REFERENCES

Adrian Towse, Anne Mills and Viroj Tangcharoensathien. (2004). Learning from Thailand's health reforms. **British Medical Journal**. volume 328, pp. 103-105. [Online].Available from: http://bmj.bmjjournals.com/cgi/reprint/328/7431/103

Boonjai Srisatitnarakoon. (2001). **Research methodology in nursing**. 1st edition. Bangkok. Chulalongkorn university press. pp. 219-227.

Boonruen Chaichana. (2002). **Cost analysis of nursing service activity based on activity-based costing system: in-patient units, yuwaprasatwaitayopathum hospital.** Thesis for master of nursing science in nursing administration Faculty of nursing. Chulalongkorn university.

Brian Aird. (1996). Activity-based cost management in health care another fad?. **International Journal of Health Care Quality Assurance**, pp.16-19. United Kingdom MCB University Press. [Online].Available from http:// juno. emeraldinsight.com/vl=973292/cl=60/nw=1/rpsv/~1196/v9n4/s3/p16

Chaisit Chalermmeeprasert. (2001). **The Standard of financial devolution 7 Hurdles**. 1st edition. Bangkok. Teera film and sytext press. pp.2-1 – 2-24.

Cooper, R. and R. S. Kaplan. 2003. Activity-based systems: measuring the costs of resource usage. **Accounting Horizons**.(September), pp. 1-13. Summary by Lori Meister Master of Accountancy Program University of South Florida, Summer. [Online].Available from: http://www.maaw.info/ArtSumCooperKaplan 1992.htm

Crott R, Makris N, Barkun A and Fallone C. (2002). The cost of an upper gastroduodenal endoscopy: an activity-based approach. **Can J Gastroenterol**. Jul; 16(7), pp.473-482. [Online].Available from: http://www.ncbi.nlm.nih.gov/ entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids =12177726

Dor R. Hansen and Maryanne M. Mowen. (1997).**Cost management: accounting and control**, 2nd edition. Cincinnati. South-Western College Publishng. pp. 301-314.

Douglass Cagwin and Marinus J. Bouwman. (2000). **The association between activity-based costing and improvement in financial performance.** [Online].Available from: http://www.offtech.com.au/abc/ABC_PDF/1999-04.pdf

Gary Siegel. (1999). **Measuring practice expense in pulmonary practices**. [Online].Available from: http://www.thoracic.org/practitioners/adobe/expensesurvey.pdf

Hawkins H, Langer J, Padua E and Reaves J. (2001). Activity-based costing via an information system: an application created for a breast imaging center. **J Digit Imaging**. Jun; 14(2 Suppl 1), p.189. [Online].Available from: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11442093&dopt=Abstract&itool=iconabstr

Hugh Waters, Hany Abdallah, Diana Santillán, and Paul Richardson. (2003). **Application of activity-based costing (ABC) in a peruvian NGO healthcare system.** The Quality Assurance Project (QAP). [Online].Available from: http://www.qaproject.org/pubs/PDFs/PeruABCrev.pdf

J. Laurila, I. Suramo, M. Brommels, E. M.Tolppanen, P.Koivukangas, and P.Lanning. (2000). Activity-based costing in radiology: application in a pediatric. **Acta radiological.** volume 41 issue 2, , p.189. [Online].Available from: http://www.blackwell-synergy.com/openurl?genre =article&sid =nlm:pubmed &issn=0284-1851&date=2000&volume=41&issue=2&spage=189

Kasame Tungkasamesamran. (2001). **Unit cost and cost analysis of community hospital: a case study of Thongsaenkhan hospital**. Thesis for master of science in Health Economics. Faculty of economics. Chulalongkorn university.

L. Leslie Gardner, Mary E. Grant, Laurie J. Rolston. (1994). **Using simulation to benchmark traditional vs. activity-based costing in product mix decisions.** Winter Simulation Conference. [Online].Available from: http://delivery.acm.org/10.1145/200000/ 194659/p1050gardner.pdf?key1 =194659&key2 =5333345701 &coll=portal&dl=ACM&CFID= 16169181& CFTOKEN =44040499

Mark Shinder and David McDowell. (1999). ABC, the balanced scorecard and EVA: distinguishing the means from the end. **EVAluation**. Stern Stewart Europe Limited. Volume 1. Issue 2. April. [Online].Available from: http://www.sternstewart.com/content/evaluation/info/v1n2.pdf

Mervyn D. Cohen, Donald R. Hawes, Gary D. Hutchins, William D. McPhee, Michael B. LaMasters, Robert P. Fallon. (2000). Activity-based cost analysis: a method of analyzing the financial and operating performance of academic radiology departments. **Radiology**. pp. 708-716. [Online].Available from: http://radiology.rsnajnls.org/cgi/reprint/215/3/708.pdf

Michael H. Granof, David E. Platt and Igor Vaysman. (2000). **Using activity-based costing to manage more effectively.** Grant report. The Pricewaterhouse Coopers Endowment for The Business of Government. Department of Accounting college of business administration university of texas at austin. Jan. [Online]. Available from: http://www.offtech.com.au/abc/ ABC_PDF/GranofReport.pdf.

Pipat Intug. (2002). **Cost analysis of nursing service in primary care unit using activity-based costing system: a case study of primary care unit at nakornthai crown prince hospital**. Thesis for master of nursing science in nursing administration Faculty of nursing Chulalongkorn university.

Ridderstolpe L, Johansson A, Skau T, Rutberg H, Ahlfeldt H. (20020. Clinical process analysis and activity-based costing at a heart center. **J Med Syst**. Aug; 26(4), pp.309-22. [Online].Available from: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12118815 &dopt=Abstract.

Robert S. Kaplan and David P. Norton. (1996). **The balanced scorecard: translating strategy into action**, pp. 122-123.1st edition. Massachusetts. USA. Harvard Business School Press.

Roybal H, Baxendale SJ, GuptaM. (1999). **Using activity-based costing and theory of constraints to guide continuous improvement in managed care.** [Online]. Available from:http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db = PubMed&list_uids=10350791&dopt=Abstract

Silvia A. Marteau, Luis H. Perego. (2001). Activity-based cost model applied to consultations for tracer events of cardiovascular diseases. **salud pública de méxico**. vol.43, no.1, january-february,

Steve Player. 1998. **Activity-based analyses lead to better decision making. (cost management strategies in the health care industry.** Healthcare Financial Management. [Online].Available from: http://www.findarticles.com/cf_dls/m3257/n8_v52/21045794/p6/article.jhtml?term=.

Teresita T. Nadurata. 2002. **Using balanced scorecard as a management planning and control tool**. De La Salle University.Philippines.[Online].Available from: http://www.spk.uum.edu.my/aaaa/doc/2002/067.PDF.

Thomas L. Zeller, Gary Siegel, Gail Kaciuba, Amy Hing-Ling Lau. 1999. Using activity-based costing to track resource use in group practices.(includes related article on 17 business processes used in orthopedic surgery group practices). **Healthcare Financial Management**. Sept. [Online].Available from: http://www.findarticles.com/cf_0/m3257/9_53/55834427/p1/article.jhtml?term=

Yolande Lievens, Walter Van Den Bogaert and Katrien Kesteloot. 2003. Activity-based costing: a practical model for cost calculation in radiotherapy. Int. **J. Radiation Oncology Biol. Phys**. Vol. 57, No. 2, p.522–535. [Online].Available from: http://www.iem.efei.br/edson/download/ABC%20radiotherapy%202003.Pdf.

Appendix 1

Data Gathering Form

Form 1: Recording form of each main activity in OPD service

OPD services	Main activities
1…	1.1…
	1.2…
	1.n…
2…	2.1…
	2.2…
	2.n…
3…	3.1…
	3.2…
	3.n…
4…	4.1…
	4.2…
	4.n…
5…	5.1…
	5.2…
	5.3…
n…	n…

Form 2: Recording form of detailed activity in each main activity in OPD service

Type of service.....

Main activities	Detailed activities
1.1...	1.1.1...
	1.1.2...
	1.1.n...
1.2...	1.2.1...
	1.2.2...
	1.2.n...
2.1...	2.1.1...
	2.1.2...
	2.1.n...
2.2...	2.2.1...
	2.2.2...
	2.2.n...
3.1...	3.1.1...
	3.1.2...
n...	n...

Form 3: Dictionary of activity

Type of service.....

Main activities	Code ofdetailed activities	Detailed activities	Activities description

Form 4: Time recording form of detailed activity in each main activity in OPD services

Type of service.....

Code	detailed activity	time(min)											total	average	% of total time
		1	2	3	4	5	6	7	8	9	10	11			

Recorder name.....

Form 5: Recording form of activity driver

Services.....

Detailed activities code	detailed activities	Unit	Volume of detailed activities

Recorder name.....

Form 6: Recording form of labor cost

Ord.	Code	name	Salary	Overtime allowance	Out of workplace activity Allowance	CSMBS (hospitall fee)	Child benefit allowance	Position benefit allowance	Non-private practice incentive	home rental benefit allowance	electric benefit allowance	Other fringe benefit	total
Total of labor costs(฿)													

Recorder name.....

Form 7: Recording form of medical material cost: drug, medical supplies

Medical material List	unit	Volume	Price/unit(฿)	Total expenditure
Total of medical material costs(฿)				

Recorder name.....

Form 8: Recording form of non medical material cost

Code	Non medical material list	Price/Unit	volume	Total expenditure	note
Total of non medical material costs (฿)					

Recorder name.....

Form 9: Recording form of utilities cost

Month	Water	Electricity	Telephone	Other
May				
June				
July				
August				
September				
Total of utilities cost (฿)				

Recorder name.....

Form 10: Recording form of capital cost: equipment depreciation

code	Equipment List	Price/unit	Usage time	Depreciation	note
Total of equipment depreciation (฿)					

Recorder name.....

Form 11: Recording form of capital cost: OPD building depreciation

code	Building List	Price/unit	Usage time	Depreciation	Note
Total of OPD building depreciation(฿)					

Recorder' name.....

Appendix 2

Data Analyzing Form

Table for unit cost calculation using Activity-Based Costing Technique (Cont...)

level of personal		total	Activity	Unit cost
no. of personal		of	driver	
salary&fringe benefit		all		
activity codes	activity lists	expenditure	(vol. of service)	
G1	.....			
G2	.....			
G3	.....			
G4	.....			
G5	.....			
G6	.....			
G7	.....	17	18	19
G8	.....			
G9	.....			
G10	.....			
G11	.....			
G12	.....			
G13	.....			
total			22	

Table for unit cost calculation using Activity-Based Costing Technique (cont...)

level of personal		Budget						total
no. of personal		salary	drug	non	utilities	depreciat.	depreciat.	of
salary&fringe benefit		&	&	medical		of	of	all
activity codes	activity lists	fringe benefit	med.supplies	supplies		equipment	building	expenditure
G1	.....							
G2	.....							
G3	.....							
G4	.....							
G5	.....							
G6	.....							
G7	.....	11	12	13	14	15	16	17
G8	.....							
G9	.....							
G10	.....							
G11	.....							
G12	.....							
G13	.....							
total				22				
indirect cost				21				
total expenditure (dorect cost+indirect cost)				20				

Table for unit cost calculation using Activity-Based Costing Technique

level of personal		C10 - C9	C8	C7	C6	C5-C3	C2-C1	temp.worker	total	% of each work
no. of personal					1				3	
salary&fringe benefit					2				4	
activity codes	activity lists	%	%	%	%	%	%	%	total of %	
G1	.....									
G2	.....									
G3	.....									
G4	.....									
G5	.....									
G6	.....									
G7	.....				5				7	9
G8	.....									
G9	.....									
G10	.....									
G11	.....									
G12	.....									
G13	.....									
total					6				8	10
indirect cost										
total expenditure (direct cost + indirect cost)										

APPENDIX 3

1. Dictionary of Activities

2. Percentage of time in each activity and Activity Driver

Dictionary of activity

Type of service: General Patient Clinic

Main activities	Code	Detailed Activities	Activities Description
1.1 General Patient services	GCS01	1.1.1 Medical Record activity	1) To inform process of services to patient and relations by public relation nurse. 2) To classify patient follow type of services, i.e. Dressing wound, OPD clinic, Dental service, health promotion service, etc. 3) To record patient information in case of new patient. 4) To check health insurance scheme of patient. 5) To search Medical Record folder (OPD card) for old patient. 6) To register patient information in STAT software in computer and print out new Medical Record Folder (for new patient) and drug prescription record form.

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and own Medical Record folder (OPD card) to Patient Screening Department. 8) To collect Medical Record Form (OPD card) after patient already obtained services to shelf of OPD card.
	GCS02	1.1.2 Patient Screening	1) To get OPD card from patient and to order patient 2) To check the error of OPD card, if found the problem, for example, name and own patient not correct, then turn OPD card to Medical Record Department. 3) To ask patient about chief complain, disease and drug allergy history and record in OPD card. 4) To measure Vital Sign and evaluate symptom of patient 6) First aid for severe patient 7) To send patient and OPD card meet physician

Main activities	Code	Detailed Activities	Activities Description
			8) To give health education for each patient
	GCS03	1.1.3 Diagnosis/Treatment	1) Diagnosis and Treatment by physician 2) Nurse help physician for specific investigation 3) To send OPD card and patient to specific investigation, i.e. Laboratories Diagnosis or Radiology service, etc. 4) To check completeness of Medical Record and Physician 'Order. 5) To send patient to get some service from other department, i.e. Dressing Wound, etc.
	GCS04	1.1.4 Patient Discharge	1) To give suggestion about disease, self-care of patient 2) To record the follow up card and give to patient. 3) To send OPD card and patient to Pharmacy Department or other hospital.

Main activities	Code	Detailed Activities	Activities Description
	GCS05	1.1.5 Laboratories Diagnosis	1) To obtain OPD card and patient from OPD. 2) To keep specimen of patient from patient. 3) To test specimen follow physician' order. 4) To record result into OPD card. 5) To send OPD card and patient back to OPD.
	GCS06	1.1.6 Radiology	1) To obtain OPD card and patient from OPD. 2) To prepare patient for radiation. 3) To radiate patient 4) To operate the radiated film 5) 5) To send OPD card and patient back to OPD.
	GCS07	1.1.7 Pharmacy Dispensation	1) To obtain drug prescription from patient 2) Print out drug label and prepare drug 3) To check error of drug 4) To dispense drug and give suggestion about drug indication, drug use, side effect of drug.

Main activities	Code	Detailed Activities	Activities Description
1.2 quality improvement activity	GCQ01	1.2.1 Quality Improvement Activity	1) OPD' members review about problem of service' process. 2) OPD' member set the policy or standard operating procedure manual for problem solving. 3) To evaluate and monitor the result
1.3 knowledge improvement activity	GCK01	1.3.1 Knowledge Improvement Activity	1)To set knowledge improvement plan for each Fiscal Year 2) To set knowledge conference for OPD team 3) If there are mortality case or morbidity case, then OPD team had to set the case conference
1.4 human resource management	GCP01	1.4.1 Internal Conference	1) Head of OPD set the internal conference about policy and regulation of hospital to OPD member. 2) OPD member suggest the problem and the way to solve those problem.

Main activities	Code	Detailed Activities	Activities Description
	GCP02	1.4.2 Personal Evaluation	1) Head of OPD evaluate work performance of each OPD members. 2) Head of OPD report the result of personal evaluation to Head of Nurse Department.
	GCP03	1.4.3 Workforce Management	1) Head of OPD set Workforce and Budget planning in every Fiscal Year 2) Head of OPD support workforce of own department for specific project to other department
1.5 medical equipment operation	GCE01	1.5.1 Medical Equipment Preparation	1) To prepare Diagnosis/Treatment, Patient Screening area and equipment. 2) To test quality and maintenance Medical equipment 3) To write user' manual for each medical equipment 4) If Medical equipment break down, then contact General Administrative Department 5) To do the Medical equipment account.

Main activities	Code	Detailed Activities	Activities Description
	GCE02	1.5.2 Medical Equipment Requisition	1) To request non-drug medical materials and non-medical material from General Administrative Department, Nursing Department, Pharmacy Department 2) To obtain non-drug medical materials and non-medical material from those departments 3) To collect those non-drug medical materials and non-medical material to OPD stock 4) To distribute those non-drug medical materials and non-medical material to each clinic

Type of service: Hypertension Patient Clinic

Main activities	Code	Detailed Activities	Activities Description
2.1 Hypertension Patient services	HCS01	2.1.1 Medical Record activity	1) To inform process of services to patient and relations by public relation nurse. 2) To classify patient follow type of services, i.e. Dressing wound, OPD clinic, Dental service, health promotion service, etc. 3) To record patient information in case of new patient. 4) To check health insurance scheme of patient. 5) To search Medical Record folder (OPD card) for old patient. 6) To register patient information in STAT software in computer and print out new Medical Record Folder (for new patient) and drug prescription record form.

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and own Medical Record folder (OPD card) to Patient Screening Department. 8) To collect Medical Record Form (OPD card) after patient already obtained services to shelf of OPD card.
	HCS02	2.1.2 Patient Screening	1) To get OPD card from patient and to order patient 2) To check the error of OPD card, if found the problem, for example, name and own patient not correct, then turn OPD card to Medical Record Department. 3) To ask patient about chief complain, disease and drug allergy history and record in OPD card. 4) To measure Vital Sign and evaluate symptom of patient 6) First aid for severe patient

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and OPD card meet physician 8) To give health education for each patient
	HCS03	2.1.3 Diagnosis/Treatment	1) Diagnosis and Treatment by physician 2) Nurse help physician for specific investigation 3) To send OPD card and patient to specific investigation, i.e. Laboratories Diagnosis or Radiology service, etc. 4) To check completeness of Medical Record and Physician 'Order. 5) To send patient to get some service from other department, i.e. Dressing Wound, etc.
	HCS04	2.1.4 Patient Discharge	1) To give suggestion about disease, self-care of patient 2) To record the follow up card and give to patient. 3) To send OPD card and patient to Pharmacy Department or other hospital.

Main activities	Code	Detailed Activities	Activities Description
	HCS05	2.ll.5 Laboratories Diagnosis	1) To obtain OPD card and patient from OPD. 2) To keep specimen of patient from patient. 3) To test specimen follow physician' order. 4) To record result into OPD card. 5) To send OPD card and patient back to OPD.
	HCS06	2.ll.6 Radiology	1) To obtain OPD card and patient from OPD. 2) To prepare patient for radiation. 3) To radiate patient 4) To operate the radiated film 5) 5) To send OPD card and patient back to OPD.
	HCS07	2.ll.7 Pharmacy Dispensation	1) To obtain drug prescription from patient 2) Print out drug label and prepare drug 3) To check error of drug 4) To dispense drug and give suggestion about drug indication, drug use, side effect of drug.

Main activities	Code	Detailed Activities	Activities Description
2.2 quality improvement activity	HCQ01	2.2.1 Quality Improvement Activity	1) OPD' members review about problem of service' process. 2) OPD' member set the policy or standard operating procedure manual for problem solving. 3) To evaluate and monitor the result
2.3 knowledge improvement activity	HCK01	2.3.1 Knowledge Improvement Activity	1)To set knowledge improvement plan for each Fiscal Year 2) To set knowledge conference for OPD team 3) If there are mortality case or morbidity case, then OPD team had to set the case conference
2.4 human resource management	HCP01	2.4.1 Internal Conference	1) Head of OPD set the internal conference about policy and regulation of hospital to OPD member. 2) OPD member suggest the problem and the way to solve those problem.

Main activities	Code	Detailed Activities	Activities Description
	HCP02	2.4.2 Personal Evaluation	1) Head of OPD evaluate work performance of each OPD members. 2) Head of OPD report the result of personal evaluation to Head of Nurse Department.
	HCP03	2.4.3 Workforce Management	1) Head of OPD set Workforce and Budget planning in every Fiscal Year 2) Head of OPD support workforce of own department for specific project to other department
2.5 medical equipment operation	HCE01	2.5.1 Medical Equipment Preparation	1) To prepare Diagnosis/Treatment, Patient Screening area and equipment. 2) To test quality and maintenance Medical equipment 3) To write user' manual for each medical equipment 4) If Medical equipment break down, then contact General Administrative Department 5) To do the Medical equipment account.

Main activities	Code	Detailed Activities	Activities Description
	HCE02	2.5.2 Medical Equipment Requisition	1) To request non-drug medical materials and non-medical material from General Administrative Department, Nursing Department, Pharmacy Department 2) To obtain non-drug medical materials and non-medical material from those departments 3) To collect those non-drug medical materials and non-medical material to OPD stock 4) To distribute those non-drug medical materials and non-medical material to each clinic

Type of service: Diabetes Mellitus Patient Clinic

Main activities	Code	Detailed Activities	Activities Description
3.1 Diabetes Mellitus Patient services	DCS01	3.1.1 Medical Record activity	1) To inform process of services to patient and relations by public relation nurse. 2) To classify patient follow type of services, i.e. Dressing wound, OPD clinic, Dental service, health promotion service, etc. 3) To record patient information in case of new patient. 4) To check health insurance scheme of patient. 5) To search Medical Record folder (OPD card) for old patient. 6) To register patient information in STAT software in computer and print out new Medical Record Folder (for new patient) and drug prescription record form.

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and own Medical Record folder (OPD card) to Patient Screening Department. 8) To collect Medical Record Form (OPD card) after patient already obtained services to shelf of OPD card.
	DCS02	3.1.2 Patient Screening	1) To get OPD card from patient and to order patient 2) To check the error of OPD card, if found the problem, for example, name and own patient not correct, then turn OPD card to Medical Record Department. 3) To ask patient about chief complain, disease and drug allergy history and record in OPD card. 4) To measure Vital Sign and evaluate symptom of patient 6) First aid for severe patient

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and OPD card meet physician 8) To give health education for each patient
	DCS03	3.1.3 Diagnosis/Treatment	1) Diagnosis and Treatment by physician 2) Nurse help physician for specific investigation 3) To send OPD card and patient to specific investigation, i.e. Laboratories Diagnosis or Radiology service, etc. 4) To check completeness of Medical Record and Physician 'Order. 5) To send patient to get some service from other department, i.e. Dressing Wound, etc.
	DCS04	3.1.4 Patient Discharge	1) To give suggestion about disease, self-care of patient 2) To record the follow up card and give to patient. 3) To send OPD card and patient to Pharmacy Department or other hospital.

Main activities	Code	Detailed Activities	Activities Description
	DCS05	3.1.5 Laboratories Diagnosis	1) To obtain OPD card and patient from OPD. 2) To keep specimen of patient from patient. 3) To test specimen follow physician' order. 4) To record result into OPD card. 5) To send OPD card and patient back to OPD.
	DCS06	3.1.6 Radiology	1) To obtain OPD card and patient from OPD. 2) To prepare patient for radiation. 3) To radiate patient 4) To operate the radiated film 5) 5) To send OPD card and patient back to OPD.
	DCS07	3.1.7 Pharmacy Dispensation	1) To obtain drug prescription from patient 2) Print out drug label and prepare drug 3) To check error of drug 4) To dispense drug and give suggestion about drug indication, drug use, side effect of drug.

Main activities	Code	Detailed Activities	Activities Description
3.2 quality improvement activity	DCQ01	3.2.1 Quality Improvement Activity	1) OPD' members review about problem of service' process. 2) OPD' member set the policy or standard operating procedure manual for problem solving. 3) To evaluate and monitor the result
3.3 knowledge improvement activity	DCK01	3.3.1 Knowledge Improvement Activity	1)To set knowledge improvement plan for each Fiscal Year 2) To set knowledge conference for OPD team 3) If there are mortality case or morbidity case, then OPD team had to set the case conference
3.4 human resource management	DCP01	3.4.1 Internal Conference	1) Head of OPD set the internal conference about policy and regulation of hospital to OPD member. 2) OPD member suggest the problem and the way to solve those problem.

Main activities	Code	Detailed Activities	Activities Description
	DCP02	3.4.2 Personal Evaluation	1) Head of OPD evaluate work performance of each OPD members. 2) Head of OPD report the result of personal evaluation to Head of Nurse Department.
	DCP03	3.4.3 Workforce Management	1) Head of OPD set Workforce and Budget planning in every Fiscal Year 2) Head of OPD support workforce of own department for specific project to other department
3.5 medical equipment operation	DCE01	3.5.1 Medical Equipment Preparation	1) To prepare Diagnosis/Treatment, Patient Screening area and equipment. 2) To test quality and maintenance Medical equipment 3) To write user' manual for each medical equipment 4) If Medical equipment break down, then contact General Administrative Department 5) To do the Medical equipment account.

Main activities	Code	Detailed Activities	Activities Description
	DCE02	3.5.2 Medical Equipment Requisition	1) To request non-drug medical materials and non-medical material from General Administrative Department, Nursing Department, Pharmacy Department 2) To obtain non-drug medical materials and non-medical material from those departments 3) To collect those non-drug medical materials and non-medical material to OPD stock 4) To distribute those non-drug medical materials and non-medical material to each clinic

Type of service: Drug Addiction Patient Clinic

Main activities	Code	Detailed Activities	Activities Description
4.1 Drug Addiction Patient services	ACS01	4.1.1 Medical Record activity	1) To inform process of services to patient and relations by public relation nurse. 2) To classify patient follow type of services, i.e. Dressing wound, OPD clinic, Dental service, health promotion service, etc. 3) To record patient information in case of new patient. 4) To check health insurance scheme of patient. 5) To search Medical Record folder (OPD card) for old patient. 6) To register patient information in STAT software in computer and print out new Medical Record Folder (for new patient) and drug prescription record form.

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and own Medical Record folder (OPD card) to Patient Screening Department. 8) To collect Medical Record Form (OPD card) after patient already obtained services to shelf of OPD card.
	ACS02	4.1.2 Patient Screening	1) To get OPD card from patient and to order patient 2) To check the error of OPD card, if found the problem, for example, name and own patient not correct, then turn OPD card to Medical Record Department. 3) To ask patient about chief complain, disease and drug allergy history and record in OPD card. 4) To measure Vital Sign and evaluate symptom of patient 6) First aid for severe patient

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and OPD card meet physician 8) To give health education for each patient
	ACS03	4.1.3 Diagnosis/Treatment	1) Diagnosis and Treatment by physician 2) Nurse help physician for specific investigation 3) To send OPD card and patient to specific investigation, i.e. Laboratories Diagnosis or Radiology service, etc. 4) To check completeness of Medical Record and Physician 'Order. 5) To send patient to get some service from other department, i.e. Dressing Wound, etc.
	ACS04	4.1.4 Patient Discharge	1) To give suggestion about disease, self-care of patient 2) To record the follow up card and give to patient. 3) To send OPD card and patient to Pharmacy Department or other hospital.

Main activities	Code	Detailed Activities	Activities Description
	ACS05	4.1.5 Laboratories Diagnosis	1) To obtain OPD card and patient from OPD. 2) To keep specimen of patient from patient. 3) To test specimen follow physician' order. 4) To record result into OPD card. 5) To send OPD card and patient back to OPD.
	ACS06	4.1.6 Radiology	1) To obtain OPD card and patient from OPD. 2) To prepare patient for radiation. 3) To radiate patient 4) To operate the radiated film 5) 5) To send OPD card and patient back to OPD.
	ACS07	4.1.7 Pharmacy Dispensation	1) To obtain drug prescription from patient 2) Print out drug label and prepare drug 3) To check error of drug 4) To dispense drug and give suggestion about drug indication, drug use, side effect of drug.

Main activities	Code	Detailed Activities	Activities Description
4.2 quality improvement activity	ACQ01	4.2.1 Quality Improvement Activity	1) OPD' members review about problem of service' process. 2) OPD' member set the policy or standard operating procedure manual for problem solving. 3) To evaluate and monitor the result
4.3 knowledge improvement activity	ACK01	4.3.1 Knowledge Improvement Activity	1)To set knowledge improvement plan for each Fiscal Year 2) To set knowledge conference for OPD team 3) If there are mortality case or morbidity case, then OPD team had to set the case conference
4.4 human resource management	ACP01	4.4.1 Internal Conference	1) Head of OPD set the internal conference about policy and regulation of hospital to OPD member. 2) OPD member suggest the problem and the way to solve those problem.

Main activities	Code	Detailed Activities	Activities Description
	ACP02	4.4.2 Personal Evaluation	1) Head of OPD evaluate work performance of each OPD members. 2) Head of OPD report the result of personal evaluation to Head of Nurse Department.
	ACP03	4.4.3 Workforce Management	1) Head of OPD set Workforce and Budget planning in every Fiscal Year 2) Head of OPD support workforce of own department for specific project to other department
4.5 medical equipment operation	ACE01	4.5.1 Medical Equipment Preparation	1) To prepare Diagnosis/Treatment, Patient Screening area and equipment. 2) To test quality and maintenance Medical equipment 3) To write user' manual for each medical equipment 4) If Medical equipment break down, then contact General Administrative Department 5) To do the Medical equipment account.

Main activities	Code	Detailed Activities	Activities Description
	ACE02	4.5.2 Medical Equipment Requisition	1) To request non-drug medical materials and non-medical material from General Administrative Department, Nursing Department, Pharmacy Department 2) To obtain non-drug medical materials and non-medical material from those departments 3) To collect those non-drug medical materials and non-medical material to OPD stock 4) To distribute those non-drug medical materials and non-medical material to each clinic

Type of service: Anxiety Relaxation Clinic

Main activities	Code	Detailed Activities	Activities Description
5.1 Anxiety Relaxation services	XCS01	5.1.1 Medical Record activity	1) To inform process of services to patient and relations by public relation nurse. 2) To classify patient follow type of services, i.e. Dressing wound, OPD clinic, Dental service, health promotion service, etc. 3) To record patient information in case of new patient. 4) To check health insurance scheme of patient. 5) To search Medical Record folder (OPD card) for old patient. 6) To register patient information in STAT software in computer and print out new Medical Record Folder (for new patient) and drug prescription record form.

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and own Medical Record folder (OPD card) to Patient Screening Department. 8) To collect Medical Record Form (OPD card) after patient already obtained services to shelf of OPD card.
	XCS02	5.1.2 Patient Screening	1) To get OPD card from patient and to order patient 2) To check the error of OPD card, if found the problem, for example, name and own patient not correct, then turn OPD card to Medical Record Department. 3) To ask patient about chief complain, disease and drug allergy history and record in OPD card. 4) To measure Vital Sign and evaluate symptom of patient 6) First aid for severe patient

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and OPD card meet physician 8) To give health education for each patient
	XCS03	5.1.3 Diagnosis/Treatment	1) Diagnosis and Treatment by physician 2) Nurse help physician for specific investigation 3) To send OPD card and patient to specific investigation, i.e. Laboratories Diagnosis or Radiology service, etc. 4) To check completeness of Medical Record and Physician 'Order. 5) To send patient to get some service from other department, i.e. Dressing Wound, etc.
	XCS04	5.1.4 Patient Discharge	1) To give suggestion about disease, self-care of patient 2) To record the follow up card and give to patient. 3) To send OPD card and patient to Pharmacy Department or other hospital.

Main activities	Code	Detailed Activities	Activities Description
	XCS05	5.1.5 Pharmacy Dispensation	1) To obtain drug prescription from patient 2) Print out drug label and prepare drug 3) To check error of drug 4) To dispense drug and give suggestion about drug indication, drug use., side effect of drug.
5.2 quality improvement activity	XCQ01	5.2.1 Quality Improvement Activity	1) OPD' members review about problem of service' process. 2) OPD' member set the policy or standard operating procedure manual for problem solving. 3) To evaluate and monitor the result
5.3 knowledge improvement activity	XCK01	5.3.1 Knowledge Improvement Activity	1)To set knowledge improvement plan for each Fiscal Year 2) To set knowledge conference for OPD team 3) If there are mortality case or morbidity case, then OPD team had to set the case conference

Main Activities	Code	Detailed Activities	Activities Description
5.4 human resource management	XCP01	5.4.1 Internal Conference	1) Head of OPD set the internal conference about policy and regulation of hospital to OPD member. 2) OPD member suggest the problem and the way to solve those problem.
	XCP02	5.4.2 Personal Evaluation	1) Head of OPD evaluate work performance of each OPD members. 2) Head of OPD report the result of personal evaluation to Head of Nurse Department.
	XCP03	5.4.3 Workforce Management	1) Head of OPD set Workforce and Budget planning in every Fiscal Year 2) Head of OPD support workforce of own department for specific project to other department

Main Activities	Code	Detailed Activities	Activities Description
5.5 medical equipment operation	XCE01	5.5.1 Medical Equipment Preparation	1) To prepare Diagnosis/Treatment, Patient Screening area and equipment. 2) To test quality and maintenance Medical equipment 3) To write user' manual for each medical equipment 4) If Medical equipment break down, then contact General Administrative Department 5) To do the Medical equipment account.
	XCE02	5.5.2 Medical Equipment Requisition	1) To request non-drug medical materials and non-medical material from General Administrative Department, Nursing Department, Pharmacy Department 2) To obtain non-drug medical materials and non-medical material from those departments

Main Activities	Codes	Detailed Activities	Activities Dictionary
			3) To collect those non-drug medical materials and non-medical material to OPD stock 4) To distribute those non-drug medical materials and non-medical material to each clinic

Type of service: Acupuncture Clinic

Main activities	Code	Detailed Activities	Activities Description
6.1 Anxiety Relaxation services	TCS01	6.1.1 Medical Record activity	1) To inform process of services to patient and relations by public relation nurse. 2) To classify patient follow type of services, i.e. Dressing wound, OPD clinic, Dental service, health promotion service, etc. 3) To record patient information in case of new patient. 4) To check health insurance scheme of patient. 5) To search Medical Record folder (OPD card) for old patient. 6) To register patient information in STAT software in computer and print out new Medical Record Folder (for new patient) and drug prescription record form.

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and own Medical Record folder (OPD card) to Patient Screening Department. 8) To collect Medical Record Form (OPD card) after patient already obtained services to shelf of OPD card.
	TCS02	6.1.2 Patient Screening	1) To get OPD card from patient and to order patient 2) To check the error of OPD card, if found the problem, for example, name and own patient not correct, then turn OPD card to Medical Record Department. 3) To ask patient about chief complain, disease and drug allergy history and record in OPD card. 4) To measure Vital Sign and evaluate symptom of patient 6) First aid for severe patient

Main activities	Code	Detailed Activities	Activities Description
			7) To send patient and OPD card meet physician 8) To give health education for each patient
	TCS03	6.1.3 Diagnosis/Treatment	1) Diagnosis and Treatment by physician 2) Nurse help physician for specific investigation 3) To send OPD card and patient to specific investigation, i.e. Laboratories Diagnosis or Radiology service, etc. 4) To check completeness of Medical Record and Physician 'Order. 5) To send patient to get some service from other department, i.e. Dressing Wound, etc.
	TCS04	6.1.4 Patient Discharge	1) To give suggestion about disease, self-care of patient 2) To record the follow up card and give to patient. 3) To send OPD card and patient to Pharmacy Department or other hospital.

Main activities	Code	Detailed Activities	Activities Description
	TCS05	6.1.5 Pharmacy Dispensation	1) To obtain drug prescription from patient 2) Print out drug label and prepare drug 3) To check error of drug 4) To dispense drug and give suggestion about drug indication, drug use, side effect of drug.
6.2 quality improvement activity	TCQ01	6.2.1 Quality Improvement Activity	1) OPD' members review about problem of service' process. 2) OPD' member set the policy or standard operating procedure manual for problem solving. 3) To evaluate and monitor the result
6.3 knowledge improvement activity	TCK01	6.3.1 Knowledge Improvement Activity	1)To set knowledge improvement plan for each Fiscal Year 2) To set knowledge conference for OPD team 3) If there are mortality case or morbidity case, then OPD team had to set the case conference

Main Activities	Code	Detailed Activities	Activities Description
6.4 human resource management	TCP01	6.4.1 Internal Conference	1) Head of OPD set the internal conference about policy and regulation of hospital to OPD member. 2) OPD member suggest the problem and the way to solve those problem.
	TCP02	6.4.2 Personal Evaluation	1) Head of OPD evaluate work performance of each OPD members. 2) Head of OPD report the result of personal evaluation to Head of Nurse Department.
	TCP03	6.4.3 Workforce Management	1) Head of OPD set Workforce and Budget planning in every Fiscal Year 2) Head of OPD support workforce of own department for specific project to other department

Main Activities	Code	Detailed Activities	Activities Description
6.5 medical equipment operation	TCE01	6.5.1 Medical Equipment Preparation	1) To prepare Diagnosis/Treatment, Patient Screening area and equipment. 2) To test quality and maintenance Medical equipment 3) To write user' manual for each medical equipment 4) If Medical equipment break down, then contact General Administrative Department 5) To do the Medical equipment account.
	TCE02	6.5.2 Medical Equipment Requisition	1) To request non-drug medical materials and non-medical material from General Administrative Department, Nursing Department, Pharmacy Department 2) To obtain non-drug medical materials and non-medical material from those departments

Main Activities	Codes	Detailed Activities	Activities Dictionary
			3) To collect those non-drug medical materials and non-medical material to OPD stock 4) To distribute those non-drug medical materials and non-medical material to each clinic

Percentage of operating time in each activity and Activity Drivers

activity lists	% of each activity	Activity Drivers
1.1.1 Medical Record	14.54	11,911
1.1.2 Patient Screening	24.60	11,911
1.1.3 Diagnosis/Treatment	11.39	11,911
1.1.4 Patient Discharge	1.89	11,911
1.1.5 Laboratories Diagnosis	0.40	407
1.1.6 Radiology	4.55	224
1.1.7 Pharmacy Dispensation	21.50	11,911
1.2.1 Quality Improvement Activity	0.08	3
1.3.1 Training	0.00	0
1.4.1 Internal Conference	0.25	10
1.4.2 Personal Evaluation	0.00061	1
1.4.3 Workforce Management	0.00061	1
1.5.1 Medical Equipment Preparation	0.04	104
1.5.2 Medical Equipment Requisition	0.01	22
2.1.1 Medical Record	1.13	736
2.1.2 Patient Screening	4.19	736
2.1.3 Diagnosis/Treatment	1.01	736
2.1.4 Patient Discharge	0.16	736
2.1.5 Laboratories Diagnosis	0.29	219
2.1.6 Radiology	0.00	0
2.1.7 Pharmacy Dispensation	3.80	736
2.2.1 Quality Improvement Activity	0.08	3
2.3.1 Training	0.03	1
2.4.1 Internal Conference	0.00	0

activity lists	% of each activity	Activity Drivers
2.4.2 Personal Evaluation	0.00061	1
2.4.3 Workforce Management	0.00061	1
2.5.1 Medical Equipment Preparation	0.01	21
2.5.2 Medical Equipment Requisition	0.01	22
3.1.1 Medical Record	1.95	575
3.1.2 Patient Screening	0.30	575
3.1.3 Diagnosis/Treatment	0.73	575
3.1.4 Patient Discharge	0.13	575
3.1.5 Laboratories Diagnosis	3.85	575
3.1.6 Radiology	0.00	0
3.1.7 Pharmacy Dispensation	1.92	575
3.2.1 Quality Improvement Activity	0.10	4
3.3.1 Training	0.03	1
3.4.1 Internal Conference	0.00	0
3.4.2 Personal Evaluation	0.00061	1
3.4.3 Workforce Management	0.00061	1
3.5.1 Medical Equipment Preparation	0.01	21
3.5.2 Medical Equipment Requisition	0.01	22
4.1.1 Medical Record	0.02	17
4.1.2 Patient Screening	0.01	17
4.1.3 Diagnosis/Treatment	0.01	17
4.1.4 Patient Discharge	0.00022	17
4.1.5 Laboratories Diagnosis	0.00433	17
4.1.6 Radiology	0.00	0
4.1.7 Pharmacy Dispensation	0.01	17

activity lists	% of each activity	Activity Drivers
4.2.1 Quality Improvement Activity	0.00	0
4.3.1 Training	0.00	0
4.4.1 Internal Conference	0.00	0
4.4.2 Personal Evaluation	0.00061	1
4.4.3 Workforce Management	0.00061	1
4.5.1 Medical Equipment Preparation	0.01	20
4.5.2 Medical Equipment Requisition	0.01	22
5.1.1 Medical Record	0.00416	5
5.1.2 Patient Screening	0.00166	5
5.1.3 Diagnosis/Treatment	0.01	5
5.1.4 Patient Discharge	0.00007	5
5.1.5 Pharmacy Dispensation	0.00120	5
5.2.1 Quality Improvement Activity	0.00	0
5.3.1 Training	0.00	0
5.4.1 Internal Conference	0.00	0
5.4.2 Personal Evaluation	0.0028	1
5.4.3 Workforce Management	0.0028	1
5.5.1 Medical Equipment Preparation	0.05	20
5.5.2 Medical Equipment Requisition	0.06	22
6.1.1 Medical Record	0.22	257
6.1.2 Patient Screening	0.02	257
6.1.3 Diagnosis/Treatment	0.51	257
6.1.4 Patient Discharge	0.01	257
6.1.5 Pharmacy Dispensation	0.05	257
6.2.1 Quality Improvement Activity	0.00	0

activity lists	% of each activity	Activity Drivers
6.3.1 Training	0.00	0
6.4.1 Internal Conference	0.00	0
6.4.2 Personal Evaluation	0.00061	1
6.4.3 Workforce Management	0.00061	1
6.5.1 Medical Equipment Preparation	0.01	22
6.5.2 Medical Equipment Requisition	0.01	22
Total	**100.00**	

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