Table 1 Characteristics of unused medication owners

	N	% (N = 523)
Gender		
Male	224	42.8
Female	299	57.2
Age		
0-5 years	115	22.0
6-18 years	100	19.1
19-40 years	155	29.6
41-60 years	102	19.5
61-95 years	51	9.8
Education:		
Pre-school children	95	18.1
Kindergarten	28	5.4
Primary school	201	38.4
Secondary school	84	16.1
Diploma	45	8.6
Bachelor degree or higher	35	6.7
Adults without formal education	24	4.6
Not answer	11	2.1
Occupational		
Pre-school children[*]	95	18.2
Students	132	25.2
Agriculture	61	11.7
Business	52	9.9
Labor worker	51	9.8
Civil servants	27	5.2
Housewives	69	13.1
Retirement	36	6.9
Religious		
Buddhist	428	81.8

	N	% (N = 523)
Islamic	95	18.2
Habitat		
Rural area	317	60.6
Urban area	206	39.4
Chronic diseases		
No	401	76.7
Having chronic diseases	122	23.3

* Pre-school children were too young to include in any occupation.

Table 2 Quantities of unused medications

	No. of items	Quantities	Costs (Bahts)
Tablets or capsules	636	11,228 tablets	9904.4
Oral powder	4	55 grams	24.7
Oral liquid ﹕	311	16,494 ml	4274.5
Topical liquids	14	671 ml	83.5
Eye drops	23	390 ml	486.3
Creams	5	130 grams	148.0
Inhalers	2	400 doses*	376.0*
	995	-	15,297.4

* Medication never be used, it was costed as full doses.

Table 3 Statistical data of unused medications

	N	Mean ± SD	Median	Min-Max
Number of medication items				
per person	523	1.9 ± 1.2	1.0	1-13
per household	453	2.2 ± 1.7	2.0	1-18
Number of oral doses				
per medication item	995	15.1 ± 38.4	9.0	1-855
per person	504	28.4 ± 57.9	15.0	1-868
per household	440	32.3 ± 61.5	17.5	1-868
Cost of medications				
per medication item	995	14.8 ± 51.5	4.7	0.1-912.0
per person	523	27.5 ± 81.8	9.0	0.01-1155.4
per household	453	31.4 ± 89.0	9.8	0.01-1155.4

Table 4 Total costs of unused medication categorized by pharmacological classification

Pharmacological class	Costs of unused medications (bahts)
Anti-infective drugs*	5,208.2
Gastro-intestinal drugs	2,859.4
Respiratory drugs	2,279.4
Muscular and joints drugs	1,805.4
Allergy and immune drugs	783.9
Vitamins and minerals	536.8
Central nervous system drug	380.0
Cardiovascular drugs	359.6
Others[†]	1,084.7
Total	15,297.4

* Antibacterial, anti-fungal and anthelmintics

[†] Dermatologicals, opthalmics, hormone and metabolic drugs

Table 5 Types of unused medications

	% N = 995	No. of oral doses[*]			Medication costs (Bahts)		
		Mean ± SD	Median	Min-Max	Mean ± SD	Median	Min- Max
Medication names							
Paracetamol	137 (13.8)	8.4 ± 6.0	8.0	1-34	3.2 ± 2.2	2.7	0.1-12.9
Chlorpheniramine	76 (7.6)	14.5 ± 8.8	12.0	2-48	2.4 ± 2.9	1.6	0.1-22.7
Amoxycillin	69 (6.9)	11.0 ± 7.8	8.0	2-40	20.1 ±14.6	14.6	3.2-64.0
Penicillin V	28 (2.8)	11.9 ± 7.4	10.0	1-39	7.8 ± 5.1	6.5	0.7-28.1
Cloxacillin	27 (2.7)	11.0 ± 10.1	7.0	1-40	31.6 ± 35.8	22.5	1.3-40.0
Dosage forms							
Tablet & capsule	641 (64.4)	17.8 ± 45.7	10.0	1-855	15.8 ± 38.8	4.3	0.1-514.8
Oral liquids	308 (31.0)	9.0 ± 7.4	7.0	1-50	13.9 ± 71.7	5.6	0.5-912.0
Oral powder	4 (0.4)	4.0 ± 0.0	4.0	4	6.2 ± 4.7	3.8	3.8-13.3
Eye drops	24 (2.4)	-	-	-	21.1 ± 19.5	16.2	0.1-65.0
Topical liquids	14 (1.4)	-	-	-	5.9 ± 8.4	3.4	1.3-32.0
Inhalers	2 (0.2)	-	-	-	-	-	131.0-245.0
Cream	4 (0.4)	-	-	-	19.6 ± 50.8	12.0	1.2-120.0
Pharmacological classification							
Respiratory	237 (23.8)	11.5 ± 10.2	9.0	1-90	10.2 ± 58.2	3.72	0.1-876.0
Muscular and joints	231 (23.2)	9.6 ± 9.4	8.0	1-104	7.5 ± 18.6	3.37	0.1-228.6
Anti-infective	191 (19.2)	18.3 ± 50.0	8.0	1-419	26.4 ± 49.9	12.2	0.7-514.8
Gastro-intestinal	131 (13.2)	13.1 ± 14. 7	9.0	1-122	22.7 ± 89.6	22.7	0.1-912.0
Vitamins & minerals	69 (7.0)	36.0 ±103.1	15.5	1-855	6.3 ± 9.2	2.6	0.1-51.8
Central nervous system drugs	38 (3.8)	13.8 ± 13.3	9.0	3-60	10.6 ± 26.9	2.2	0.3-128.5
Cardiovascular drugs	22 (2.2)	31.2 ± 49.1	12.5	2-194	16.8 ± 30.3	3.9	0.1-122.7
Allergy & immune	21 (2.1)	13.3 ± 5.9	11.0	7-25	21.3 ± 42.8	4.8	0.4-176.7
Others	55 (5.5)	21.0 ± 49.8	6.0	2-200	18.7 ± 38.8	5.7	0.1-245.0
Continuity of medication							
As needed	743 (74.7)	15.6 ± 42.5	9.0	1-855	11.3 ± 43.2	3.7	0.1-912.0
Continuously	242 (24.3)	13.7 ± 23.3	8.0	1-200	25.7 ± 70.0	10.5	0.4-876.0
Payment							
Free	579 (58.2)	17.6 ± 48.9	9.0	1-855	15.9 ± 53.0	5.0	0.1-912.0
Pay	416 (41.8)	12.1 ± 16.7	8.0	1-200	14.2 ± 51.5	4.5	0.1-876.0
Sources [†]							
Governmental	794 (79.8)	16.5 ± 42.9	9.0	1-855	16.4 ± 57.3	4.8	0.1-912.0
Private	201 (20.2)	9.6 ± 7.9	8.0	1-50	9.7 ± 16.6	4.4	0.1-140.0

*Eye drops, topical liquid, inhaler, cream could not be calculated as number of doses

† Governmental sources were governmental hospitals and primary health care units, the private sources means private hospitals or clinics or community pharmacies

Table 6 Variables in the regression analysis

Variable	Range and label
Age	0.08 – 95 years
Sex	1-2; male = 1, female = 2
Religious	1-2; Buddhist = 1, Islamic = 2
Habitat	1-2; rural = 1, urban = 2
Chronic disease	0-1; no chronic disease = 0; having chronic disease = 1
Dosage form	0-1; not tablet or capsule = 0; tablet or capsule = 1
Continuity of medication	0-1; medications used when needed (prn) = 0, continuously = 1
Medication payment	1-2; free = 1, pay = 2
Sources	1-2; governmental sectors = 1. private sectors = 2
Reason for not using medication as shown in table 7	0-1; no = 0, yes = 1

Table 7 Reasons for unused medications from interviewing medication owners

	% (N = 995)		
	Yes	No	Not sure
Attitude to patient's' perception			
Symptoms or disease had resolved, so the medications were useless	73.5	22.1	4.4
Mild diseases and it was not necessary to take all received medications	30.9	57.5	11.6
The medications were not effective	14.2	74.4	11.4
Boring for long term medication usage	7.8	79.3	12.9
Forget to use medications	9.1	79.8	11.1
Attitude to dispensers			
Dispenser did not tell to use all of medications	15.2	73.4	11.4
Dispensers did not inform indication of usage	8.4	82.0	9.7
Attitude to medications			
Receiving too many medication items in one occasion	9.1	81.2	9.7
Too frequent medication in each day	4.9	83.2	11.9
Too much of medication quantities	21.1	71.4	7.5
Color, shape and size of medications were unpleasant	6.6	83.1	10.3
Experience of side effects or medication allergy	6.2	84.2	9.6
Thought that medications were expired	11.9	77.0	11.1

Table 8 Factors associated the reasons for not using medications

	Beta	SE	P value
Attitude to patients' perception			
-Resolve of symptoms or disease, so the medications were useless			
Age	-0.0217	0.0040	0.0000
Gender	-0.4009	0.1792	0.0252
Having chronic disease	-1.1485	0.1847	0.0000
Continuity of medication	-0.4121	0.1748	0.0184
-Mild diseases, it was not necessary to take all received medications			
Age	-0.0211	0.0049	0.0000
Gender	0.3706	0.1567	0.0290
Chronic diseases	-0.5344	0.2004	0.0077
Medication payment	-0.5397	0.1815	0.0030
Attitude to dispensers			
-Dispenser did not tell to use all of medications			
Age	-0.0124	0.0045	0.0065
Religious	0.5385	0.2250	0.0167
Chronic disease	0.4465	0.2201	0.0425
Source of medication	-0.8045	0.2877	0.0052
Attitude to medications			
-Too much of medication quantities			
Gender	0.5236	0.1744	0.0027
Habitat	0.6404	0.1718	0.0002
Source of medication	-0.6088	0.2308	0.0083

Table 9 Factors affecting number of oral doses of unused medication at home

	Standardized Beta-Coefficients	t-value	P value
Age	0.096	2.765	0.006
Having chronic disease	0.085	2.445	0.015
Continuity of medication	0.102	3.053	0.002
Source of medications	-0.089	-2.683	0.007
Constant		14.380	.000

Adjusted $R^2 = 0.044$; n = 995

Table 10 Factors affecting cost of unused medication at home

	Standardized Beta-Coefficients	t-value	P value
Habitat	0.111	3.542	0.000
Having chronic disease	0.043	1.375	0.169
Continuity of medication	0.319	10.186	0.000
Source of medications	-0.035	-1.121	0.263
Constant		.459	.646

Adjusted R^2 = 0.115; n = 995

For Peer Reviewer

Data Collection Form for households which all resident use all receiving medications and those that throw away unused medications

Survey area : ( ) Hat Yai ( ) Tepa ( ) Khuanniang ( ) Ranode ( ) Jana

Village ………………District…………………….Date…………………….

Please fill in the household number and mark with / in a column "all medication be used" or in a column "throw away unused medication before surveying".

Household number	All medications be used (/ for yes)	Throw away unused medication before surveying (/ for yes)	Reasons for throwing away unused medications

DATA COLLECTION FORM FOR UNUSED MEDICATIONS AT HOME

Recommendation for surveyors

Please inform interviewees with this statement

"We come from Faculty of Pharmaceutical Sciences, Prince of Songkla University. We are studying unused medications left at home. If you or member in this household have any unused medications, please let us take these unused medications to further study at Faculty of Pharmaceutical Sciences. And we would like to interview the medication owner for some questions, if you gladly permit so."

When medication owners (or parents in case of children less than 12 years) give you their medications, you record data as in the data collection form and interview for the reasons of not taking all received medications

Data collection form   (Date...........................)

1. Survey area :

    ( ) Hat Yai ( ) Tepa ( ) Khuanniang   ( ) Ranode   ( ) Jana

2. Household number .... Village.........................District.................

3. Number of unused medication item .... as the following

   1.Medication name.........Medication owner......Source of medication..............

   2.Medication name.........Medication owner......Source of medication..............

   3.Medication name.........Medication owner......Source of medication..............

   4.Medication name.........Medication owner......Source of medication..............

   5.Medication name.........Medication owner......Source of medication..............

   6.Medication name.........Medication owner......Source of medication..............

   7.Medication name.........Medication owner......Source of medication..............

   8.Medication name.........Medication owner......Source of medication..............

   9.Medication name.........Medication owner......Source of medication..............

   10.Medication name.........Medication owner......Source of medication..............

When you have finished interviewing, please put all unused medication of each owner into a small bag with a label of the name of medication owners and put all small bags of each household into a large bag. Please label as the following:

Unused medications from

household number ....Village......District...............Date...............

Interview form no.........

Reasons for not Taking All Received Medications

Please check / in the bracket

1. Gender   ( ) Male   ( ) Female

2. Age...............years

3. Education

    ( ) No formal education   ( ) Primary school

    ( ) Secondary school   ( ) Diploma

    ( ) Bachelor degree   ( ) Higher than Bachelor Degree

    ( ) Other ....

4. Religious

    ( ) Buddhist   ( ) Islam   ( ) Christian   ( ) Others ....

5. Occupation

    ( ) Agriculture ( ) Business ( ) Civil servants ( ) Labor worker

    ( ) Others.................

6. Having chronic disease

    ( ) No

    ( ) Have (Please specify).........having this disease for.............years

    ( ) Have (Please specify).........having this disease for.............years

    ( ) Have (Please specify).........having this disease for.............years

7. Having the right for welfare payment or other fringe benefit

    ( ) No

    ( ) Having welfare payment..................

    ( ) Civil servant

    ( ) Other...................

8. Name of unused medication...

    Payment of this medication   ( ) Free   ( ) Pay

9. Reasons for not taking each items of unused medications (Answers could be made with several reasons)

Ask medication owners "Why this medication is not used?" Please mark X as medication owners' statements

	Reasons	Yes	No	Not sure	Remark
	9.1 Symptoms or disease had resolved, so the medications were useless				
	9.2 Mild diseases and it was not necessary to take all received medications				
	9.3 The medications were not effective				
	9.4 Boring for long term medication usage				
	10.5 Forget to use medications				
	Attitude to dispensers 9.6 Dispenser did not tell to use all of medications				
	9.7 Dispenser did not emphasize to use all of medications				
	9.8 Dispensers did not inform indication of usage				
	Attitude to medications 9.9 Receiving too many medication items in one occasion				
	9.10 Too frequent medications in each day				
	9.11 Too much of medication quantities				
	9.12 Color, shape and size of medications were unpleasant				
	9.13 Experience of side effects or medication allergy				
	9.14 Thought that medications were expired				
	9.15 Others……				

Note: Question 7 were removed from running logistic regression analysis of these reasons and patient background factors because question 6 and question 7 are highly correlated with R = 0.724.