REFERENCES

Adam J. S.(1963). Toward and understanding of Inequity.

Anderson, J. (1984). Public policy making. Third edition , University of Houston.

Baker G.P., Jensen C. M., and Murphy K.J. (1988). Compensation and Incentive: Practice vs Theory. Journal of Finance, 43.p. 593.

Bodart C., Servais G., Mohamed L.Y. and Ehry B.(2001) . The influenced of Health sector reform and external assistance in Burkina Faso. Health Policy and Planning16 (1):74-86

Buki SJ., (1992).The management of crisis. In James E, Roy S. Foundation of Pakistan's Political Economic: Towards an agenda for the 1990s, London: Sage publication:116-45.

Buse, K., (1993). The World Bank and international: genesis, evolution and implication unpublished M.Sc. Thesis, London School of Hygiene and Tropical Medicine and London School of Economic.

Buse, K., (1994) Spotlight on international agencies: the World Bank, Health Policy and Planning 9: 95-9.

Carter, J., (1996). Basic Laboratory Services. Nairobi, Kenya: Appropriate health Resources and Technology Action Group (AHRTAG).

Chatterjee, P., (1992). How to waste $5 billion a year' Guardian, 7 November

Clift, C., (1988). Aid co-ordination: are there any lesson to be learns from Kenya? Development policy review 6:115-37

Fieldler, J., (1988). El Salvador's Ministry of Health ,1975-1986: a provisional performance assessment', Health Policy 10: 177-206.

Fronezack, N., (2000). Public and Private partnership in Cambodia. Unpublished report. Collaboration of MoH Cambodia and WB.

Gilson, L., (1992). Value for money. The efficiency of primary health facilities in Tanzania, Ph.D. Dissertation, University of London.

Henderson L. P.(1995), Donor and government Constrains to sustainability in Nepal. Health policy and planing;10 supplement:17-27

Hiscoock J. (1995). Looking gift horse in the mouth: the shifting power balance between the Ministry of Health and donors in Ghana. Health Policy and Planning;10 Supplement: 28-39.

Hogwood, B., and Gunn, L. (1984). Policy analysis for the real world, Oxford University.

Lafond, A., (1995). Sustainability in health sectors: the research study, Health policy and Planing; 10 Supplement: 40-48.

Lafond A. And White J. (1993). Sustainability in health sectors: A case study of Northwest Frontier Province Pakistan. London Save the children Fund.

Lanjouw, S., Macrae J., and Zwi B. A.(1999). Rehabilitating Health services in Cambodia: The challenge of coordination in chronic Political emergencies. Health Policy Unit, London School of Hygiene and Tropical Medecine, UK and Humanitarian Policy Group, Oversee Development Institute, London UK.

Laporte, R.,(1992). Administration: In James E, Roy S. Foundation of Pakistan's Political Economy: Towards an agenda for the 1990s, London: Sage publication: 102-15.

Martiney ,j., and Martineau T.(1998). Rethinking human Resources: an agenda for the millennium. Health policy and Planning 13(4):345-358.Liverpool School of tropical Medicine. Liverpool UK.

MEDICAM, (1999). The health sector reform in Cambodia. MEDICAM position paper 1999.

Ministry of Health Cambodia. (1997). The workshop of Management and stock control for laboratory supplies. Unpublished report of laboratory services, ministry of Health, Cambodia

Ministry of Health Cambodia. (1999). Department of Hospital, Medical Equipment Unit, Unpublished document: Medical Equipment draft Policy

Ministry of Health Cambodia, (1999) Department of finance, Procurement Unit. Health expenditure book and consolidate report 1995 – 1999.

Ministry of Health of Cambodia, Department of Health, (1997). Guideline for Developing Operational District. Ministry of Health with collaboration of the world health organization.

Ministry of Health, Cambodia, Health Economic task forces (1999). Introducing User Fee at Public Sector Health Facilities in Cambodia in collaboration with Strengthening District Health system, MOH / UNICEF.

Ministry of Health, laboratory Subcommittee Report, (1996). Unpublished document.

Monica, C.(1987). Medical Laboratory Manual for Tropical Countries. Volume I, second edition.

National Public Health Research Institute, (1998). The demand for Health care in Cambodia. NIPH/GTZ/WHO. Government of Cambodia.

Organization for Economic Co-operation and Development OECD. (1993). Private Pay for the Public Work. Performance-Related Pay for Public Sectors Managers.

Royal Government of Cambodia, Ministry of Health (1999). Department of Health Planning and Information. Health Situation Analysis 1998 and Future Direction for Health Development 1999 – 2003.

Royal Government of Cambodia, Ministry of Health, Laboratory Subcommittee Survey report.

Sharma K.B., Agarwal, D. S., Arya S.C., Bulloock D.G., Lewis S.M., Prakash K., and Snell J.J.S.(1994). Health Laboratory Services in Support of Primary Health Care in Developing Countries. WHO Regional Office for South-East Asia New Delhi.

Sidemen, S, and D. Bendak, J. (1997).Cambridge University Press: International of Technology Assessment in Health Care. Assessing Medical Technology in Less- Developed countries.

Smithson, P.,(1995). Quarts into the pint jugs? The financial viability of health sector investment in low income countries. Health policy and Planning; 10 Supplement: 6-16. Oxfard University Press.

Vroom V.(1964). Work and Motivation. Wiley, New York. Journal of Abnormal and Social Psychology 67: 422-436.

Walford W. et al, (1999). Mid Term Review of the Health Sector Reform Phase III Project. Cambodia, (December). Final report.

Walt G. (1994). Health Policy. An Introduction to Process and Power. People , governments and international agencies- who dives policy and how it is made.

Walt G.(1976). Policy making in Britain: comparative study of fluoridation and family planning 1960-1974,PhD. Dissertation,University of London.

Walt G., Pavignni E., Gilson L.,and Buse K. (1999). Health Policy Unit,London School of Hygiene and Tropical Medecine UK. Health Policy and Plannig;14 (3):207-218.

WHO, (1976). Application of Systems Analysis to Health Management Technical report , World health organization Geneva.

WHO, (1994). Regional office for South-East Asia. Health laboratory services in support of Primary Health care in developing countries.

World Bank, (1999). Cambodia Public Expenditure Review.__Enhancing the effectiveness of public expenditure. Volume 2.

World Health Organization, (1978). Financing of health services. Technical report Series 625.

APPENDICES

Appendix A

Health Coverage Plan

The health coverage plan is the framework for developing the health system infrastructures, based on population and geographical access criteria. It aim to:

- Develop health services by defining criteria for the location of health facility and their catchments area.
- Allocate financial and human resources
- Ensure that population health need are met in an equitable way through coverage of the whole population.

Criteria for the definition of catchments area and the establishments of facilities

Facilities	Population	Geographical Accessibility
health Center	Optimal sized: 10,000 Range: 8000 - 12,000 - Above 10,000, the work load become too heavy, leading to poor quality of care and less flexibility to manage urgent cases and priority on a day to day basis - Below 10,000, the work load is too light to justify the concentration of resources. commune with less than 6,000 inhabitants should be grouped together with other commune to form a catchments area. - Some heavily populated communes will have to be divided into more than catchments areas, served by separate health centers	Health Center should be situate: 1. within 10 km or two hours walk maximum for the catchments area population. 2.In highly populated village and on main roads. 3. In socially acceptable place. 4. Close to a water sources, markets, temple, school and administrative building. 5. Where staffs are willing to be posted. 6. Be accessible for supervision. These criteria should be flexibly applied taking into account local constrain, as well as the resent of the existing health facilities.

Facilities	Population	Geographical Accessibility
Referral Hospital	Optimal sized : 100,000 Range: 60, 000 to 200,000+ - Referral hospitals are expensive run and can only be justified it fully utilized. A hospital becomes inefficient if the population covered is too small. - A district administrative boundaries are not suitable for defining operational health district, so several districts have been grouped together under a single referral catchments area.	1. In populated area: within two hours drive. 2. In rural area: not more than three hours drive or boat journey. - Accessibility should determine for the location of referral hospital, but existing hospital should be utilized and developed, if possible. - Referral hospital should not necessarily be situated in the middle of it operational district. Instead, they should be located on a main road and in a major urban center

The Minimum and Comprehensive Package of Activity (MPA and CPA)

	MPA	**CPA**
Delivery of services	- Primary curative consultation for treating the most common health problem: Malaria, sexual transmitted and diarrhea disease, etc. - Emergency care and simple surgery - Chronic diseases: TB, Leprosy - Consultations for healthy infant age o to 4. • Vaccination • Management of malnutrition • Prevention of vitamins A deficiency - Care for pregnant women • Antenatal and postnatal • Anti-tetanus Vaccination • Prevention of anemia • Deliveries and referral of complicate case to second level - Birth spacing - Refer patient to the second level for diagnostic, or complex management reasons. - Outreach activities	- Referral cases - Medical and surgical emergency • Amputation • Strangulated hernia • Appendicitis • Transfusion • cardiovascular diseases - Complicated deliveries • Extra- uterine pregnancy • Obstructed labor • Haemorrhage • Retained Placenta • Caesarean - Complicated TB cases - Hospitalization - Laboratory diagnosis - Radiological and Ultrasound diagnosis - Rehabilitation - 24 hours ward duty staffed by skilled personel

Appendix B1

Draft National Laboratory policy

The aim of the national laboratory services is to develop and maintain a national laboratory services program, that aim to meet the unbiased fashion, all of the perceived need of the patient population thought out the country on a regular basic at minimal cost with minimal waste, but with optimal strategy and efficiency. The important point:

1. Laboratory diagnosis should be available in every Health Center where specific patient needs are identified (eg. malaria diagnosis in endemic areas)
2. Laboratory diagnoses should be available in every Referral Hospital and should meet the full need of the hospital.
3. Number of microscope at different health facility should be according to activity levels of the individual facility, and they should be considered as a part of laboratory services and not the individual programs
4. All laboratory equipment including (microscopes) should be part of a planned and maintenance program.
5. Sufficient, trained staff should be available at each level of services, and a program of on going training should be available.
6. Sufficient, supplies of reagent and consumable material should always be available to all level of the laboratory services.

Sources : Sub- CoCom laboratory services initial report for 1996.

Appendix B2

Ministry of Health, Kingdom of Cambodia

CoCom sub-committee for laboratory services training and research

Revised terms of reference (up-dated April 30th 1998)

1. Review the minimum package of activity for each level of service (examine the standardized test methods for each type of laboratory) taking into account the new SDHS work of the ministry. Estimate the needs for laboratories (estimate the workload, the basic equipment and consumable materials, estimate the use of reagents and consumable according to the activity).
2. Define the needs for human resources (Number, level, job description career path, multidisciplinary staff, implementation: basic training, in-service training, retaining etc.)
3. Ensure that technical support is available to departments of the Ministry of Health with respect to laboratories :

-Central Medical Store(CMS)

-National Programs(TB, Malaria, MCH, Blood transfusion, Leprosy, Dengue etc..)

-Essential Drugs Bureau(EDB)

-Health Information Unit

-Human Resource Department

-Any department concerned with the training of health personnel

4. Make recommendation concerning:

   -Rational use of the laboratory service.

   -Progressive integration of the vertical programs (CNM, CNTS, CNHE, STD, CENAT etc.)

   -The routine analysis performed by laboratories within the health coverage plan.

   -The needs for any legislation or registration scheme with respect to the laboratory service in Cambodia.

   -On existing services in the private sector in order to develop a plan for quality assurance for their work.

Appendix C

Basic laboratory equipment needs by hospital type

N	Item	Unit	National Level	Referral Hospital
1.	Microbiology loop	1	1	1
2.	Balance(mechanical)	1	1	1
3.	Flat bottom balloon flask 500ml	1	1	1
4.	Flat bottom balloon flask 1000ml	1	1	1
5.	Beaker 250ml	1	12	4
6.	Beaker 50ml	1	3	1
7.	Slide storage box (100 slides)	1	6	6
8.	Bunsen burner	1	1	1
9.	Neubauer counting chamber	1	2	2
10.	Centrifuge bench top, electric	1	1	1
11.	Haematocrite centrifuge	1	1	1
12.	Mechanical counter	1	1	1
13.	Hand tally counter	1	2	2
14.	Spectrophotometer	1	1	1
15.	Coplin jar	1	1	1
16.	Funnel 6.5cm diameter	5	6	6
17.	Measuring cylinder 10ml	1	1	1
18.	Measuring cylinder 100ml	1	1	1
19.	Measuring cylinder 500ml	1	1	1
20.	Measuring cylinder 25ml	1	1	1
21.	Measuring cylinder 50ml	1	1	1
22.	Water filter	1	1	1
23.	Volumetric flask 100ml	1	1	1
24.	Volumetric flask 500ml	1	1	1
25.	Dropper bottle	1	3	3
26.	Reagent bottle 1000ml	1	2	2
27.	Test tube brush 20mm diameter	4	2	2
28.	Test tube brush 10mm diameter	1	2	2
29.	Alcohol lamp	1	2	2
30.	Wick for lamp	5	2	2
31.	Timer 60min mechanical	1	2	2
32.	Microscope Olympus CHD	1	4	0
33.	Automatic pipette 10 -100ul	1	1	1
34.	Automatic pipette 100 -1000ul	1	1	1
35.	Pestle and mortar	1	1	1
36.	Staining forceps	1	3	1
37.	Test tube holder	1	1	1
38.	Thoma pipette	1	5	5
39.	Potain pipette	1	5	5
40.	Sahli pipette	1	5	5
41.	Graduated pipette 1ml	1	10	10
42.	Graduated pipette 2ml	1	10	10
43.	Graduated pipette 5ml	1	5	5
44.	Graduated pipette 10ml	1	5	95
45.	Westergren pipette 0-200mm	5	15	15
46.	Pasteur pipette sterile	1000	2	2
47.	Wash bottle 125ml	1	5	5

48.	Specimen collection tray	1	1	1
49.	3 way safety bulb	1	1	1
50.	Pipette teats	1	10	10
51.	Slide drying rack	1	10	10
52.	Slide draining rack	1	3	3
53.	Test tube rack 12 places	1	5	5
54.	Test tube rack 24 places (small)	1	10	10
55.	ESR rack	1	2	2
56	Haematocrite reader	1	1	1
57.	Spatula Chattaway	1	2	2
58.	Diamond pen	1	2	2
59.	Sahli mouth piece	1	10	10
60.	Nichrome wire	1Mtr	1	1
61.	Refrigerator	1	1	1
62.	Westergren tube aspirator	1	10	10
63.	Kidney basin	1	1	1
64.	Bone Marrow Needle	1	1	1
65.	60ml bottle for imm oil	1	1	1
66	Staining trough/ Schieferdecker	1	1	1
67.	Metal work tray	1	1	1
68.	Bucket	1	1	1
69.	200ml Storage bottle	1	1	1
70.	Water bath	1	1	1
71.	Stop Watch	1	1	1
72.	Water Still	1	1	1
73.	Electricity inverter	1	1	1
74.	Car Battery	1	1	1

Sources: Laboratory Subcommittee (1996)

Laboratory examination recommended by laboratory Subcommittee

Activities at the 'general laboratory' of referral hospital with surgical activities

Specimens	Specialties	Type of examination
Urine	Cytobacteriology	White blood cell, Red blood cell, Crystal, Gram stain
	Chemistry	Albumin / glucose
	Others	Pregnancy test
Stool	Parasitology	Research of intestinal parasites (direct examination+ concentration)
Blood	Hematology	Hemoglobin,Heamatocrite, White blood cell count, differential count, Platelets, Reticulocyts, Red blood cell morphology, Coagulation + bleeding time, Blood grouping, Syphilis test Hepatitis B, Hepatitis C, HIV, Cross-match.
	Biochemisrty	Urea, Creatinine, Bilirubine, blood glucose
	Parasitology	Research malaria parasite
	Serology	Widall test
Sputum	Bacteriology	Reseach Acid Fast Bacillus
Genital Discharge	Cytobacteriology + Parasitology + Mycology	Trichomonas, Candida, Gram stain, KOH (sniff test)
C.S.F Other	Cytobacteriology	White blood cell count+ differential count,, AFB, Gram
	Chemistry bacteriology	Glucose/ protein , research of leprosy bacilli
Body fluids examination	Cytobacteriology	White blood cell + differential count, A F B, Gram , Cryptococcus
	Chemistry	Proteine estimation (Rivalta)

Activities at the 'general laboratory' of referral hospital without surgical activities

Specimens	Specialties	Type of examination
Urine	Cytobacteriology	White blood cell, Red blood cell, Crystal, Gram stain
	Chemistry	Albumin / glucose
	Others	Pregnancy test
Stool	Parasitology	Research of intestinal parasites (direct examination+ concentration)
Blood	Hematology	Hemoglobin,Heamatocrite, White blood cell count, differential count, Platelets, Reticulocyts, Red blood cell morphology,
	Biochemisrty	Urea, Creatinine, Bilirubine, blood glucose
	Parasitology	Research malaria parasite
	Serology	Widall test
Sputum	Bacteriology	Reseach Acid Fast Bacillus
Genital Discharge	Cytobacteriology + Parasitology + Mycology	Trichomonas, Candida, Gram stain, KOH (sniff test)
C.S.F	Cytobacteriology	White blood cell count+ differential count,, AFB, Gram
	Chemistry bacteriology	Glucose/ protein , research of leprosy bacilli
Body fluids examination	Cytobacteriology	White blood cell + differential count, A F B, Gram , Cryptococcus
	Chemistrty	Proteine estimation (Rivalta)

** Note: The list of examination is almost identical only technical protocols will be different

Appendix D

Interview guideline for laboratory key informant

Section I

1. Date.....Duration of working in lab... .....years

2. Name..... Position .....

3. Hospital name..... .....

Section II

4. Regarding equipment and reagent, do you receive enough supplies from MoH?

Y☐ N☐

5. If, no what are the sources to compensate the need?

Equipment	**Reagent & Materials**
NGO .....☐	NGO .....☐
Hospital..... ☐	Hospital.....☐
Staff .....☐	Staff .....☐

6. What are the percentage of reagent/ material from each source?

Equipment	**Reagent**
Government .....%	Government .....%
NGO .....%	NGO .....%
Hospital.....%	Hospital.....%
Staff .....%	Staff .....%

7. Do you have enough equipment for the current activities perform?

Y□ N□

Do you have :

- Microscope Y□ N□
- Centrifuge heamatocrite Y□ N□
- Refrigerator Y□ N□
- Sterilizer (autoclave or dry sterilizer) Y□ N□
- Centrifuge Y□ N□
- Spectrophotometer Y□ N□

Section III

8. Regarding MoH supply, have you ever have any problem relate to reagent, material and equipment.? Y□ N□

If yes please state

Reagent.....

Equipment.....

Do you have any evidence? .....

.....

9. Regarding to NGO supply have you ever have any problem relate to reagent / material and equipment.? Y□ N□

If yes please state

Equipment.....

Do you have any evidence?

.....

10. In your opinion what do you think about the current supply system?

Government Good □ not good □

Detail explanation .....

.....

NGO Good ☐ not good ☐

Detail explanation .....

.....

Section IV

11. What are the process you usually order or report regarding your demand and consumption.....

.....

Section V

12. Do you have enough staff in the laboratory? Y ☐ N☐

How many person?.....

13. Have you ever had any problem or difficulty regarding the staff capacity?

.....

14. Is there any incentive system for the staff Y ☐ N☐

If yes from whom?

MoH ☐

Donor ☐

Hospital user fee ☐

Staff self income ☐

15. Is there any problem cause by the incentive system? Y ☐ N☐

If yes why?.....

.....

16. What would you like to recommend for improving the laboratory supplied system.

.....

ព្រះរាជាណាចក្រកម្ពុជា

ជាតិ សាសនា ព្រះមហាក្សត្រ

៛៛៛❁៛៛

ក្រសួងសុខាភិបាល

អគ្គនាយកដ្ឋានបច្ចេកទេសសុខាភិបាល

លេខ:...[illegible]...អបស/មព

រាជធានីភ្នំពេញ, ថ្ងៃទី [illegible] ខែ [illegible] ឆ្នាំ២០០១

លិខិតឧទ្ទេសនាម

♣♣♣

អគ្គនាយកបច្ចេកទេសសុខាភិបាល

មានៈ -លិខិតលេខCPH 9/ 2001 ចុះថ្ងៃទី 6 ខែ កុម្ភៈ ឆ្នាំ2001 របស់ THE COLLEGE OF PUBLIC HEALTH CHULALONGKORN UNIVERSITY.

ឱសថការី សុខ ឃីម ត្រូវបានអនុញ្ញាតឱ្យចុះជួបពិភាក្សានិងស្រង់ទិន្នន័យផ្នែកមន្ទីរពិសោធន៍ នៅតាមមន្ទីរពេទ្យជាតិ វិទ្យាស្ថានជាតិដែលពាក់ព័ន្ធនឹង ផ្នែកមន្ទីរពិសោធន៍ ក្នុងរាជធានីភ្នំពេញ។

អាស្រ័យហេតុនេះសូមលោកប្រធានអង្គភាពពាក់ព័ន្ធមេត្តាជួយសំរួលផ្តល់ការឧបត្ថម្ភដល់ ឱសថការី សុខ ឃីមក្នុងការបំពេញការងារខាងលើនេះតាមការគួរ។

លិខិតឧទ្ទេសនាមនេះមានប្រសិទ្ធភាពចាប់ពីថ្ងៃទី១៦ដល់៣០កុម្ភៈឆ្នាំ២០០១។

សាស្ត្រាចារ្យ. អេង ហួត

រងជូនៈ

ន្ទីរពេទ្យជាតិ

ទ្យាស្ថានជាតិ

ក្រសួងសុខាភិបាល លេខ: ១៥១-១៥៣ ... កម្ពុជាក្រោម ភ្នំពេញ - ... (៨៥៥ ២៣) ៤២៦៨៤១ - ៧២២៩៣៣ - ...
STRY OF HEALTH NO. 151-153 AVENUE KAMPUCHEA KROM, PHNOM PENH, CAMBODIA, FAX PHONE (855-23) 426841, 722933 E-mail: MOH@camnet.com.kh

CURRICULUM VITAE

Name:	Sok Khim
Gender:	Female
Date of birth	January 12, 1963
Place of birth	Phnom Penh, Cambodia
Nationality:	Cambodian
Area of interest	Health System Development

Education

Bachelor of Pharmacy (1984-1989), Faculty of Pharmacy Phnom Penh, Cambodia.

Post graduate study: Management and Technology of Microbiology, Kumamoto City, Japan.

Professional Background:

1996 - Present: health officer of Laboratory Unit, Hospital Department, Ministry of Health, Cambodia.

1994-1996: Staff working at Curative and Preventive Department, Ministry of Health, Cambodia.

1992 – 1994: health officers of supplies department, provincial hospital Bathtambang province.

1989-1992: health staff working at the provincial hygiene and epidemiology center Bathtambang province