		ប័ណ្ណសមរម្យសំរាប់សមាជិក ម.ព.ជ. ទិញថ្នាំមូលនិធិបង្វិលទុនឱសថ នៅតាមឱសថស្ថានជៃគូរ	
កញ្ចប់ថវិកាផលប្រយោជន៍ពីមូលនិធិសមធម៌នេះគឺផ្តល់ជូនសមាជិក ម.ព.ជ. តាមរយៈមិត្តអប់រំមិត្តដោយមិនគិតថ្លៃ			
លេខកូដសមាជិក៖	C T C	0 0 2 9	ប្រើស៊ីកេ៖ ខែ ០៥ (ឧសភា)
ឈ្មោះសមាជិក៖	សេង សុខា		ផុតកំណត់៖ ថ្ងៃទី ២៥ ខែ ០៥ ឆ្នាំ ២០១២
ភេទ៖	ស្រី	អាយុ៖ 59	តម្លៃទឹកប្រាក់៖ 4,100 រៀល
ក្រីមាសទី	02 - 2012	លេខប័ណ្ណ	BM041
		លេខយល់ព្រម	HEF003-CT
ស្នាក់នៅស្ថានភាព៖	លេខរ៉ែក័យប័ត្រ	បានបញ្ជាក់ថ្ងៃទី០៦ ខែមេសា ឆ្នាំ២០១២	ស្នាក់នៅស្ថានភាពសមាជិក៖
ហត្ថលេខា.....	តំលៃសរុបក្នុងរ៉ែក័យប័ត្រ	បើក ដោយ (ប្រចាំគ្រងសេវាផ្គត់ផ្គង់)	CTC 0029 សេង សុខា
ឈ្មោះ.....		សូមមើលផ្នែកខាងក្រោយប័ណ្ណសំរាប់ព័ត៌មានបន្ថែមពីការប្រើប្រាស់ប័ណ្ណ ។	

It is too early to say much about the uptake of the vouchers through the new system.

FIGURE 22 VOUCHER DISTRIBUTION

	HEF voucher for Patients		
	Distribute	Used	% of Used
Banteay Mean Chey	93	67	72%
Kompong Speu (not yet)	0	0	0%
Phnom Penh	429	336	78%
Takeo	18	14	78%

The funding for vouchers must come from external sources. Diabetic patients and their households are vulnerable themselves and should not have to carry the financial burden for other poorer diabetic patients. Instead this burden should be borne by society as a whole and qualify for special subsidies.

It is important to bear in mind, that the price of the medicine, for which the voucher is issued, covers about half of the cost of all the benefits the patients are directly and indirectly receiving, in particular if the patient has benefited from early diagnosis as a result of screening, training in self-management, medical consultations, a laboratory service etc. Without those preceding and pre-conditional benefits, the patient would not have access to the medicines and would be living unaware, undetected, unconvinced, untrained and afraid of the implications of a positive diagnosis in her/his village like hundreds of thousands of other patients with the same chronic disease in Cambodia.

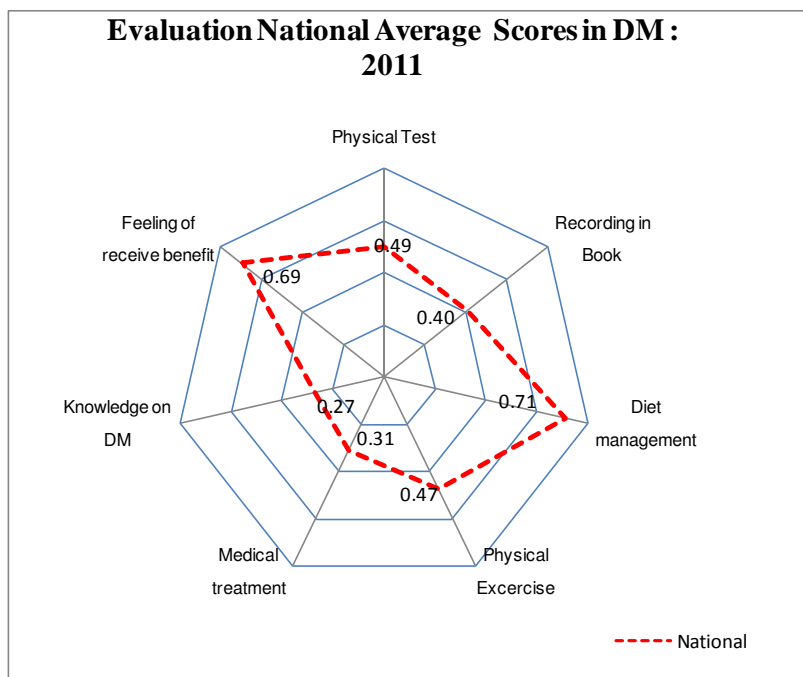
3. OUTCOMES AND THEIR MEASUREMENT

Re-assessment

The 2011 re-assessment was done in July 2011. In 44 areas samples of 19 patients were randomly selected among patients with diabetes and patients with hypertension. Both types of patients were separately re-assessed by peer educators from other provinces. In 14 areas, the sample of diabetics was not complete. High Blood Pressure patients were assessed in 20 areas, but only 3 could complete the sample of 19. Due to a misunderstanding the hypertension patients in Ang Roka OD had not been assessed.

In 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 hypertension patients. The relationship between peer educator and the hypertension patients, who do not have diabetes, is not as strong as the peer educators are not encouraged or paid to organize specific self-management classes for people with hypertension as there is for diabetes. The hypertension information must reach the pre-hypertensive and hypertensive people mostly through the village high blood pressure group whose leaders are not supposed to organize classes, besides facilitating access to information, educational material and to formal care through the peer educator network. The information that a hypertension patient needs to know is on the hypertension pyramid. Every hypertension patient who registers receives this pyramid for free, together with their self-management book. A self-management education module on isolated hypertension has so far not been created because it is not sure if organizing classes in the same way as is done for diabetics and by diabetic peer educators is the right way forward. It seems more strategic to create a direct link with the local public health centers for this but let the peer educators support and facilitate this aspect of public health care which for the moment does not exist.

FIGURE 23 RE-ASSESSMENT DIABETES SPIDER



This national result can be broken down per Operational District in the provinces and Phnom Penh where the diabetes patients were randomly selected and assessed.

TABLE 12 RE ASSESSMENT DIABETES - TABLE PER OD

Average Scores by Ods	Physical Test	Recording in Book	Diet management	Physical Exercise	Medical treatment	Knowledge on DM	Feeling/well being
Angroka	0.56	0.51	0.86	0.54	0.41	0.30	0.72
DounKeo	0.55	0.34	0.74	0.43	0.27	0.39	0.65
Kirivong	0.48	0.32	0.66	0.48	0.19	0.24	0.69
Bati	0.45	0.42	0.76	0.51	0.19	0.33	0.76
Prey Kabas	0.47	0.25	0.65	0.46	0.26	0.26	0.69
Thmar Puok	0.51	0.44	0.68	0.49	0.19	0.15	0.63
Kong pisey	0.49	0.28	0.57	0.32	0.40	0.19	0.62
PP slums	0.51	0.62	0.75	0.52	0.63	0.40	0.88
National	0.49	0.40	0.71	0.47	0.31	0.27	0.69
ទូទាំងខេត្តកំពែវ Takeo	0.49	0.38	0.73	0.48	0.29	0.30	0.68

The scores in the 7 columns are the result of the workload per peer educator multiplied by the quality score that they reach when the randomly selected patients are re-assessed using 43 indicators in the Table 13 outcome indicators (43) in 7 groups below. These 43 indicators are collected through the re-assessment when one peer educator network visits another area and questions the selected patients there. It is a useful practice and people like to be part of it. It is almost a survey because of the randomization but it lacks of course the costly rigour that real surveys require. Nevertheless, the collected data that can be aggregated provide useful insight into the development of health indicators of the registered members over time.

It is needless to repeat that the average blood sugars and average systolic and diastolic blood pressures invariably show great improvements when these biomarkers in random groups patients are compared with their own baseline data as has been the case since 2005.

For a community-based Peer Educator Network it is important to remain oriented and rewarded for working towards a large range of outcome indicators and not fall into the trap of obsessive clinical glucose and blood pressure management, however important these clinical indicators may be. Long term clinical success depends entirely on the successful pursuit of a much larger set of favoring conditions, as exemplified by these 43 indicators.

The outcome measurement system allows the supervisor of the OD to spot weaknesses in individual peer educators but it also allows the province to spot weak OD's. A low score can be due to small numbers of detected and registered patients, or to low quality. The indicators are grouped in such a way that is easy to see what has to be done to improve the situation. The re-assessment results help to inform the local, districtal, provincial and national priorities. There is an important role for the Ministry of Health to set the new indicators in order to promote public health action in Noncommunicable Disease.

TABLE 13 OUTCOME INDICATORS (43) IN 7 GROUPS

43 indicators that are used to measure outcomes of the Peer Educators performance in randomly selected samples of patientes				
15 indicators on Physical outcomes			4 indicators on Physical Activity	
1	Nr of patients with improved Blood Glucose level compared with the patients BG at time of their registration (first assessment)		1	Last 6 days: AT least 3 hours of exercises/physical activities
2	Is the BG normal (FBG<126mg/dl and PPBG<180 mg/dl) at time of this reassessment's or not		2	Yesterday : AT least 30 minutes of exercises/physical activities
3	Average: BP (Systolics<130) of the last 3 months in the follow up		3	Doing enough exercise/ physical activities
4	Average: BP (Diastolics<80 of the last 3 months in the follow up\		4	Doing more exercise than before registered
5	At reassessment: the number of BP-with Systolic <130mmHg		Average	
6	At reassessment: the number of patients with BP-Diastolic <80mmHg			
7	Nr patients with improved Systolic BP compared to at time of their registration/assessment's			
8	Nr of patients with improved Diastolic BP compared to time of their registration assessments		6 indicators on medical care/treatment	
9	Nr of patients with Pulse<100 at time of re-assessment		1	Used Lab service at least once during last 12 months
10	Nr of patients with improved Pulse compared to their pulse at the time of registration (first assessment)		2	Used medical consultation with doctor at least once during last 12 months
11	Nr of patients with Normal BMI (<23, >18.5) at time of re-assessment		3	Knows at least 1 name of their DM medicine
12	Proportion of patients who have normal BMI compared to the proportion at time of assessment		4	has at least 1 urine strip for self test at home at time of reassessment
13	The proportion of those with improved BMI compared to their assessment BMI		5	Knows meaning of changing color of urine strip
14	No protein in urine		6	can explain process of how to do 24 hours urine-strip-test
15	No food wounds		Average	
Average				
3 indicators on Record Keeping by the patient			3 indicators on Disease knowledge	
1	recorded urine test result		1	Know the two organs functions relates to BG control (Liver and pancreas)
2	recorded blood glucose test result		2	Know the 3 ways to control diabetes
3	recorded BP measured result		3	Know the impacts of diabetes
Average			Average	
7 indicators on Nutrition / diet by people with Diabetes			5 indicators on patient's feeling of benefit	
1	Eats less white rice compared to before registering as patient		1	Spent out of pocket money less than before registering
2	Last lunch contained vegetables		2	Reports to be in better health than before registering
3	Has been eating whole rice during the last 3 months		3	Has learned how to self manage diabetes with PEERs at least once
4	Has been eating any kinds bean during the last 3 months (but not as sweetened dessert)			
5	Knows that some kind of foods raised/not raise BG (morning glory, watermelon, grilled bread, white rice, fish, egg) (average of detailed questions)		4	Finds the informations from Peer Educators helpful
6	has pyramid food picture in house		5	Report to be able to control DM better than before registering
7	Found pyramid is useful		Average	
Average				

For Hypertension the spider looks as below.

FIGURE 24 RE ASSESSMENT HIGH BLOOD PRESSURE - SPIDER

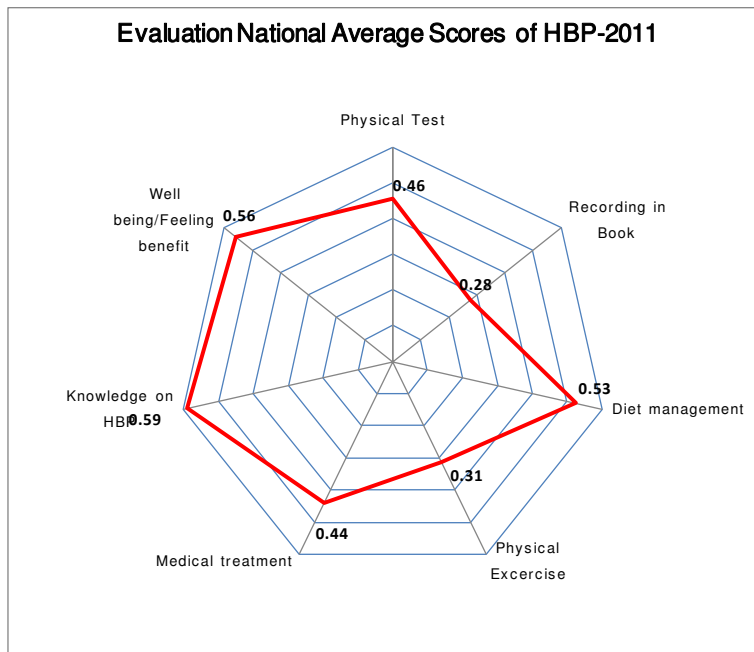


TABLE 14 REASSMENT HBP - TABLE PER OD

	Physical Test	Recording in Book	Diet management	Physical Exercise	Medical treatment	Knowledge on HBP	Well being/Feeling benefit
AVD	0.41	0.68	0.45	0.34	0.13	0.51	0.41
AVL	0.67	0.75	0.70	0.43	0.55	0.75	0.74
AVO	0.31	0.11	0.35	0.22	0.18	0.47	0.29
AVQ	0.51	0.28	0.61	0.47	0.18	0.67	0.39
AVR	0.30	0.00	0.37	0.09	0.08	0.29	0.18
APG	0.42	0.09	0.59	0.37	0.22	0.69	0.44
APH	0.47	0.10	0.58	0.33	0.41	0.65	0.47
APJ	0.40	0.00	0.46	0.31	0.38	0.67	0.53
APL	0.50	0.39	0.35	0.29	0.19	0.68	0.54
APM	0.33	0.00	0.39	0.22	0.33	0.53	0.35
APN	0.48	0.68	0.59	0.44	0.31	0.45	0.54
APG	0.42	0.38	0.37	0.22	0.66	0.47	0.62
APH	0.50	0.31	0.49	0.25	0.61	0.61	0.74
APJ	0.40	0.00	0.56	0.36	0.69	0.60	0.74
APL	0.42	0.19	0.46	0.29	0.51	0.37	0.59
APM	0.56	0.45	0.72	0.40	0.89	0.74	0.89
APN	0.46	0.34	0.65	0.20	0.68	0.65	0.79
DKD	0.56	0.03	0.68	0.50	0.48	0.69	0.69
DKL	0.37	0.00	0.41	0.13	0.50	0.44	0.56
DKN	0.62	0.76	0.73	0.41	0.81	0.84	0.75
National Average	0.46	0.28	0.53	0.31	0.44	0.59	0.56

4. INTERNAL ORGANISATION

In 2011, MoPoTsyo underwent a management review by Oly Shipp, a VSO volunteer working in THmar Pouk OD. The 15 page report contains findings and recommendations can be downloaded here http://www.mopotsyo.org/Highlight2010_Dec_2011_Feb/110331%20%20MoPoTsyo,%20External%20Review,%20Report%20%20%28Oly%20Shipp%29.pdf

The most important structural changes are for the Project Department, which needed to be strengthened in terms of administrative capacity. The project department oversees the work of the peer educators, checks their reports before they are submitted to the Financial Administration for payment. With the growth the numbers of patients and peer educators and peer educator activity, the reporting quality began to suffer. The reports had to be rejected creating delays in payments and frustration.

There were too many mistakes made in the assignment of ID codes to new patients. For this reason we had to recentralize the assignment of patient ID codes, preprint the books with the codes.

We contracted a professional database developer to improve our database as our membership grows fast.

Our medicine stock became too small in relation to the volume that we must order yearly. Also the project department was growing out of its room. For this reason we had to move to a bigger office. At the end of December 2011 we moved from our small office at 29D, Street 138, to number 262 in the same Street 138, a building with more office space and a lower price per m2.

In November 2011, the volunteers began to be paid through mobile banking using the system known as “wing payments”. The peer educator receives an SMS in his phone with a credit and a secret code. The code allows the peer educator to claim at one of the thousands small Wing outlets in the countryside the cash. MoPoTsyo has a contract with WING to make a monthly group payment to all peer educators in one OD. This practice lowers the fee and puts pressure on the peer educators within one OD to report all on time and correctly as one peer educator can delay the payment to all the others if the report is not acceptable. In 2012, a manager of all Peer Educators in the OD is going to help the peer educators with the reporting. This PE manager receives USD 5 per month per Peer Educator (per Health Center coverage area with a peer educator) for this activity.

5. DETAILS BY INTERVENTION AREA

A. THE URBAN SLUMS

Membership growth

The first activities of MoPoTsyo began in 2 slum areas in 2005. Now they cover 5 slum areas. There are 1398 patients registered since 2005. Of them only 14% (190) are hypertension patients (non-diabetic). The hypertension intervention for non-diabetics in the urban slums is not well developed.

FIGURE 25 URBAN MEMBERSHIP 2005 TO 2011

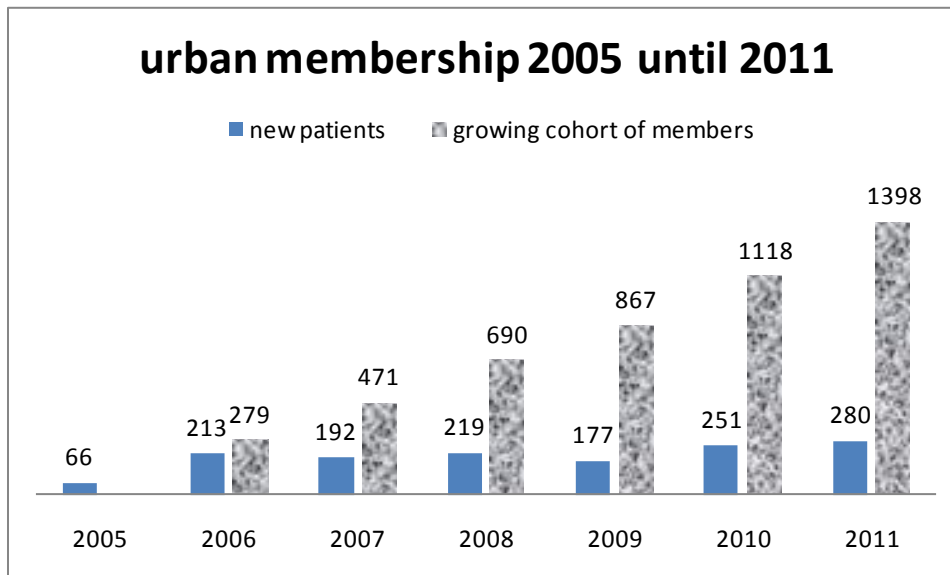
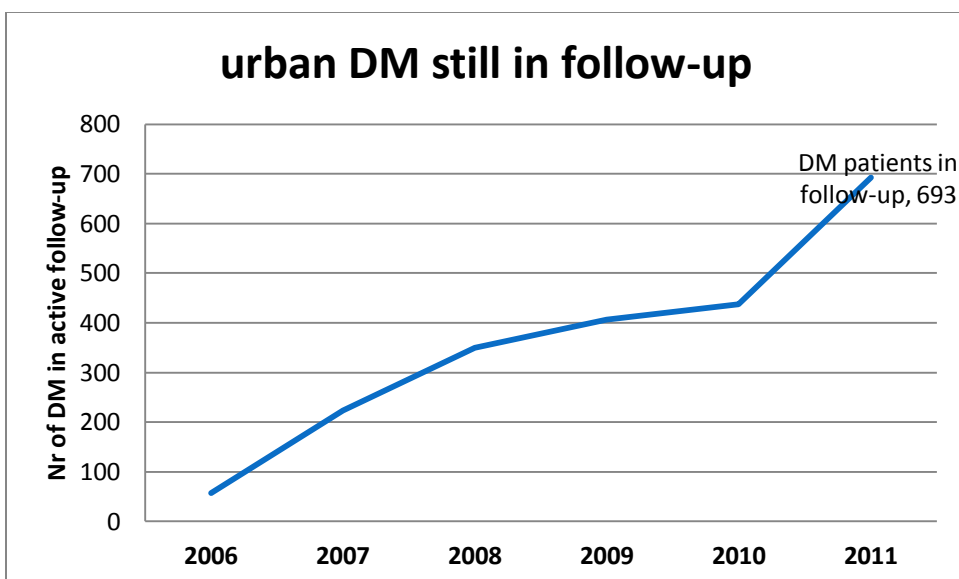


FIGURE 26 GROWTH OF URBAN COHORT OF PATIENTS IN FOLLOW-UP



The experiment with 7 high blood pressure groups in slum area and peri-urban setting of Anlong Kangan did not deliver the expected results for the 190 high blood pressure patients. The reason given by the staff is that in urban areas people have less “communal spirit” than in the rural villages. It is said to be less common to allow strangers into the house just to use a machine. Houses are locked and neighbors do not always get on well despite (or because?) living closer together with less space between the shacks than in the rural areas. So we may have run into a structural problem. For the results in the rural areas are slightly more promising as described in the chapters below. In urban areas a solution must be found which is convenient for people who cannot afford to buy their own automatic blood pressure machine. The original idea is to create a place close by where patients with high blood pressure can easily make use of a shared high blood pressure machine to check their blood pressure. The feedback is that the holder of the machine wants money to take care of it and money to allow other people to use it because they do not want all these strangers come into their house to use the machine. So where to put this machine in the urban low-resource setting so that there are no barriers to its use? That is the question that must still be answered.

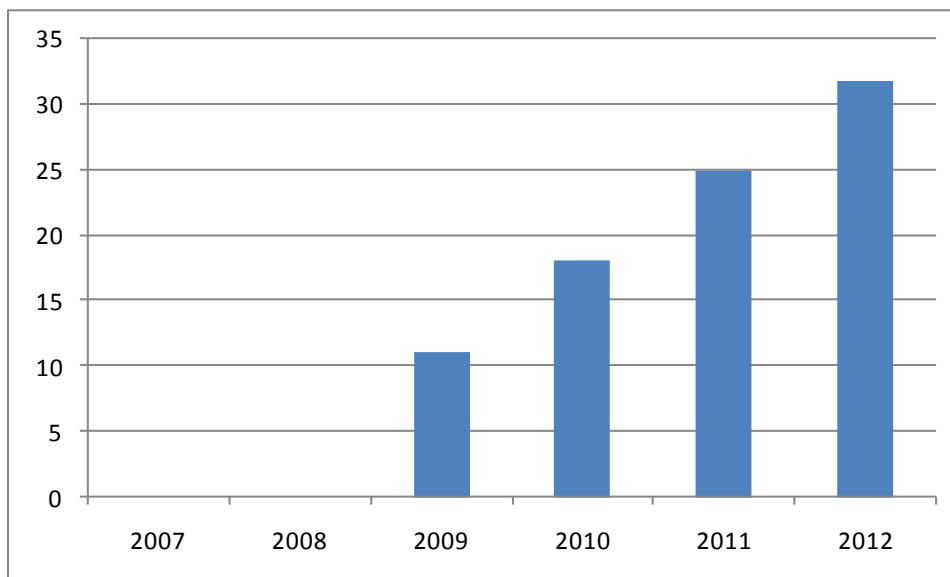
Urban Peer Educators

There are 5 peer educators. One more peer educator, number 6, 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. He will start in 2012 if we can find budget to support his work.

Medical Services in urban area

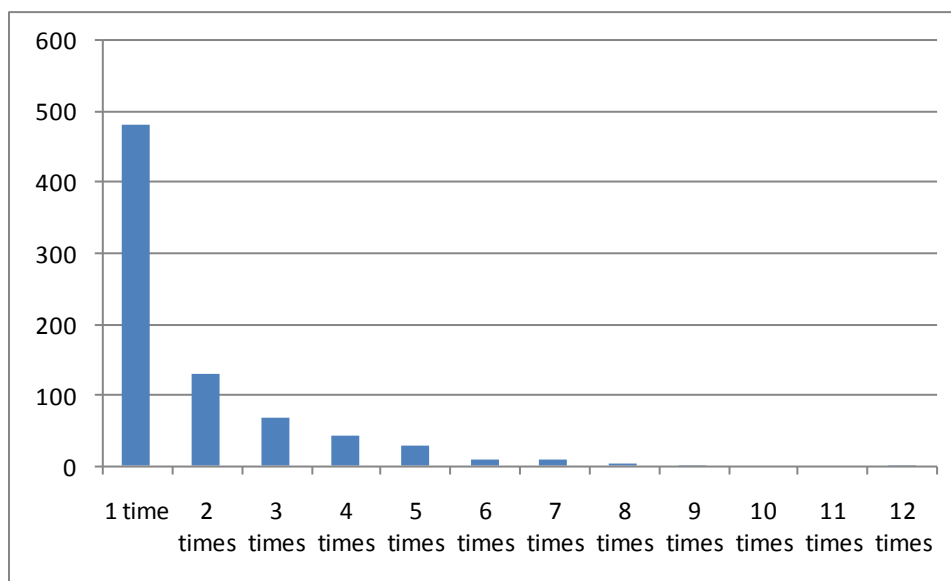
Laboratory services: Among the registered patients in the urban area 607 (43%) have used the laboratory service (927 times) to obtain their lab profile before they go for medical consultation. In the year 2011, the 441 lab profiles were provided to the urban members.

Average number of monthly “first prescriptions” in the urban area



The persons who have obtained their lab profile are using the medical consultation that is organised by the Peer Educators at the public hospital (Pochentong Referral Hospitals), on appointments. It is once a week for the membership only. The patient have to pay the user fee of 1500 riels per consultation. Most patients have to use it only once so they can get their prescription.

FIGURE 27 NUMBER OF TIMES PATIENTS HAVE USED THE MEDICAL CONSULTATION



Afterwards with their prescription they have access to the revolving drug fund. With the self-management skills that they learn from the peer educator, they can keep their blood pressure and blood sugar under control. They get regular follow up from the peer educator who lives close to their home. If the patient goes out of control, the peer educator will facilitate a new appointment at the hospital to change the prescription. This way, the doctor is not wasting his time on patients who can be counseled by the Peer educator.

Revolving Drug Fund use in urban area

Among those 607 patients with a lab test, there are 177 (29%) who bought their medication less than 5 times, 117 who bought between 5 and 9 times(19%), and 235 who bought more than 10 times (39%). There are 78 (13%) of whom we have no record as they may have other sources of their medication than the revolving drug fund (charity) or do not need medication to keep control.

In fact the implication of these percentages can only be understood if we know how long every patient had the prescription to buy medication routinely every month. That was not part of this analysis. However, the great majority of the invoice data are related to 2010 and 2011, so mostly the time span is 2 years, unless patients are newly registered in late 2010 and 2011.

Drop out rate in urban area has been on average 16% per year.

	location of slum		Total DM registered	2011	2010	2009	2008	2007	2006	2005
order	Phnom Penh	start date		new DM	new DM	new DM	new DM	new DM	new DM	new DM
2	Anlong Kangan. AK	2005-Jul-01	192	29	1	20	25	35	62	20
3	Boeung Kak2. BB	2006-Jan-01	197	25	4	20	21	44	83	-
1	Srash Chork. BK	2005-Jun-01	242	33	2	41	47	28	49	42
5	Borei Kela. BR	2007-Apr-01	123	22	10	21	34	36	-	-
4	Boeung Salang. BS	2007-Apr-01	88	17	3	10	8	49	1	-
6	PX		220	102	96	2	0	0	15	5
			1,062	228	116	114	135	192	210	67
still in follow up	2006		56	56						
	2007		224	176						47
	2008		349	161					148	40
	2009		407	113				135	124	33
	2010		437	96			95	114	105	28
	2011		693	228	97	80	80	96	88	24

The category PX are DM patients who do not live in the slums, so they are not detected by a peer educator and cannot be followed-up by a community-based peer educator. They have self-presented for counseling to the NGO, or they have been presented by another NGO to MoPoTsyo for follow-up.

The PX group is not included in the calculation of the drop out rate.

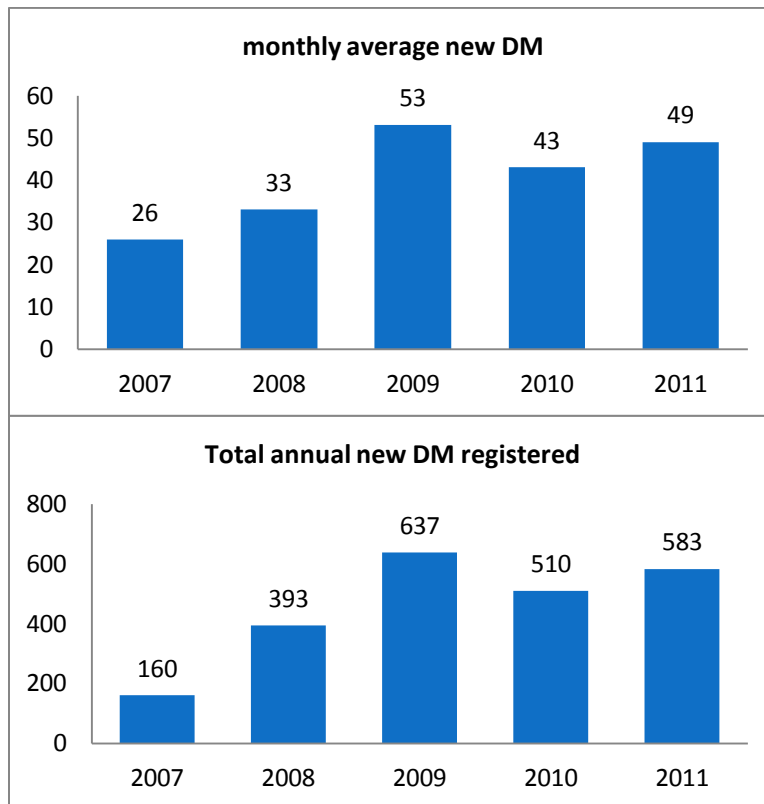
Drop out is influenced by the evictions in the slum areas Sras Chork (BK) and Boeungkak2 (BB) because the patients had to move out to areas far away where there is no peer educator follow up, such as Borey Santhepheap (7NG).

B. TAKEO PROVINCE WITH 5 OD'S

Membership growth

Diabetics: Almost 80% (2070 out of 2625) of the new people with Diabetes says that they are farmer. The others are mostly teachers, sellers, some monks, doctors and nurses, police and army and district authorities. There are 140 (5%) who do not give a profession (blank).

FIGURE 28 MEMBERS WITH DIABETES IN TAKEO PROVINCE



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

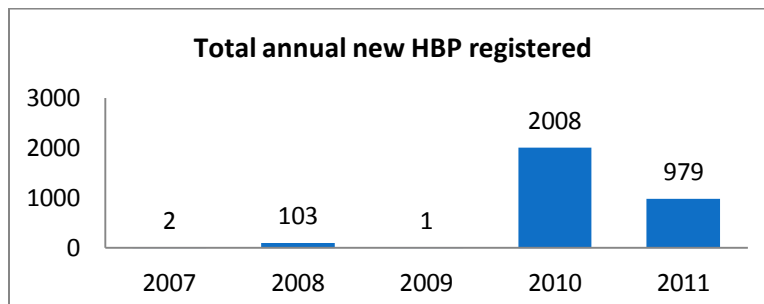
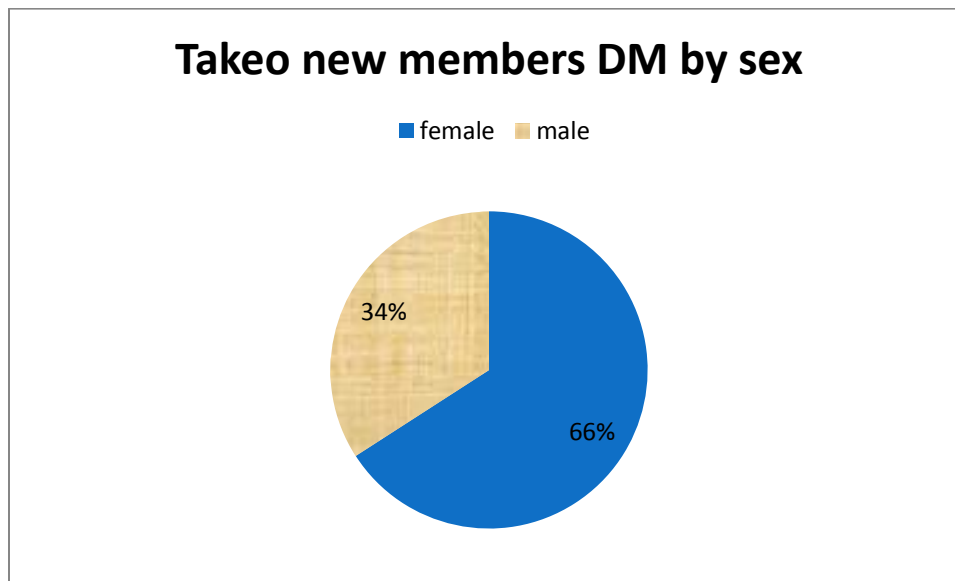


FIGURE 29 DM MEMBERS IN TAKEO BY SEX



Takeo province Primary Prevention

In Takeo province our Primary Prevention team of 6 peer educators 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 peer educators held primary prevention sessions in 49 schools, reaching 833 teachers of the more than 1100 who will be have been reached when this activity ends. It is funded by the World Diabetes Foundation as part of a grant (WDF09-463). Both these types of activities are successful and will be replicated to other areas in the coming years when funding becomes available.

Peer Educators in Takeo

The number of peer educators grew from 39 at the end of 2010 to 43 at the end of 2011. It is difficult to find suitable candidates to complete the network in the 5 OD's. We had to reinforce with administrative assistants the ability of the Peer Educators to do their "real" work, see above in "internal organization".

Medical Services

TABLE 15 USE & COST OF MEDICAL CONSULTATIONS

Takeo province in 2011

Total cost of consultations in Takeo	\$11,843
Number of consultations 6 Hospitals	3524
cost per consultation in Takeo	\$3.36
consultation sessions (mornings)	123
nr of patient per session	29
our cost per session in Takeo	\$96.28

The costs are not the same in every Operational District. In Kirvong OD, we held consultation at 2 different locations: at the Referral Hospital but also at Rominh Hospital, a former District Hospital.

TABLE 16 MEDICAL CONSULTATIONS IN 5 OD IN TAKEO

year 2011	Ang Roka	Doun Keo	Bati	Prey Kabass	Kirivong
1. Nr of patients who received Consultation	588	621	639	527	1149
2. Cost $[(nr3+nr4)*nr5]$	2106	1782	2268	2178	3509
3. Transportation	45	45	45	85	85
4. Fee per consultation for Doctor	36	36	36	36	36
5. Nr of time of consultation session	26	22	28	18	29
cost per consulting patient $(nr2/nr1)$	\$ 3.58	\$ 2.87	\$ 3.55	\$ 4.13	\$ 3.05

The numbers of patients who attend the consultation per session does not vary substantially among the 5 OD's. This is an important result of "Management of the Peer Educator Networks".

nr of consulting patients per session $(nr1/nr5)$	31	23	28	23	29
---	----	----	----	----	----

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.

Adherence:: Many patients with Diabetes or High Blood Pressure who have a prescription do not take all the medicines that have been prescribed. The graphs below illustrate this. It is not unusual to see this, and many countries have this problem, but it is not healthy and it should be improved.

FIGURE 30 ADHERENCE ANG ROKA BY 535 DIABETICS WITH A PRESCRIPTION

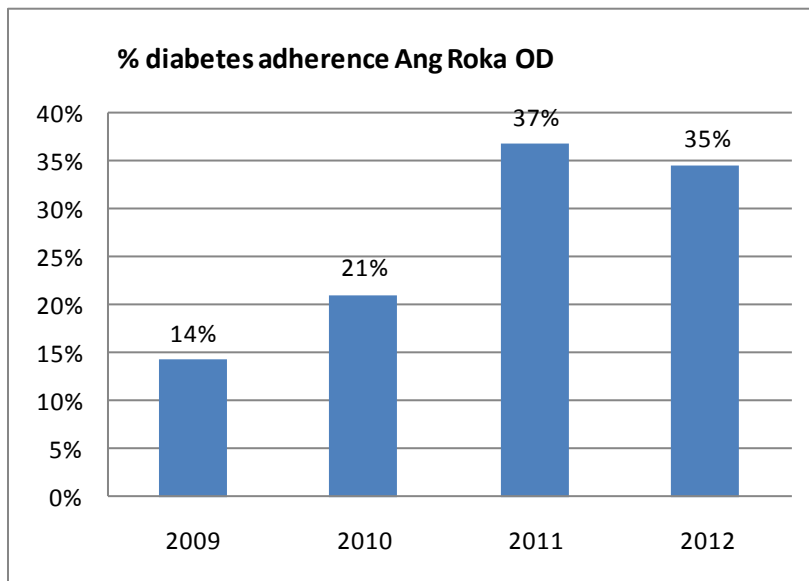
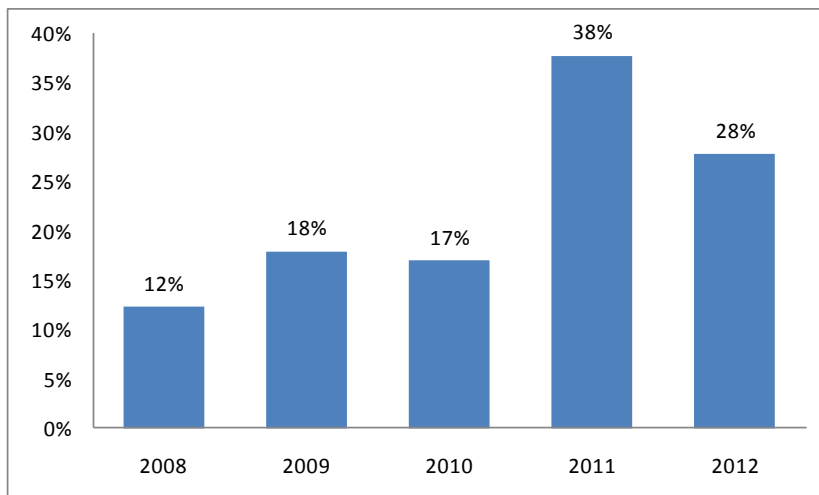


FIGURE 31 ADHERENCE IN ANG ROKA OD OVER TIME BY 211 HIGH BLOOD PRESSURE PATIENTS



However, In Ang Roka OD the adherence patterns of DM and HPB are strikingly similar. That is remarkable because normally the HBP patients buy less medication than DM patients. We can speculate that this might be related to a relatively large number of Village High Blood Pressure groups in Ang Roka OD. This should be investigated.

Partnership with CARITAS EYE CLINIC: Diabetic Retinopathy screening

In 2011, we tried for the first time to promote screening for Diabetic Retinopathy among the diabetes patients in Takeo. We made an agreement with CARITAS eye clinic. 59 patients suffering from diabetes type II and/or systemic hypertension were referred from community-based peer educators to Takeo Eye Hospital in 12/2010. All of them underwent detailed dilated eye examination.

Results of the screening were as follows:

57 of 59 patients with a median age of 54.9 (38-70) years reported that they had diabetes. The duration since diagnosis of diabetes was 4.7 (01-18) years, 52.5% were female patients. 8 patients (13.6%) were visual impaired (best-corrected VA <6/18-6/60 in the better eye), 1 patient (1.7%) was blind (best-corrected VA < 3/60 in the better eye). 13 patients (22.8%) suffered from diabetic retinopathy, most of it was of the mild (12.3%) or moderate (3.5%) type; CSME was diagnosed in 4 (7%) patients. There was no patient with proliferative diabetic retinopathy. 14 (23.7%) suffered from systemic hypertension. Other ocular diseases were mainly cataract (25.4%), pterygium (13.6%) and uncorrected refractive error (42.4%), mainly presbyopia. One patient with a hypertensive retinopathy stage III and a BP of 200/120 had to be referred as an emergency to a general hospital. 22.8% of referred patients with known diabetes suffered from early stages of diabetic retinopathy which is treatable. Given the fact that the duration of diabetes was only 4.7 years and the comparatively young population a likely significant increase in complications due to diabetic retinopathy might lead to further visual impairment and blindness in the future. As most of the patients didn't present again at the eye hospital for recommended follow-up, it will be a crucial part of the program to implement a reliable and sustainable follow-up system which is accessible especially for poor patients in rural areas in Cambodia.

Most of the patients didn't present at the hospital again for follow-up after 6 months. The reasons must be investigated but it is likely that they are not aware of the importance of this often a-symptomatic problem. Another problem is that some patients have to pay and others do not have to pay, depending on the assessment by the clinic staff. This creates uncertainty about the costs.

C. BANTEAY MEANCHEY PROVINCE WITH 1 OD: THMAR POUK

The area has been longer under the influence of conflict than other parts of Cambodia which became de facto stable already several decades ago. Other factors contributing to slower progress of our intervention than in other parts of Cambodia are the flooding and the renewed tensions with Thailand over the border itself and border related issues.

Despite this, during the year 2011, the membership doubled. It grew with 321 members to 647 chronic patients in total. Among all the members there are 204 patients with Hypertension. There are 443 Diabetics registered. There are 482 women among the 647 chronic patients (75%). That is 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 80% reports to be farmer when they register.

Peer Educators

The number of peer educators in Thmar Pouk grew from 5 to 7, leaving still 3 Health Center areas without a peer educator. It is difficult to find suitable candidates due to especially low rates of literacy in the area. This shows that years of protracted conflict have caused structural problems that slow down development.

Screening

The Peer educators have organised self-screening with urine glucose strips in the villages in their health center coverage areas. At the end of 2011, 38,798 adults in Thmar Pouk OD have self screened for presence of urine glucose by dipping the urine glucose strip into their urine two to three hours after having had a lunch. If the urine strip changes color, the Peer Educator will provide a free blood glucose test, either a Fasting Blood Glucose test, or a Postprandial Blood Glucose test.

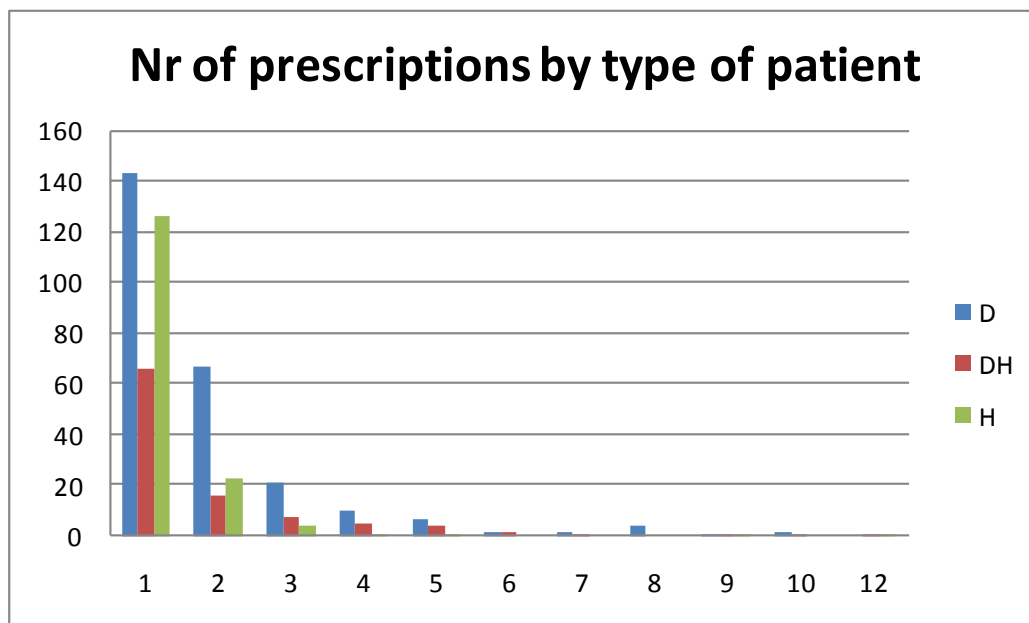
Medical Services

Among the 647 chronic patients, only 142 (22%) have used the laboratory services in 2011. The reasons are partly logistic. There were 6 members who used the lab twice and 1 who used it 3 times.

Among these 647 chronic patients, there are 521 who have a prescription (=80%). That is relatively high proportion.

The numbers of medical consultations increased. There were 335 medical consultations resulting in a prescription done in 2010, compared with 593 in the year 2011. Most patients have seen the doctor once or twice resulting in a prescription. A small number of patients went to see the doctor many times, up to 12 times.

FIGURE 32 NR OF PRESCRIPTIONS PER PATIENT



In the year 2010, the patients bought their medication 1,113 times, compared with 2,927 times in 2011.

There were 504 individual patients who bought 2,927 times, so that 5.8 times out of 12 times, showing an adherence of 48% among those with a prescription. Among 504 individuals, there are 133 non-diabetic hypertensive patients (26%) and 371 diabetics (74%).

Only 19% of the total invoices for non-diabetic hypertension patients, so the diabetics are more adherent, unsurprisingly.

78% of the 4,040 invoices in 2010 and 2011 is for female patients, confirming that the men do not access to the care system.

Thmar Pouk Partnership Project

MoPoTsy leads the secretariat of the Thmar Pouk Partnership Project. This is a collaborative project among private and public partners.

It consists of the following 3 public partners:

- the Operational District Thmar Pouk,
- The Provincial Health Department of Banteay Meanchey and
- the Ministry of Health in Phnom Penh,

and 3 private not for profit organisations:

- CAAFW, a community based health insurance organisation (NGO), based in Thmar Pouk OD
- Center for Advanced Studies (CAS), a research NGO
- MoPoTsy Patient Information Center

The purpose of the Partnership is:

“ The Community Based Health Insurance scheme in Thmar Pouk Operational District provides insurance coverage for health care benefits available for all households, including for the district’s poor level 1 and poor level 2 and including for the household members with Diabetes (DM) and High Blood Pressure (HBP), as part of Annual Operational Plan and with enough government subsidy to be financially sustainable”.

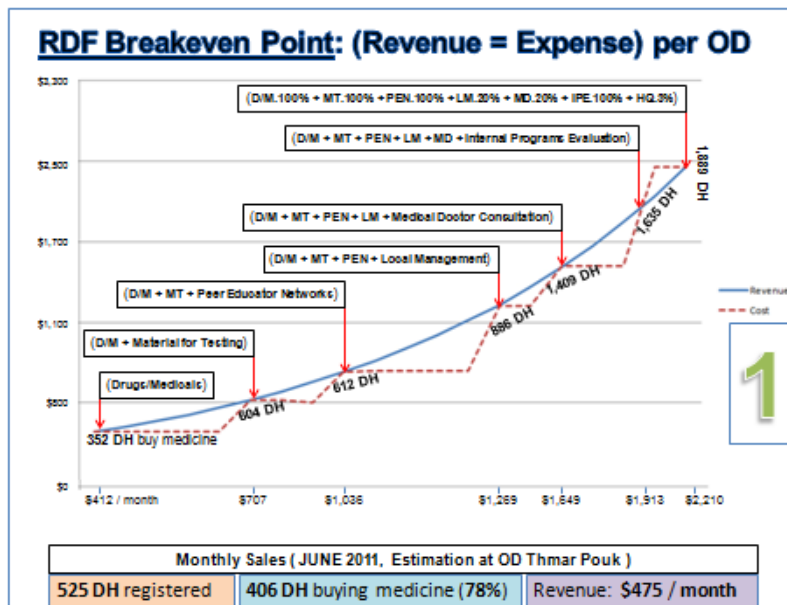
During 2011, the partnership was implemented in pursuit of its purpose, be it with delays. Progress can be followed through the website: http://www.mopotsyo.org/TPPS_Web/Moa_Home.html

The secretariat of the partnership is managed by MoPoTsy. It is in charge of sub contracting to other NGO’s the activities that are necessary for the implementation of the partnership project, notably the Identification of Poor Households in the operational district Thmar Pouk.

The Secretariat sub contracted Partners For Development to carry out the Identification according to the guidelines of the Ministry of Planning. The data were entered into the national database, the ID cards were printed and distributed in 2010 and 2011.

(http://www.mopotsyo.org/TPPS_Web/Result_June_July,2011.html)

During the workshop of Thmar Pouk Partnership held on 26 August 2011 in Phnom Penh the progress



was reviewed from the perspective of the financial sustainability of the Peer Educator Networks. Thanks to a growing membership and use of medical services, the Peer Educator Network and services can be financed. Continued membership growth and access to affordable services are important conditions for the intervention to succeed in the long term.

D. KOMPONG SPEU PROVINCE WITH 1 OD: KONG PISEY

This project is funded by a grant from AUSAID.

Membership growth

In 2010, 194 chronic patients had been assessed and registered, compared with 680 new patients who became member during the year 2011. There are 874 chronic patients registered at the end of 2011. Among them 42% is older than 60 years (born before the start of calendar year 1953).

Among the 874 members, there are 451 Hypertensive (52%) and 423 diabetic (48%).

Peer Educators in Kong Pisey OD

The number of Peer Educators grew from 9 at the end of 2010 to 16 at the end of 2011. They are led by Diabetes Peer Educator Manager. There are still 3 HC areas without a peer educator at the end of 2011.

Screening

The Peer educators have organised self-screening with urine glucose strips in the villages in their health center coverage areas. At the end of 2011, 33,991 adults in Kong Pisey OD have self screened for presence of urine glucose by dipping the urine glucose strip into their urine two to three hours after having had a lunch. If the urine strip changes color, the Peer Educator will provide a free blood glucose test, either a Fasting Blood Glucose test, or a Postprandial Blood Glucose test.

Medical Services

Among the 647 chronic patients with a prescription, 59% (380) is diabetic, and 41% (267) is non-diabetic hypertensive.

A total of 361 lab profiles were done for the registered patients. In total 320 individual patients benefited from these lab profiles (some used the service twice). Diabetics make more use of the laboratory services because 181 (57%) was done for diabetics, compared with 139 (43%) for hypertensive patients. The laboratory service helps to determine who should go for medical consultation.

By the end of 2011, 43% (281) of the 647 chronic patients who have a prescription has used the laboratory service: Diabetics 45% and Hypertensives 42%.

In 2011, medical consultations were organised for the members at the Kong Pisey Referral Hospital on Saturday mornings. In total 1521 medical consultations were provided during 2011, compared with only 91 at the end of 2010. The average monthly number of medical consultations is 127.

71% of the consultations is for people with Diabetes, whereas 29% is for non-diabetic hypertensive people. This shows that the diabetics make more use of the medical consultations than the people with high blood pressure. This is not unusual.

63% of the consultations is for female chronic patients.

Only (512) 32% of the all the chronic patients (1612) who came for consultation are older than 60 years which shows that they have significantly more difficulty to access the medical consultations. If their access were equitable, their number should have been at least proportionate (42%) at 677 medical consultations out of the total. In fact, one would expect that they would be over represented as hypertension rises with age. The figures suggests that a quarter did not access the service, possibly related to age barriers.

Result of re-assessments

In July 2011, the hypertension patients were assessed in 3 health center coverage areas (respectively 19, 11 and 19 patients). It was the first time. For the results see above in chapter 3 Outcomes and their measurement.

6. PLANNING FOR 2012 AND BEYOND

- Prepare a plan to submit officially to Ministry of Health to fund continuation and expansion of Peer Educator Networks to other OD's in Cambodia. In 2011, the Joint Annual Program Review of Ministry of Health and its Development Partners decided to put the continuation and expansion of Peer Educator Networks as a priority strategy for NCD.
- Expand the scope of laboratory services with urine analysis both in our office and in the outreach services, so urine protein and or albumin can early detected. Chronic Kidney Disease can be early diagnosed and treated.
- Create a follow-up system for members-patients who have been found to have Diabetic Retinopathy and pilot this system with institutions who provide screening and treatments for such patients.
- Prepare special contracts for the public service so they can dispense the revolving drug fund medicines to our members. The MoH has requested MoPoTsyo to expand the Revolving Drug Fund but to dispense through the public service.
- Develop research capacity by joining in the first multicountry study, funded by International Diabetes Federation, with technical input from Antwerp Tropical Institute.
- Create a supervision guideline for Peer Educator Networks, which can be used by the Operational District Managers who is counterpart of MoPoTsyo and co-manager.
- Participate in the Health Financing Conference that will be held in Phnom Penh with scientific contributions based on our own experience with Peer Educator Networks.
- Expand to Baray Santuk OD in Kompong Thom province.
- In Thmar Pouk OD, create a link between the Peer Educator Network and the Community Based Health Insurance of CAAFW.
- Prepare for more involvement of Operational District Managers in the management of the Peer Educator Networks.
- Review and improve the monthly progress indicators.

7. PROFILE OF PATIENTS REGISTERED IN 2011

FIGURE 33 BMI OF NEW DIABETICS

the assessments entered in 2011	total BMI N=	748	
over	>23.0	313	42%
	>25.0	167	22%
	>27.5	69	9%
under	<18.5	118	16%
	<23.0	436	58%
normal	18.5 to 23.0	318	43%
Diabetics (without HBP)	Under+normal+overweight	749	100%

FIGURE 34 BMI OF NEW HYPERTENSIVE DIABETICS

the assessments entered in 2011	total BMI N=	559	
over	>23.0	311	56%
	>25.0	181	32%
	>27.5	87	16%
under	<18.5	50	9%
	<23.0	248	44%
normal	18.5 to 23.0	198	35%
Hypertensive Diabetics	Under+normal+overweight	559	100%

FIGURE 35 BMI OF NEW HYPERTENSIVES (NOT DIABETIC)

the assessments entered in 2011	total BMI N=	1390	
over	>23.0	537	39%
	>25.0	274	20%
	>27.5	118	8%
under	<18.5	243	17%
	<23.0	854	61%
normal	18.5 to 23.0	611	44%
Hypertensive (but not diabetic)	Under+normal+overweight	1391	100%

Profile of the laboratory use by patients in 2011 (most are diabetic)

FIGURE 36 LABORATORY SERVICE USERS BY SEX

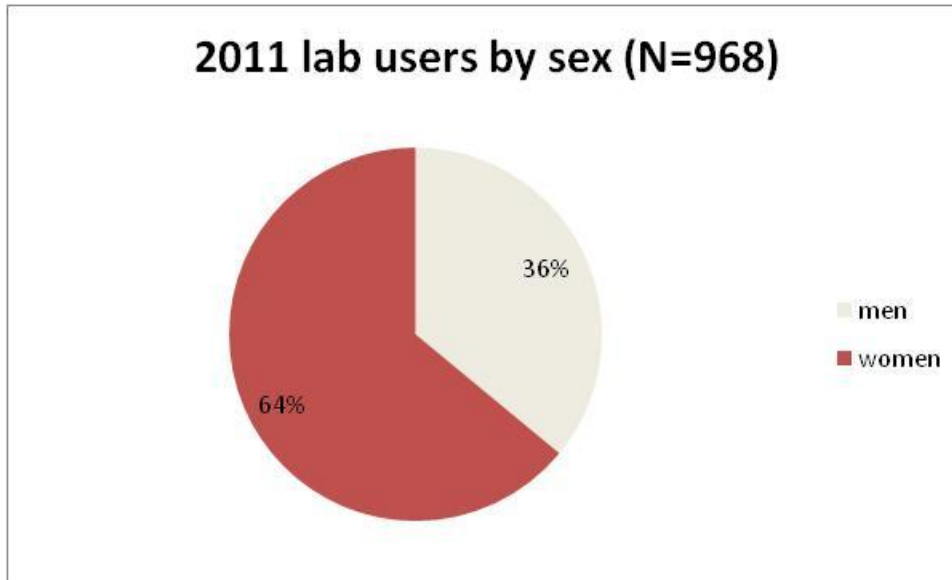
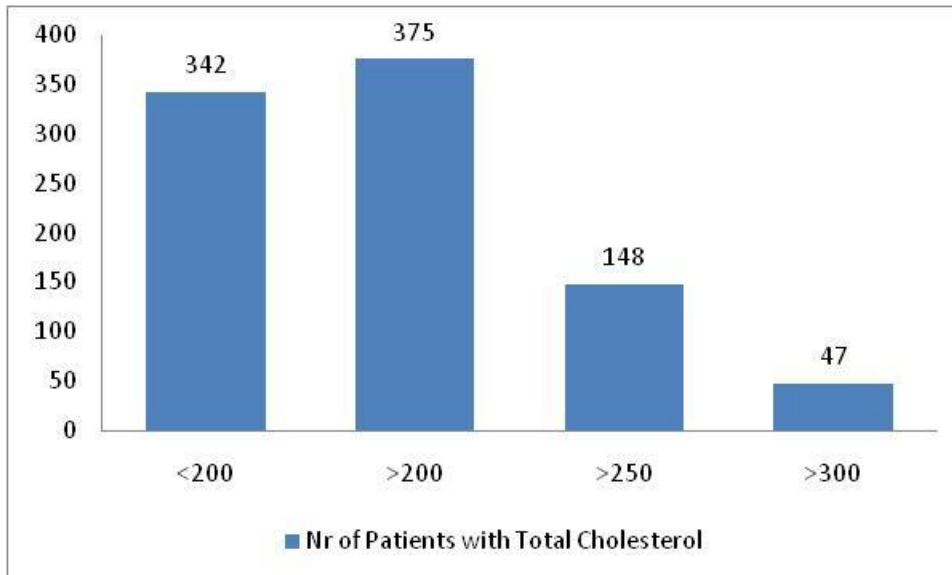


FIGURE 37 NUMBERS OF PATIENTS PER CATEGORY TOTAL CHOLESTEROL



With total cholesterol over 250 mg/dl about 1 in 5 of our members may indeed need a statin but just as important requires pharmaceutical treatment of blood pressure also if it is below 160/100 mm Hg. The revolving drug fund has generic simvastatin to treat the elevated serum cholesterol. The early detection of elevated serum cholesterol is important cornerstone of prevention, especially in people who are not old, because it is the long term that causes the irreversible damage. With the lab team outreach it is possible and cost effective.

FIGURE 38 TOTAL CHOLESTEROL AMONG 967 DIFFERENT PATIENTS IN 2011 BY PERCENTAGE

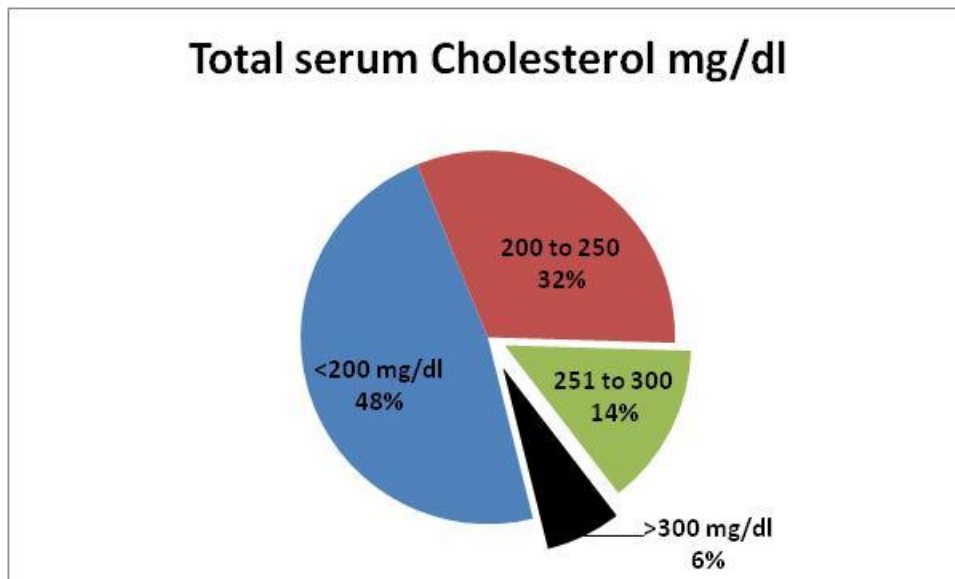
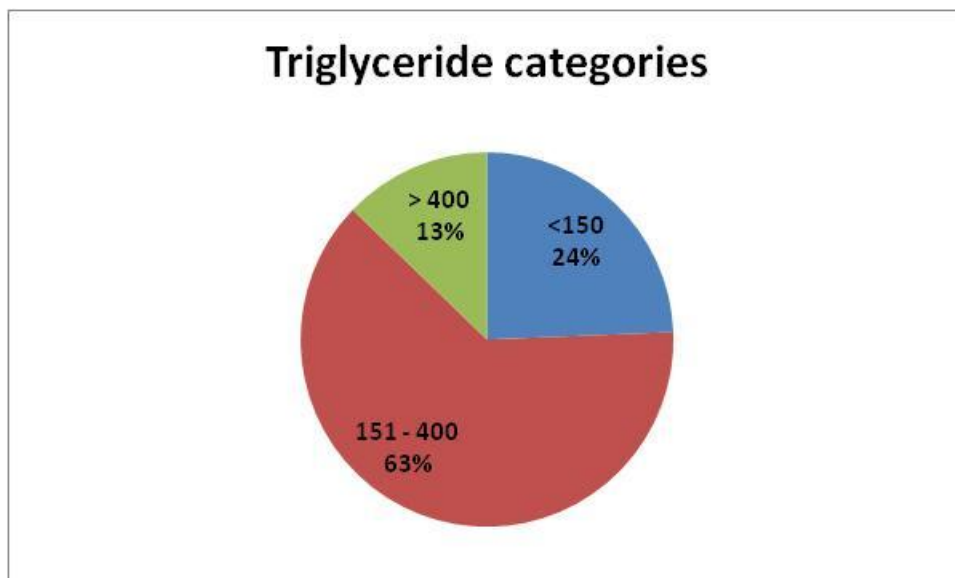


FIGURE 39 TRIGLYCERIDE BY CATEGORY AMONG 944 DIFFERENT PATIENTS



Triglyceride is raised typically among Diabetic persons because of alcohol (mis)use and Cambodia's highly glycemic white rice (fast sugars/carbohydrates). It must only be pharmaceutically treated once the blood sugars are normalized through lifestyle and anti-diabetic medicine. An exception must be made when it is higher than 400 mg/dl because of the risk of pancreatitis. Gemfibrozil is available in our Revolving Drug Fund to treat patients with very high levels of Triglycerides. It is a bit expensive, although it is generic, but still a much more affordable drug of choice than the expensive fenofibrates from Vietnam and France that dominate the Cambodian market.

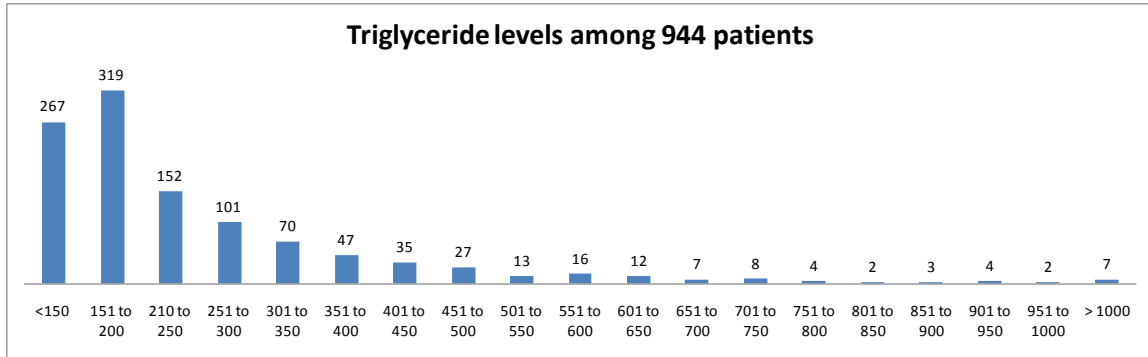
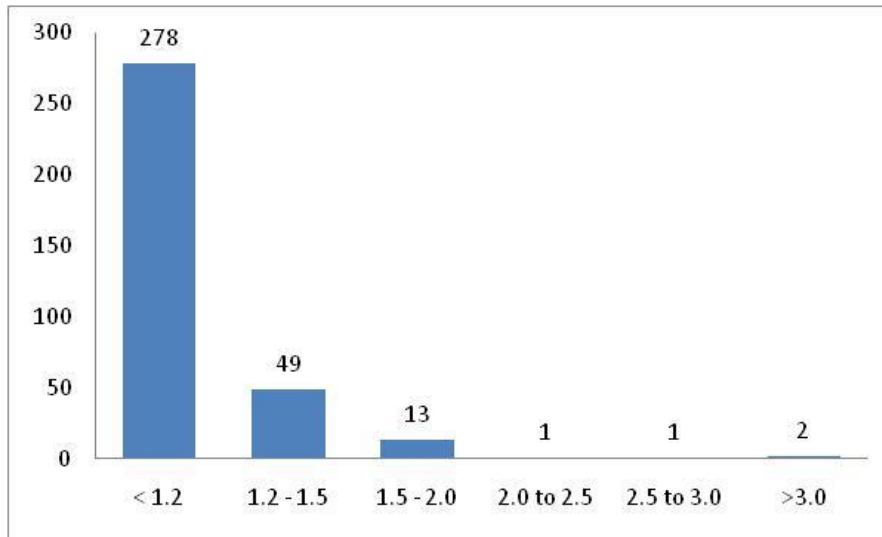


FIGURE 40 CREATININE LEVELS AMONG MALE PATIENTS IN 2011



19% of 344 male patients show elevated serum creatinin in 2011. Almost all are diabetic. The medication in our revolving drug fund that is used to treat slightly elevated levels of creatinin is Captopril, Enalapril and Losartan.

FIGURE 41 SERUM CREATININ IN MALE PATIENTS

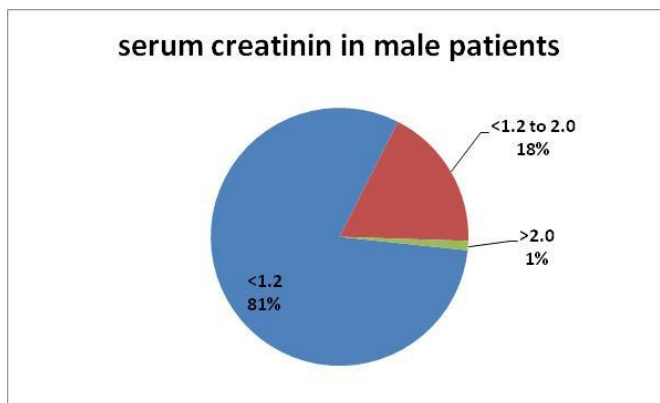
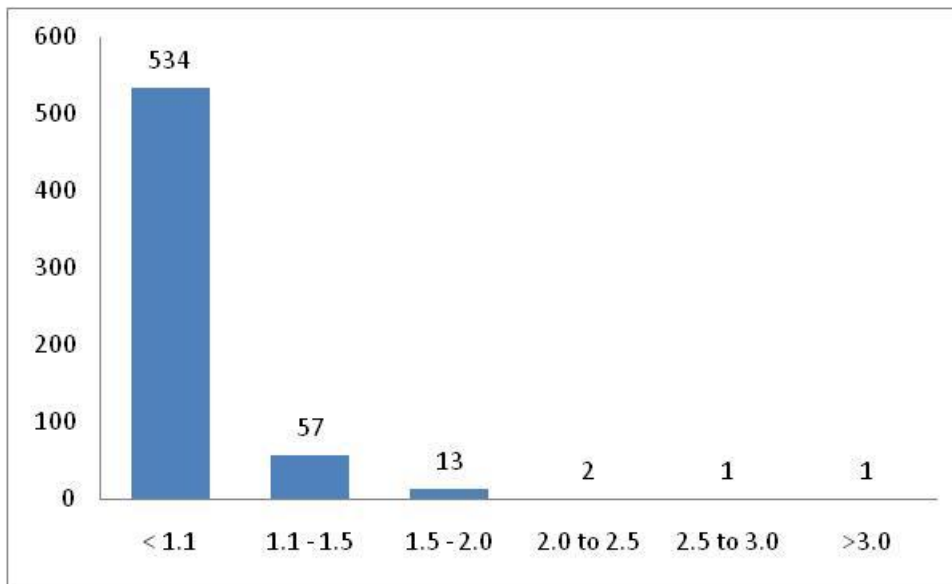


FIGURE 42 RESULTS OF SERUM CREATININ IN 608 FEMALE PATIENTS



88% of the female patients (almost all are Diabetic) still has a normal creatinin value.

As proportion: 12% of 608 female patients have elevated serum creatinin

FIGURE 43 SERUM CREATININ IN FEMALE PATIENTS

