

## Economic evaluation of the AIDS Competence Process (ACP)

### A summary of the study

*Yot Teerawattananon, Inthira Yamabhai*

*Health Intervention and Technology Assessment Program (HITAP), Ministry of Public Health, Thailand*

[yot.t@hitap.net](mailto:yot.t@hitap.net); [inthira.y@hitap.net](mailto:inthira.y@hitap.net)

### Introduction

The AIDS Competent Process (ACP) is a strength-based, community mobilization approach to enhance local responses to HIV. Several external evaluations show that the approach succeeds in the empowerment and mobilization of communities in response to the HIV/AIDS epidemic. Still, the ACP and its transfer to other organizations is not without costs. Properly conducted economic evaluation would present reasoned and justifiable arguments as to why more or less resources should be directed towards the ACP.

However, as for other social policy and development interventions, the ACP yields multi-dimensional benefits beyond the reduction of AIDS related illness and the increase in life expectancy. Those benefits span over a large spectrum, related to the response to AIDS and beyond. Not only does the ACP reduce risks of HIV infection or improves access to proper care among those who are HIV infected, but also enables communities to increase the quality of life of all its members, whether infected or not, through the reduction of stigma and discrimination and through action on various local factors of vulnerability and risk. Moreover, the ACP fosters sustainability of the response through its management by the community itself.

Most current economic evaluations have attempted to establish a mechanical relationship between a specific intervention and the outcome in individuals. None of the current economic evaluations have been adequate to capture the relationship between inputs and the increase in social capital resulting from these

interventions. Therefore, there is a need for developing a more holistic framework for economic evaluations assessing interventions with complex, interrelated social outcomes.

This study aims to (i) develop a methodological framework for assessing the cost-effectiveness of the ACP and applying such a framework retrospectively to implementation in Asia and the Pacific; and (ii) provide capacity building recommendations to the Constellation to routinely measure and improve cost-effectiveness in its programs, applying the methodological framework.

### The AIDS Competence Process

The Constellation is a non-profit, non-governmental organization which envisions a world where “AIDS Competence” spreads faster than the virus. To achieve this, the Constellation stimulates and connects local responses to HIV/AIDS. A local response is the set of actions that individuals and communities undertake by themselves to address the HIV challenge, first of all using their own resources and strengths. The ACP facilitates these local responses through a community mobilization process that starts from the experience that each community has the capacity to solve their own problems. It provides a low-cost, high return possibility, since it is believed that when individuals, families and communities openly acknowledge that HIV/AIDS is a matter of concern, they act to prevent its effects, and mobilize in their environment the support they need to maintain the quality of their lives.

The Constellation, with support from the Asian Development Bank (ADB), has implemented a 2-year project from 2007-2009 to build capacity of non-governmental organizations (NGO) to learn and apply the AIDS Competence Process in their communities and facilitate sharing and learning on AIDS Competence. The project involves organizations from Cambodia, India, Indonesia, the Philippines, Papua New Guinea and Thailand. In all countries, the ACP methodology was presented and modified to respond to the threats of HIV/AIDS. Today, facilitators belonging to various organizations have established National Support Teams in each country to promote and use the ACP on a country level. In total 436 facilitators have been trained through an intensive process, and at least 543 communities have used the ACP in the abovementioned countries.

## Scope of the study

The study used first of all document review of existing methodological guidelines for economic evaluations. Secondly, a desk review and consultations with the Constellation, partners and community members were conducted. Thirdly, the team collected costs and outcome data of the ACP. Fourthly, consultations were held with funders, Ministry of Public Health’s personnel, academics, community leaders, program managers and staff before the compilation of the final report.

## Findings

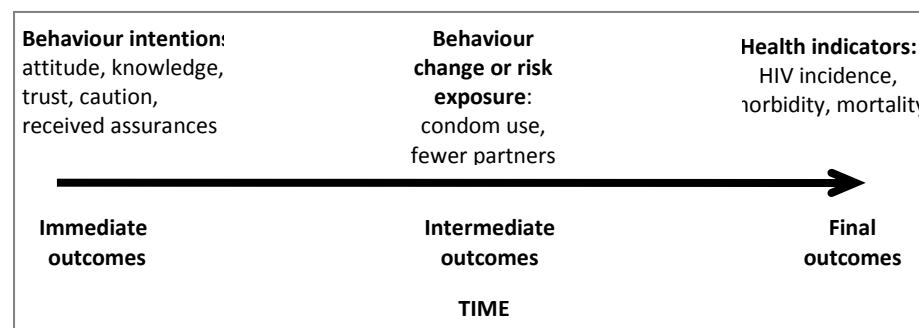
### *Methodological framework*

The study adopted the societal viewpoint. This viewpoint is closest to the model of welfare economics, which theoretically takes account of allocation efficiency within the whole economy, not just one sector. For the study, the attribution of the resources used and impact of the ACP are made in comparison with its counterfactual scenario or null scenario—the situation where there was no ACP implementation. Issues of time and uncertainty were addressed through discounting costs to their ‘present value’ and triangulation.

The measurement of costs logically followed the societal perspective. All direct and indirect costs related to the ACP and its related activities born by the Constellation, community NGOs, other local authorities, and individuals in the community need to be included. Furthermore, it was important to consider the estimation of productivity costs of people involved, non-HIV related medical costs, and opportunity costs of volunteer workers. Also corrections using health-care related inflation rates need to be considered.

The measurement of intervention effects focused on intermediate and final outcomes (figure 1). Since the ACP aims to improve individual and community capability (to respond to HIV/AIDS), this study explored a measurement of these outcomes in terms of “the change in individual and community capability” and “number of HIV infections averted”, respectively.

Measuring intervention effectiveness in terms of “increased capability” (see text box) is a very new concept, especially in economic evaluations. Landmark studies are those presenting the recent development of the “capability index” by Anand et al (Anand P and M. 2006), and Lorgelly et al (Lorgelly PK, Lorimer K et al. 2008). This index has the potential to be applied to the ACP and other interventions with complex social outcomes. A feasibility study assessed the potential of using the index for evaluating the ACP.



**Figure 1 - Outcome measures for HIV prevention interventions**

A “capability index” questionnaire developed by Lorgelly and her team is based on ten “Central Capabilities” as proposed by Nussbaum. This questionnaire was translated into Thai and first tested by HITAP researchers. Then, the capability index questions were combined with the self-assessment form, HIV risk behavior questions modified from the sentinel surveillance. This questionnaire was piloted in the general population at Amphawa District, Samut Songkhram Province, where 41 respondents completed the questionnaire (see Appendix 3). It was found that only the “capability index” and quality of life have normal distribution whilst self-assessment skews toward the right side. Only the capability index and quality of life had significant correlation. This result also confirms findings from the Glasgow’s survey (Lorgelly PK, Lorimer K et al. 2008).

### **The Capabilities approach**

Initially developed by Amartya Sen in the 1980s as an approach to welfare economics, the Capabilities Approach states that social arrangements should aim to expand people's capabilities – their freedom to promote or achieve valuable beings and doings ('functionings'). Put differently, capabilities are "the substantive freedoms a person enjoys to lead the kind of life he or she has reason to value." Development can be seen as a process of expanding the real freedoms that people enjoy. The approach is interested in what people are actually able to do or be. What real opportunities are available to them? Because of this focus on freedom of choice, the approach addresses some important limitations of measurement frameworks using utilitarian and resource-based approaches.

An ongoing debate addresses the relevant question: If development is expressed in capabilities, then what are the key capabilities? Although Sen himself refrains from providing a fixed list, Nussbaum came up with a list of ten 'Central Capabilities' that provide an accepted list of capabilities that are central for a life of human dignity: life, bodily health, bodily integrity, senses imagination and thought, emotions, practical reason, affiliation, other species, play, and control over one's environment (Nussbaum 2011, 2003)

The pilot showed that the self-assessment framework is used primarily for use at community level, for which individuals come together to discuss and assess the current local response to HIV/AIDS in the community. The tool is not suitable for individual use. As a result, the survey questionnaire was modified by removing the self-assessment and including the HIV attitude questions which were modified from the original self-assessment. In addition, the questions assessing HIV knowledge were added in the new survey questionnaire.

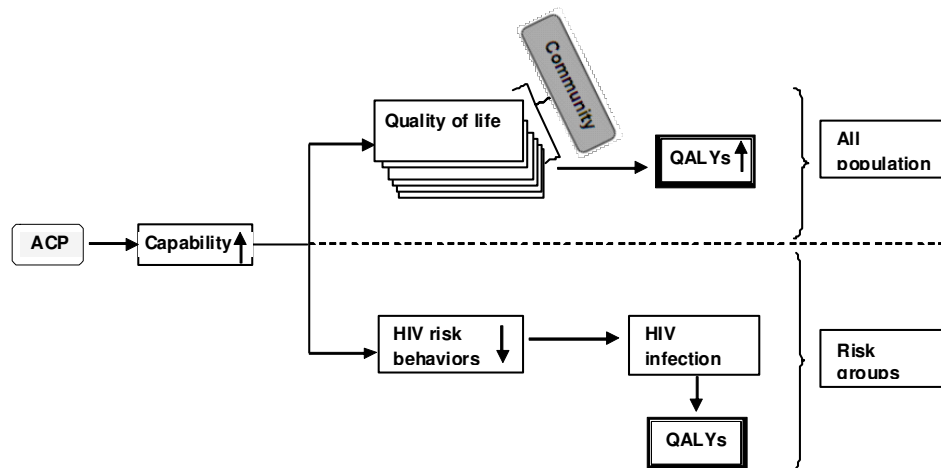
The new questionnaire combined five elements: personal background, the capability index, quality of life through the Visual Analogue Scale, HIV/ AIDS awareness and attitude and HIV risk factors (Annex 1). The questionnaire was tested and used to collect information from general and high-risk populations (i.e., men who have sex with men, MSM) in Nakorn Nayok and Chiang Mai Provinces in September 2010. The focus on MSM with a higher HIV risk behavior

than the general population could demonstrate better the relationship between capability, quality of life, and HIV risk behaviors.

The findings indicated that only the "capability index" was a significant determinant on quality of life, that is, the higher the capability, the better quality of life. In addition, it showed that the higher the capability, the lower the HIV risk. It was found that the "capability index" is a good predictor for the highest risk level. An increase of one unit in the "capability index" will decrease the relative risk of HIV for the highest risk group (over non-risk group) by around 0.51.

In conclusion, the study demonstrated the possibility of measuring intermediate and final outcomes of the ACP using the "capability index". This index is an appropriate measure because it was strongly associated with quality of life of population and HIV risk behavior score. The detection of the change in the "capability index" among population affected by the ACP will help estimate the change of quality of life in population (due to the enhancement of individual and community capability—suggesting that a community-focused capability approach has an impact on individual quality of life), and the reduction of HIV risk behaviors, which will result in reduction of HIV infections (or number of HIV infections averted).

Figure 2 illustrates the conceptual framework for measuring effectiveness of the ACP. The effectiveness of the ACP can be measured in terms of improvement of individual and community capability. The individual capability can be measured using the "capability index" questions, whilst the community capability can be measured by self-assessment. The change of individual capability can be used to estimate the increase of quality of life among people with and without HIV risk behavior (as a result of their increased functioning) (Lorgelly PK, Lorimer K et al. 2008). The increased capability will reduce HIV risk behavior among risk groups and result in subsequent reduction of HIV infections. The decreased incidence of HIV infections means that quality of life and life years (QALYs) were saved.



**Figure 2: Hybrid model for economic evaluation of the ACP**

**Economic evaluation**

Without empirical evidence on the change of “capability index” attributable to the ACP, we assumed that the ACP increased the “capability index” score by 1, which is equal to the increased quality of life of 0.04 (utility unit ranges from 0 to 1). The methodological framework was then applied to ACP to conduct an economic evaluation. The team held a focus group discussion with seven former trainees who attended the training process of the ACP provided by the Constellation. Cost-effectiveness outcomes were presented for various scenarios.

The first scenario assumed that the trained facilitators applied the ACP to 5,500 community members. The second scenario assumed 1,500 community members. These community members then increased their “capability index” score by 1 unit and also increased condom use by 1%, 5% or 10%. For the null scenario or no ACP introduction the estimated lifetime cost of conventional HIV prevention program plus treatment for those with HIV infection (estimating that there were 9.72 infected cases) for 5,500 populations is 3.4 million Baht.

When the ACP is introduced to this population and condom use increases by 1%, the estimated cost is 9.6 million Baht and the number of HIV infection decreases to 9.49 cases. Life years (LYs) and QALYs of these 5,500 people for the null scenario are 120,238 and 98,595, respectively.

Table 1 presents ICERs of the ACP with different levels of increased condom use in general population, FSWs, and MSM. ICERs of the ACP introduced in 5,500 of the general population range from 1,075 Baht per QALY to 1,179 Baht per QALY. ICERs of the ACP introduced in 1,500 of the general population is relatively higher than that for a population of 5,500 because the ACP cost was fixed. ICERs of the ACP in FSW and MSM range from cost-saving (if the ACP increases the condom use in FSW or MSM by 10%) to 159,000 Baht per QALY (if the ACP increases the condom use in MSM by 1% for a general population of 1,500).

**Table 1 : Incremental costs, outcomes, and incremental cost-effectiveness ratios (ICERs) of the ACP among respectively general population, female sex workers and MSM in Thailand**

	General population 5,500 people			General population 1,500 people		
	increased condom use			increased condom use		
	1%	5%	10%	1%	5%	10%
Incremental cost	6,216,714	5,955,715	5,677,036	4,224,705	4,138,153	4,043,647
Incremental HIV averted	0.23	1.06	1.93	0.07	0.33	0.61
Incremental LYs	1.34	6.24	11.49	0.44	2.08	3.87
Incremental QALYs	5,272	5,277	5,281	1,521	1,522	1,524
ICER per HIV averted	27,007,311	5,612,565	2,946,546	59,470,471	12,538,352	6,682,351
ICER per QALY gained	1,179	1,129	1,075	2,778	2,718	2,653

	FSW594: general population 5,500 people			FSW162: general population 1,500 people		
	increased condom use			increased condom use		
	1%	5%	10%	1%	5%	10%
Incremental cost	2,817,766	236,645	-2,799,758	3,116,992	1,883,879	414,299
Incremental HIV averted	1.83	7.31	13.74	0.77	3.34	6.40
Incremental LYs	517	567	627	112	136	165
Incremental QALYs	994	1,042	1,097	251	274	301
ICER per HIV averted	1,537,410	32,373	-208,723	4,052,149	564,014	64,733
ICER per QALY gained	2,834	227	-2,552	12,407	6,877	1,376

	MSM 66: general population 5,500 people			MSM 18 : general population 1,500 people		
	increased condom use			increased condom use		
	1%	5%	10%	1%	5%	10%
Incremental cost	2,878,294	650,702	-2,085,041	3,263,855	2,645,930	1,869,659
Incremental HIV averted	1.14	6.68	15.18	0.29	1.72	3.97
Incremental LYs	66	109	161	14	26	42
Incremental QALYs	84	125	174	20.45	31.71	45.72
ICER per HIV averted	2,515,329	97,366	-137,310	11,160,562	1,534,666	471,102
ICER per QALY gained	34,122	5,220	-12,009	159,637	83,435	40,897

It can be seen that LYs and QALYs of the ACP with 1% increased condom use are more than in the null scenario. This is because of the increase in quality of life due to the increase in individual capability and the reduction of number of HIV infections among this population.

Incremental Cost Effectiveness Ratio's (ICERs)<sup>1</sup> of the ACP introduced in 5,500 of the general population range from 1,075 Baht per QALY to 1,179 Baht per QALY. ICERs of the ACP introduced in 1,500 of the general population is relatively higher than that for a population of 5,500 because the ACP cost was fixed. ICERs of the ACP in FSW and MSM range from cost-saving (if the ACP increases the condom use in FSW or MSM by 10%) to 159,000 Baht per QALY (if the ACP increases the condom use in MSM by 1% for a general population of 1,500).

### **Recommendations for future measurement of impact of ACP**

The second objective of the study is to provide capacity building recommendations to the CST to routinely measure impact and improve cost-effectiveness of the ACP. These recommendations can also be applied by other agencies who wish to evaluate and value benefits of other interventions with complex social outcomes.

<sup>1</sup> ICER is defined as the ratio of the change in costs of an intervention (in this case compared to the counterfactual scenario or the situation where there was no ACP implementation) to the change in effects of the intervention.

The ACP of the Constellation is seen by the evaluation team as a human capacity development activity. Ideally, it should be implemented with close monitoring and evaluation, so that data gathered from the evaluation can feed back for further improvement. These include parameters discussed above, such as population reached by the ACP, "capability index" score improved as a result of the ACP, resources used and costs of communities' responses to the ACP. This process should not be seen as a linear or a one-off event but a circular process (i.e., as a research and development loop). It needs three components of evaluation:

1. *Formative research.* This involves exploratory work to guide the design of the intervention or implementation activities. This includes pre-testing materials used in the ACP and selection criteria of facilitators to offer the ACP training. It is recommended to include people across all sectors and support a range of stakeholders in a certain province or a certain issue like youth-related HIV programmes. This is to ensure that individual, institutional and network capability are all promptly enhanced, which will enable collegial and institutional support to those working in the ACP.
2. *Process evaluation.* It is important that the evaluation is capable of informing not only whether the intervention has achieved its aims or not but also why, so that the findings can be used to guide further improvement. This can provide insights into what factors may hinder or facilitate desirable achievements. Examples are the evaluation of training and supervision processes carried out. Secondly, to better measure the applications of the ACP in community engagement, qualitative research methods such as focus group discussion, interviews or observational studies can be conducted. The 'Knowledge Fair' is one way of arriving at the qualitative measurement. Thirdly, the local responses towards human capacity development should be qualitatively and quantitatively assessed in order to demonstrate both desirable and unintended consequences of the ACP. Examples can be the number of community members being aware of the importance of HIV and willing to contribute, case studies and changes in attitudes. Some of these indicators can be captured through routine administrative sources.
3. *Outcome evaluation* aims to examine whether the intervention achieves its pre-defined ultimate goals. Economic evaluation of the ACP should be conducted alongside an assessment of its effectiveness, so its findings are

much more acceptable and useful for policy decisions. In addition, the use of modeling in economic evaluation is acceptable for extrapolation of short term outcomes collected from the field to ultimate impact. We recommend that the model should be used in a transparent way but not as a replacement for scientific evidence.

Future research is needed to confirm the usefulness of this newly developed tool for assessing outcomes and impact of the ACP. Nevertheless, the methodological standard technique for impact evaluation—randomized controlled trial (RCT) — is inappropriate and potentially misleading. RCTs are most appropriate and effective when the intervention can be delivered and received in a standard way, that is, when variations in delivery and acceptance are minimized. In contrary, the ACP involves multi-dimension in developing human capacity through facilitation and knowledge management tools rather than illness and biomedical interventions and this makes it difficult to impose tight environmental controls when implementing the intervention, or time and resource limits to evaluate the long-term effects. It is suggested that pair-matched cluster quasi-experiment, or pre- and post test evaluation are among the potential candidates.

Finally, the ACP does not only affect individuals by directly influencing individuals to change their risk behaviors, but also the community. If the ACP is effective in prevention and control of HIV/AIDS, it is likely that the ACP also changes social norms/context to affect the favorable climate in which desirable outcomes can be achieved. Thus, it is very important for monitoring and evaluation, and improving efficiency of the ACP, that the characteristics and causal relationship between the changes of individuals and their community norms/context are determined. As a result, we recommend that future research should help identify the relationship between the community indicator, self-assessment, and an aggregate indicator, the “capability index”. This would facilitate a better understanding of the importance of community norms/context on the change in individual behavior and its application to other development projects.

## Discussion and conclusions

This study was conducted with some constraints. The ACP was not designed for economic appraisal and, therefore, the availability and quality of cost and outcome data for comprehensive cost-effectiveness or cost-utility analysis were limited. For example, it was difficult to identify information of additional resources used and costs of communities’ responses to the ACP. There was no information on how much population was reached by the ACP in Thailand in total and how much the “capability index” score improved as a result of the ACP among those reached by the ACP. Thus, this economic evaluation is rather to explore the information gap for future economic evaluation of the ACP and how to guide the ACP’s monitoring framework.

The study demonstrated the possibility of measuring intermediate and final outcomes of the ACP using the “capability index”. This index is an appropriate measure because it was strongly associated with quality of life of population and HIV risk behavior score. An increase of one unit in the “capability index” will decrease the relative risk of HIV for the highest risk group (over non-risk group) by around 0.51. A community-focused capability approach like ACP that enhances individual and community capability, has an impact on the quality of life and reduction of HIV risk behaviors, leading to new HIV infections being averted.

Under the scenario assumptions of this study and comparing costs and outcomes of the ACP using various scenarios, it is found that the ACP is likely to be very cost-effective in Thailand. Comparing ICERs of the ACP with other HIV prevention programs from the systematic review carried out by Pattanapasaj and Teerawattananon (Pattanapasaj, Teerawattananon et al. 2008). The ACP saves one QALY using resources valued less than 1 Gross Domestic Product per capita (approximately 140,000 Baht), which is a cost-effectiveness benchmark defined by the National Health Security Office who manages the HIV prevention program in Thailand. The ACP is a cost-saving intervention if it increases condom use in FSWs or MSM by more than 10%. In addition, this study suggests that the higher the number of the population reached the ACP, the more cost-effective it is as the ACP not only averts HIV infection in the population, but also improves individual capability resulting in increased quality of life among individuals.

## References

- Anand P and v. H. M. (2006). "Capabilities and achievements: an empirical study." Journal of Socio-Economics **35**: 268-284
- Antonica Hembe, Innocent Modisaotsile, et al. (2006). Expert Think Tank Meeting on HIV Prevention in High-Prevalence Countries in Southern Africa UNAIDS.
- Briggs, A. (2001). Handling uncertainty in economic evaluation and presenting the results. Economic Evaluation in Health Care. M. F. Drummond and A. McGuire. Oxford, Oxford University Press.
- Brouwer, W. B. F., N. J. A. van Exel, et al. (2002). "Productivity costs before and after absence from work: as important as common?" Health Policy **61**(2): 173-187.
- Canadian Coordinating Office for Health Technology Assessment (1997). Guideline for economic evaluation of pharmaceuticals: Canada. s. edition. Ottawa, Canadian Coordinating Office for Health Technology Assessment.
- Cooper, N., D. Coyle, et al. (2005 Oct). "Use of evidence in decision models: an appraisal of health technology assessments in the UK since 1997." J Health Serv Res Policy **10**(4): 245 - 250.
- Drummond, M. (2003). "Making economic evaluations more accessible to health care decision-makers." European Journal of Health Economics **4**: 246-247.
- Drummond, M., D. Brixner, et al. (2009). "Toward a Consensus on the QALY." Value in Health **12**: S31-S35.
- Drummond, M., B. O'Brien, et al. (1997). Method for the economic evaluation of health care programmes. New York, Oxford University Press.
- Gold, M., J. Siegal, et al. (1996). Cost-Effectiveness in Health and Medicine. New York, Oxford University Press.
- Hjelmgren, J., F. Berggren, et al. (2001). "Health Economic Guidelines: Similarities, Differences and Some Implications." Value Health **4**(3): 225-250.
- International Monetary Fund (2010). World Economic Outlook (WEO).
- Kitajima, T., Y. Kobayashi, et al. (2003). "Costs of medical services for patients with HIV/AIDS in Khon Kaen, Thailand." Aids **17**(16): 2375-2381.
- Koopmanschap, M. A. and B. M. van Ineveld (1992). "Towards a new approach for estimating indirect costs of disease." Social Science & Medicine **34**(9): 1005-1010.
- Kristensen, F. B., M. Horder, et al. (2001). Health Technology Assessment Handbook. f. edition. Copenhagen, Danish Institute for Health Technology Assessment.
- Lamboray, J.-L. and S. M. Skevington (2001). "Defining AIDS Competence : A working model for practical purposes"  
" Journal of International Development **13**(4): 513-521.
- Leelahavarong, P. and Y. Teerawattananon (2010). Economic evaluation of Prime-Boost HIV vaccine ALVAC-HIV® and AIDSVAX B/E® for the Thai population. Nonthaburi, Health Intervention and Technology Program. **1**.
- Leelukkanaveera, Y. (2009). An economic evaluation of routine offer HIV counseling and testing of out patients at community hospitals in Thailand. Department of Preventive and Social Medicine, Faculty of Medicine. Bangkok, Chulalongkorn University. **Doctor of Philosophy Program: 218**.
- Lorgelly PK, Lorimer K, et al. (2008). The Capability Approach: developing and instrument for evaluating public health interventions, Section of Public Health and Health Policy, University of Glasgow.
- Maleewong, U., V. Kulsomboon, et al. (2008). "The cost-effectiveness analysis of initiating HIV/AIDS treatment with efavirenz-based regimens compared with nevirapine-based regimens in Thailand." J Med Assoc Thai **91 Suppl 2**: S126-138.
- Meltzer, D. (1997). "Accounting for future costs in medical cost-effectiveness analysis." J Health Econ **16**(1): 33-64.
- Morea, R., J. K. Kamasua, et al. (2009). Review of ACP and COMATAA re HIV/AIDS in Papua New Guinea, World Health Organization and UNICEF.
- National AIDS Prevention and Alleviation Committee ( 2008). UNGASS Country Progress Report 2008: Reporting period: January 2006 – December 2007. Bangkok, National AIDS Prevention and Alleviation Committee.
- National Institute for Clinical Excellence. (2004). "Guide to the methods of technology appraisal."
- Neumann, P. (2005). Using cost-effectiveness analysis to improve health care: opportunities and barriers. Oxford, Oxford University Press.
- Nussbaum M. (2011). "Creating Capabilities, The Human Development Approach". Harvard University Press.
- Nussbaum, M. (2003). "Capabilities as fundamental entitlements: Sen and social justice." Feminist Economics **9**(2-3): 33-59.

- Ono, S., T. Kurotaki, et al. (2006). "Cost-effectiveness analysis of antiretroviral drug treatment and HIV-1 vaccination in Thailand." Jpn J Infect Dis **59**(3): 168-173.
- Pathipvanich, P., K. Ariyoshi, et al. (2003). "Survival benefit from non-highly active antiretroviral therapy in a resource-constrained setting." J Acquir Immune Defic Syndr **32**(2): 157-160.
- Pattanapasaj, J., Y. Teerawattananon, et al. (2008). Identifying information regarding effectiveness and cost-effectiveness of policy and strategies reorientation to mitigate the impact of HIV/AIDS in Thailand. Nonthaburi, Health Intervention and Technology Assessment Program.
- Permsuwan, U., K. Guntawongwan, et al. (2008). "Handling time in economic evaluation studies." J Med Assoc Thai **91 Suppl 2**: S53-58.
- Revenga, A., M. Over, et al. (2006). The economics of effective AIDS treatment: evaluating policy options in Thailand. Washington DC, The World Bank.
- Schulenburg, J.-M. G. v. d. and C. Hoffmann (2000). "Review of European guidelines for economic evaluation of medical technologies and pharmaceuticals." HEPAC Health Economics in Prevention and Care **1**: 2-8.
- Sirivichayakul, S., P. Phanuphak, et al. (1992). "Clinical correlation of the immunological markers of HIV infection in individuals from Thailand." Aids **6**(4): 393-397.
- Szende, A., Z. Mogyorósy, et al. (2002). "Methodological guidelines for conducting economic evaluation of healthcare interventions in Hungary: a Hungarian proposal for methodology standards." HEPAC Health Economics in Prevention and Care **3**(3): 196.
- Teerawattananon, Y., S. Russell, et al. (2007). "A systematic review of economic evaluation literature in Thailand: are the data good enough to be used by policy-makers?" Pharmacoeconomics **25**(6): 467-479.
- The Analysis and Advocacy Project (A<sup>2</sup>) in Thailand and The Thai Working Group on HIV/AIDS Projection (2005) (2008). The Asian Epidemic Model (AEM): Projections for HIV/AIDS in Thailand: 2005-2025. Nonthaburi, Family Health International (FHI) and Bureau of AIDS, TB and STIs, Department of disease Control, Ministry of Public Health, Thailand.
- The Thai Working Group on Burden of Disease and Injuries (November 2002). Burden of disease and injuries in Thailand. Nonthaburi, Printing House of The War Veterans Organization of Thailand Under Royal Patronage of His Majesty the King.
- The Thai Working Group on HIV/AIDS Projection (2001). Projections for HIV/AIDS in Thailand: 2000-2020. Bangkok, Karnsana Printing Press.
- The Thai Working Group on National AIDS Spending Assessment (NASA) (2008). UNGASS on HIV/AIDS reporting requirement 2008: National Expenditure on HIV/AIDS. Nonthaburi, International Health Policy Program.
- UNAIDS/UNITAR (2005). Evaluation of the UNAIDS/UNITAR: AIDS Competence Programme. Geneva, Switzerland.
- van Baal, P. H., T. L. Feenstra, et al. (2007). "Unrelated medical care in life years gained and the cost utility of primary prevention: in search of a 'perfect' cost-utility ratio." Health Econ **16**(4): 421-433.
- Walker, D. (2001). "Cost and cost-effectiveness guidelines: which ones to use?" Health Policy and Planning **16**(1): 113-121.
- Weinstein, M. C. and W. G. Manning, Jr. (1997). "Theoretical issues in cost-effectiveness analysis." J Health Econ **16**(1): 121-128.