行政院國家科學委員會專題研究計畫 期末報告

愛滋病數學建模分析研究

計 畫 類 別 ：個別型
計 畫 編 號 ：NSC 100-2115-M-039-002-
執 行 期 間 ：100 年 08 月 01 日至 101 年 09 月 30 日
執 行 單 位 ：中國醫藥大學公共衛生學系

計 畫 主 持 人：謝英恆

計畫參與人員：碩士級-專任助理人員：吳貞霖

報 告 附 件 ：出席國際會議研究心得報告及發表論文

公 開 資 訊 ：本計畫可公開查詢

中 華 民 國 101 年 09 月 26 日

中 文 摘 要 ： 我們利用開放族群的廣義去除模型（Generalized Removal Model for Open Populations or GERMO），一個貝葉斯(Bayesian)馬爾可夫鏈蒙特卡羅（MCMC）方法，及在北京男同性戀(men having sex with men or MSM)族群的2005-2007年兩次血清採樣數據，來估計採樣的北京男同性戀族群中愛滋病病毒感染者和愛滋病病毒感染者未被發現的人數。目的為了解在北京男同性戀族群中愛滋病病毒感染率的實際幅度和時間趨勢。結果發現在這族群中愛滋病毒感染者人數的估計中值(mean estimate)幾乎上升了一倍，從2005年7-11月的51（95%CI：36-72）至2006年11月的97（95% CI：75-126。未被發現的愛滋病病毒感染者的估計數也增加了一倍以上，從34（95%CI：19-55）到72（95%CI：30-101）。所有估計HIV流行指標之間的兩個採樣週期的上升趨勢是引起人們的關注，未來的醫療負擔。

中文關鍵詞： 愛滋病毒/愛滋病，男同性戀，北京，開放族群的廣義去除模型，血清流行病學調查，漏報。

英 文 摘 要 ： To estimate the numbers of HIV-infected persons and undetected HIV-infected persons in a sampled MSM subpopulation in Beijing by utilizing the Generalized Removal Model for Open Populations (GERMO), a Bayesian Markov chain Monte Carlo (MCMC) methodology, in order to ascertain the true magnitude and the temporal trend of HIV prevalence among MSMs in Beijing. The median estimate for the number of HIV-infected individuals in this MSM subpopulation almost doubled from 51 (95% CI: 36-72) in July-November of 2005 to 97 (95% CI: 75-126) in November 2006-February 2007； while the estimated number of undetected HIV-infected individuals more than doubled from 34 (95% CI: 19-55) to 72 (95% CI: 30-101). The increasing trend of all estimated HIV prevalence indicators between the two sampling periods is a cause for concern of future healthcare burden.

英文關鍵詞： HIV/AIDS； MSM； Beijing； GERMO； seroprevalence survey； underreporting.

附件一

行政院國家科學委員會補助專題研究計畫 □期中進度報告 ■期末報告

愛滋病數學建模分析研究

計畫類別：■個別型計畫　□整合型計畫
計畫編號：NSC　100－2115－M－039－002－
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執行機構及系所：中國醫藥大學公共衛生學系

計畫主持人：謝英恒
共同主持人：
計畫參與人員：

本計畫除繳交成果報告外，另含下列出國報告，共 _2_ 份：
□移地研究心得報告
■出席國際學術會議心得報告
□國際合作研究計畫國外研究報告

處理方式：除列管計畫及下列情形者外，得立即公開查詢
□涉及專利或其他智慧財產權，□一年■二年後可公開查詢

中　華　民　國　101 年　9　月　17　日

目 錄

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英文摘要及關鍵詞

To estimate the numbers of HIV-infected persons and undetected HIV-infected persons in a sampled MSM subpopulation in Beijing by utilizing the Generalized Removal Model for Open Populations (GERMO), a Bayesian Markov chain Monte Carlo (MCMC) methodology, in order to ascertain the true magnitude and the temporal trend of HIV prevalence among MSMs in Beijing. The median estimate for the number of HIV-infected individuals in this MSM subpopulation almost doubled from 51 (95% CI: 36-72) in July-November of 2005 to 97 (95% CI: 75-126) in November 2006-February 2007; while the estimated number of undetected HIV-infected individuals more than doubled from 34 (95% CI: 19-55) to 72 (95% CI: 30-101). The increasing trend of all estimated HIV prevalence indicators between the two sampling periods is a cause for concern of future healthcare burden.

Keywords: HIV/AIDS; MSM; Beijing; GERMO; seroprevalence survey; underreporting.

報告內容

Estimating HIV Prevalence and Underreporting in a MSM Subpopulation in Beijing

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1. Introduction

Men who have sex with men (MSM) have become one of the most at high risk populations for Human Immunodeficiency virus (HIV) infection in China [1], and particularly in large cities such as Beijing [2-4]. While several cross-sectional seroprevalence studies had been conducted in recent years [1-5], the annual HIV incidence among the MSMs in China remains largely unknown. In particular, two consecutive cross-sectional serosurveys by the National Center for AIDS/STD Control and Prevention (NCAIDS), China Center for Disease Control and Prevention (China CDC) were conducted among the MSM population in Beijing between July to November 2005 [2], and again between November 2006 and February 2007 [5-6]. The first survey of 526 MSMs found that 17 (3.23%) of the participants were infected with HIV, while the second survey of 540 MSMs revealed that 25 (4.63%) were infected with HIV. Although these HIV prevalence rates tend to be smaller than those reported by similar MSM studies in the West [7], the alarmingly large increase of nearly 50% more infective-positive MSMs in less than two years motivates our study to further explore the epidemiological and public health implications of these reports.

Recent developments in statistical computing have made Bayesian analysis accessible to researchers in epidemiology and other fields. The innovation of Markov chain Monte Carlo (MCMC) methodology has facilitated the estimation of complex models that are difficult to estimate using alternative methods. Our aim is to make use of this advance in statistical methodology to further our understanding of HIV epidemiology of the MSM population in Beijing.

2. Materials and Methods

Data

For the two cross-sectional serosurvey studies that were conducted during July-November of 2005 [2] and between November 2006-February 2007 [5-6] in the same districts in Beijing, study participants were recruited in three following ways: (i) through advertisements at the NCAIDS website (www.chinaids.org.cn) and a nongovernmental AIDS volunteer group (www.hivolunt.net); (ii) 15 peer recruiters were hired and trained to reach out to clubs, bars, parks, and bath houses frequented by the MSMs and to distribute flyers with study-related information to recruit volunteers for this study; (iii) the study participants were encouraged to refer their peers to participate in the study. All potential participants came to a district HIV testing and counseling clinic in downtown Beijing for eligibility assessment. Hence the sampling is partly convenient and partly voluntary. Eligibility criteria included self-reported same-gender sex in the past 6 months, Beijing residency, and a willingness to provide written informed consent. Written informed consent was obtained from all study participants before they were interviewed. Those who met the screening criteria then completed an HIV/STD risk assessment interview, received HIV pretest and risk-reduction counseling, and had blood drawn to test for HIV and syphilis antibodies. Participants were also given HIV post-test counseling when they subsequently returned for their HIV test results. A summary of distribution of recruitment methods of all survey participants is given in Table 1.

The study protocol and informed consent form were approved by the institutional review board (IRB) of the NCAIDS. For a detailed description of the data collection and laboratory analysis, as well as the details of the 2005 survey, the readers are referred to [2]. Similarly, results of the second survey, using similar sampling procedures and conducted in the same areas in Beijing, are given in [5-6].

For the present study, the HIV serotest results from these two serosurveys are given in Table 2. Note that, for the second sampling period (11/2006-2/2007), there were in fact 541 individuals sample with 26 HIV-positive. However, one of the HIV-positive individuals had been

tested positive in the first sampling, and hence is not included in the second sampling since our statistical estimation method (to be discussed below) requires that those subjects that were tested positive in one sampling must be removed from all subsequent samplings, since it is reasonable to assume that those tested positive will not be tested again. We also note that 43 other persons in the second sample had participated in the first survey study but were found to be seronegative, and hence they remained in the sampled population for the second sampling.

More detailed socio-demographic characteristics of the sampled MSM subpopulation are given in detail in [2, 6, 8]. Our estimation results are relevant to this MSM subpopulation in Beijing only.

Statistical Method: Generalized removal model for open populations (GERMO)

In order to gain insight into the true magnitude of HIV prevalence among the MSM population in Beijing given the restriction that the actual MSM population size is unknown, we make use of the two above-mentioned HIV serosurveys conducted in Beijing between 2005 and 2007 to estimate the number of HIV-infected persons among the sampled MSM subpopulation in Beijing, by utilizing the "Generalized Removal Model for Open populations" [9-16], or the GERMO methodology, which requires at least two sets of sampling data. We consider the two serotest data as random samples drawn from a certain MSM subpopulation in Beijing that can be reached by the sampling procedures employed, in order to estimate the HIV-infected population size in this subpopulation.

In recent years, capture-recapture method (or multiple-record system method in dealing with human populations) has frequently been used for estimating elusive, hard-to-count population groups, such as the MSMs or the intravenous drug users (IDUs), where the emphasis has always been placed on estimating the sizes of these population groups. However, a more direct question of epidemiological importance is the actual number of seropositives within a particular group. In our framework the population size to be estimated is the number of HIV-infected individuals within a certain hard-to-count population who have not developed AIDS defined Illness (ADI), assuming that those individuals with AIDS symptoms would be known and

under treatment. Moreover, there is no recapture since those tested positive will not be tested again, hence the "removal model" [9-10] is the appropriate choice of model for our estimation.

Clearly, given the limited amount of data it is not possible to obtain a valid estimate using the maximum likelihood estimation. Hence we make use of the Bayesian inference of the HIV-infected population size. The Bayes analysis of the model is implemented by using the Gibbs sampler, an MCMC method [17].

The estimation procedure of GERMO is outlined in detail in [11]. We also assume that the natural mortality rate of the MSM population during this time period is small, since the subjects are of ages 17-54 in the first survey (mean age 26.2) [2] and 18-62 in the second survey (median age 27) [6] when the individuals' natural mortality is low compared to AIDS-related death rate. Moreover, it has been shown that small variation in natural mortality does not affect the estimation result [11]. Several application of this procedure to estimation of HIV-infected population sizes among at high risk groups can be found in [12-16]. The Bayes estimates are based on the Monet Carlo samples from the Gibbs Sampler run of 50000 iterations after 30000 burn-in.

3. Results

The estimation results with 95% confidence intervals (CI) are given in Table 3, where the first median estimates are the estimated number of HIV-positive MSMs among the MSM population in Beijing that was sampled during these sampling periods. The median estimates for number of HIV-infected individuals in this MSM subpopulation increase by 90% from 51 (95% CI: 36-72) in 2005 to 97 (95% CI: 75-126) in 2006-2007. Note that any fraction in the median estimate is rounded off to one individual.

In order to further gauge the information provided by this estimation procedure, we compute the estimated number of *undetected* HIV-positive persons during each sampling period, by subtracting the number of detected HIV cases in Table 2 from the median estimates of HIV-infected population in Table 3, for the two respective samples. The 95% CIs are treated similarly. The results are also given in Table 3. We also compute the percentage of the HIV-infected MSMs that remain undetected for each sampling period with 95% CI; the results are given in Table 3 where the estimated number of the undetected HIV-infected individuals in this MSM subpopulation increase by 112% from 34 (95% CI: 19-55) in 2005 to 72 in 2006-2007 (95% CI: 30-101).

One can further make use of the estimated number of HIV-positive persons in the population group in question to infer estimates of the actual size of this population group at each sampling time by simply dividing the estimated number of HIV-infected person by the HIV seroprevalence rate from each sampling [16]. To illustrate, we divide the median estimates for the HIV-infected MSMs in Table 3 by the HIV prevalence rate for each sampling period for the two respective estimations, to obtain the estimates of this sampled MSM subpopulation in Beijing with 95% CIs given in the last three rows of Table 3 where it increases by 34% from 1153 (95% CI: 1579-2229) in 2004 to 2112 (95% CI: 1637-2738) in 2005-2006. Note that, assuming no deaths occurred among these HIV-positive individuals during the short time between the two sampling periods, we added back the 17 HIV-infected MSMs (in Table 2) removed after the first sampling period to our estimate of total MSM subpopulation size during the second sampling

period in the third row from bottom of Table 3, i.e., 97÷4.63%+17=2112, to be consistent with our removal model assumption that those tested positive in previous samplings are removed from all subsequent sampling subpopulation.

In Figure 1, we give the numbers of the HIV-infected MSMs (both known and undetected) and the total MSM subpopulation size are in semilog scale; and the percentages (in shaded blocks) of the HIV-infected MSMs in the sampled MSM subpopulation and proportions of the undetected HIV-infected MSMs between the two sampling periods. Note that the corresponding 95% CIs are also shown, except for the percentages of the HIV-infected MSMs in the sampled MSM subpopulation are exact and hence have no 95% CIs.

4. Discussion

Figure 1 graphically illustrates the trends of all relevant HIV prevalence indicators for this MSM subpopulation between 7/2005-11/2005 and 11/2006-2/2007, all of which except for the percentage of the HIV-infected MSMs remaining undetected show a substantial increase. The estimated number of the undetected HIV-infecteds exhibits the largest jump, indicating rapidly increasing HIV prevalence in this subpopulation.

The exact characteristics of this sampled MSM subpopulation is difficult to describe, since three recruitment methods were used in both samplings and it is likely that the participants recruited through these methods could actually have come from multiple overlapping MSM subgroups in Beijing. Hence our estimates of population size are for this sampled MSM subpopulation in Beijing only, which only provides a partial perspective on the overall HIV prevalence among MSMs in Beijing but, more importantly, sheds some lights on its temporal trend.

In any event, the increasing trend of HIV prevalence among the MSMs, as indicated by the increase in the number of HIV-infected MSMs (both known and undetected), and of the MSM population size between the two sampling periods indicate a strong case for future concern in terms of social and public health burden. However, the estimated percentage of the HIV-infected MSMs that remains undetected in our sampled MSM subpopulation decreases slightly from 66.7% (34/51) to 63.2% (72/97) despite the steady increases in HIV infections and in the MSM population size in Beijing. Whether this gives indication of reduced HIV underreporting, perhaps in parts due successful efforts of intervention measures by the government, is a subject for further studies.

There are, of course, limitations to our GERMO estimation procedure, as there are with any estimation methods. For example, the data were treated statistically as if they were randomly drawn from the sampled subpopulation, although in reality their recruitment (i.e., convenient/voluntary) inevitably introduced selection bias. Whether this bias contributes toward the finding of an increasing prevalence is difficult to determine. Relevant discussions on its

application in various scenarios of interest for estimating HIV-infected population size among at high risk, elusive population groups can be found in [11-15]. The small number of samplings also contributes to larger CI ranges in some of the estimates when compared with previous studies using the same methodology. It suffices to say that, although widely useful in many applications of epidemiological studies, one must exercise caution in determining how well the data corresponds to the assumptions made for the estimation procedure.

For the present work, inconsistencies in the estimates as a result of the restrictions imposed by the random sampling assumptions are very likely to occur, due to the use of data from convenient/voluntary sampling. Any improvement in this direction, however, is difficult since population-based data of this nature (i.e., consecutive random seroprevalence sampling data of effusive and hard-to-count populations) is difficult to obtain.

The mobility of individuals in the sampled population also plays a role, especially in our estimation of the sampled MSM subpopulation size which shows a slower increase than the number of the HIV-infected MSMs, either in total or undetected, in this subpopulation. Moreover, GERMO assumes that the sampled population is "open", where newly infected persons and those leaving the sampled population via the onset of AIDS-related symptoms are taken into account [8]. However, Ruan [2] reported high mobility among the MSMs sampled in 2005, which might have affected our estimation results. In fact, several surveys [1-3] on the MSM population in Beijing reported that roughly 2/3 of those MSMs sampled in these studies were not official Beijing residents but migrants to the city in recent years (62.4% in 2005 [2] and 65.8% in 2006-7 [6]), a reflection of the social reality that there are millions of nonresident labors working in Beijing, many of them for several years. Similarly, high proportions of non-official residents are also found in surveys of the MSM populations in Shanghai [18] and Guangzhou [19]. Of special concern are those who are male sex workers (MSW), or "money boys" [20], an MSM subpopulation consisting of typically young, heterosexual, and under-educated rural male migrants who provide sexual services solely for money. In the 2005 serosurvey, 8.6% of the 526 respondents had received money for sex with men in the past six months while 4.2% had given

money for sex with men in the past six months (Table 1 in [2]), indicating substantial male commercial sex activity among the MSM populations. Other surveys in recent years have found MSW to range between 4.9%-24% among all MSMs [21-24]. In a survey of 15 money boys in Shanghai in 2005 [25], 9 (60%) reported residing in other cities before coming to Shanghai and 3 (20%) had been in Shanghai for less than one year, further indicating the exceptionally high mobility of the money boys. Due to their reported high level of unprotected sex, their role as a mobile core group in spreading infections among the MSM populations in different geographical locations cannot be overlooked, and needs to be addressed n future studies.

As a final note, an MSM population consists of many diverse subgroups. For example, male sex workers, gay men, bi-sexual men, or transgender are all very different in their social contact network. In recent years, studies on the MSMs in China have increasing rapidly in volume. However, the issue of these sub-groups of MSMs and their relative risks of sexually transmitted infections is still understudied, and more detailed future studies with consideration of the sexual cultures among different sub-groups of MSM are needed to further elucidate this important aspect of sexually transmitted infections in the MSMs in China.

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Table 1. Summary of distribution of the participants of the two surveys by recruitment methods.

Recruitment method	Sampling 1 (July-Nov 2005)	Sampling 2 (Nov 2006- Feb 2007)
	Number (%)	Number (%)
Peer recruiter	8 (1.5)	29 (5.4)
Volunteer[1]	308 (58.8)	272 (50.4)
Partner	203 (38.7)	229 (42.4)
Others[2]	7 (1.3)	10 (1.9)
Total	524 (100)	540 (100)

[1]Volunteers recruited via distribution of fliers, Web, and newspaper advertisement.

[2]Others include those with recruitment method unknown, and one by referral in each round.

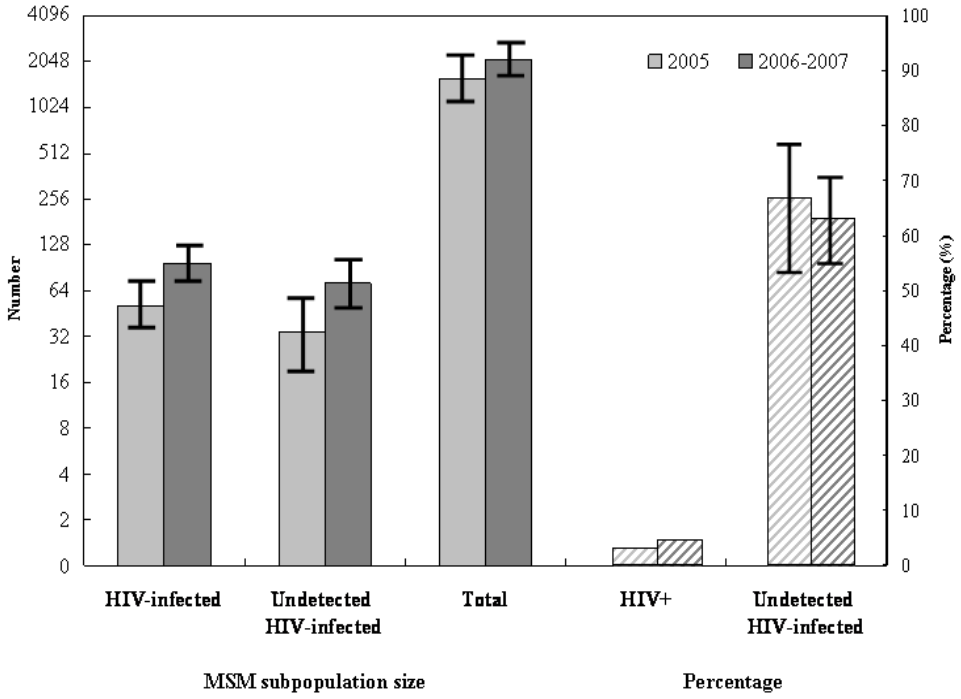
Table 2. HIV Seroprevalence Data for an MSM subpopulation in Beijing for the two sampling periods.

	Sampling period	
	July 2005-Nov2005	Nov 2006-Feb 2007
N	526	540
HIV+	17	25
+%	3.23	4.63
Change between samplings		+43%

Table 3. Median estimates of the numbers of the HIV-infected MSMs, the undetected HIV-infected MSMs, the percentage of the HIV-infected undetected, and the total MSM subpopulation size for each sampling periods; with the corresponding 95% CIs in parentheses.

	Sampling period	
	July 2005-Nov 2005	Nov 2006-Feb 2007
HIV-infected MSMs	51	97
(95% CI)	(36-72)	(75-126)
% Change between samplings		+90%
Undetected HIV-infected MSMs	34	72
(95% CI)	(19-55)	(50-101)
% Change between samplings		+112%
% HIV-infected MSMs undetected	66.7	63.2
(95% CI)	(52.8-76.4)	(54.3-70.6)
% Change between samplings		-6.7%
Sampled MSM subpopulation size	1579	2112
(95% CI)	(1115-2229)	(1637-2738)
% Change between samplings		+34%

Fig. 1. HIV prevalence in an MSM subpopulation: the numbers of the HIV-infected MSMs (both known and undetected) and the total MSM subpopulation size are in semilog scale; and the percentages (in shaded blocks) of the HIV-infected MSMs in the sampled MSM subpopulation and of the undetected HIV-infected MSMs between the two sampling periods.



計畫成果自評

1. 研究內容與原計畫相符程度: 非常相符

2. 達成預期目標情況: 達成預期目標

3. 研究成果之學術或應用價值: 有學術發表或公衛應用參考價值

4. 是否適合在學術期刊發表或申請專利: 研究成果在學術期刊發表:

   Ying-Hen Hsieh*, Yuhua Ruan, Cathy W. S. Chen, Wei Shi, Dongliang Li, Fengji Luo, and Yiming Shao. (2012) HIV prevalence and underreporting of men who have sex with men in Beijing. Int J STD AIDS August 2012 23:606-607.

5. 主要發現或其他有關價值: 本研究成果顯示在2005-2007年兩次血清採樣期(sampling period)之間，所有可估計的北京男同性戀族群的愛滋病病毒(HIV)流行指標的上升趨勢是值得引起人們的關注，尤其是未來愛滋病病毒感染者所需要的長期醫療負擔。對中國大陸愛滋病疫情，乃至其對台灣未來愛滋病防治規劃的影響，有指標性的貢獻。

附件五

國科會補助專題研究計畫出席國際學術會議心得報告

日期:101 年 9 月 17 日

計畫編號	NSC　100－2115－M－039－002－		
計畫名稱	愛滋病數學建模分析研究		
出國人員 姓名	謝英恒	服務機構 及職稱	中國醫藥大學公共衛生學系教授
會議時間	100 年 12 月 1 日至 100 年 12 月 3 日	會議地點	北京
會議名稱	BIT's 2nd Annual World AIDS Day (HIV-2011) Conference		
發表題目	HIV/AIDS Epidemiology in Cuba, 1986-2008: Modeling the Impact of Changes in Detection Measures		

一、參加會議經過

本人於 2011 年 12 月 1 日至 12 月 3 日前往北京市參加 BIT's 2nd Annual World AIDS Day(HIV-2011)會議，並發表邀請論文: HIV/AIDS Epidemiology in Cuba, 1986-2008: Modeling the Impact of Changes in Detection Measures。會議地點在北京國際會議中心。參加學者眾多約有美、古巴、南非等近 100 位學者、研究人員，共有約 60 幾場論文發表。本人的邀請演講(invited talk)，共有約 40 人出席。本人並擔任 HIV Epidemiology 組的 session co-chairman.

二、與會心得

本人在會議期間中有很多機會和舊識及新交的各國學者密集討論雙方有興趣的傳染病流行病學建模分析的最近研究方向，頗有助於未來研究。最值得一題的是認識了古巴疾病防治中心(Cuban CDC)的愛滋病專家團，其中包括古巴疾病防治中心性病及愛滋病防治中心(Center for Prevention of STD and AIDS)主任 Dr. Rosaida Ochoa。她們

對我在古巴愛滋病的建模分析研究極感興趣，並提出與我合作研究的建議。我和 Dr. Ochoa 並深入討論未來合作研究的方向及機制。

五、攜回資料名稱及內容：會議 program 及摘要集

六、最後感謝國科會補助機票及生活費，使本人得以成行並對本人執行國科會專題研究計劃之進行受益良多。

Feedback Form

- About Conference
  - Welcome Message
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  - Submission Guideline
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  - Registration Instruction
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  - Register Now
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- Sponsorship and Exhibition
  - Sponsorship Opportunity
  - Exhibition
  - Poster
- Press and Media
  - Media Partners
- Optional Tour
  - Tech Tour
  - Partial Scenery of Tour Route

BIT's Upcoming Events

Full Program

BIT's 2nd Annual World AIDS Day

Time: December 1-3, 2011

Venue: Beijing, China

Preliminary Program

HIV 100: AIDS Global Plan Cooperation

HIV 101: Basic Science of AIDS

HIV 102: HIV Diagnostics and Biotherapy and Management of HIV-associated Diseases

HIV 103: Community Engagement in AIDS Control

HIV 104: HIV, Epidemiology & Prevention

HIV 105: HIV Drug Discovery and Clinical Sciences of HIV

Registration
Time: 09:00-18:00, November 30, 2011 (Wednesday)

Opening Ceremony
Time: 09:00-09:10, December 1, 2011 (Thursday)

Welcome Banquet
Time: 18:30-20:30, December 1, 2011 (Thursday)

HIV Keynote Forum	
Time: 9:10-11:10, December 1, 2011 (Thursday)	
Moderator	***Dr. Shibo Jiang,*** Professor, Fudan University, China
09:10-09:40	***Title:*** *A Novel DNA Technology Applied in the Development of a Therapeutic HIV Vaccine* ***Dr. Kalevi Reijonen,*** CEO, FIT Biotech Ltd., Finland
09:40-10:10	***Title:*** *A Novel Chimeric Protein-based HIV-1 Fusion Inhibitor: Potential for Developing Anti-HIV Therapeutics or Microbicides* ***Dr. Shibo Jiang,*** Professor, Fudan University, China
10:10:10:40	***Title:****Overcoming Stigma with a Collaborative, Comprehensive Community Approach: Fostering Public and Private Engagement for Preventing HIV/AIDS and Promoting Lifelong Wellness* ***Dr. Carol A. Poore,*** CEO, Southwest Center for HIV/AIDS,USA
10:40-11:10	***Title****: HIV- serodiscordant Couples: Psycho Social Characteristics - A Study at Center for AIDS Treatment (CAT) Dr. Kutikuppala Surya Rao Hospital, Visakhapatnam, India* ***Dr. Kutikuppala Surya Rao***, Head, Dr.Kutikuppala Surya Rao Hospital, India

HIV 100: AIDS Global Plan Cooperation	
Time: 13:30-15:35, December 1, 2011 (Thursday)	
Chair:	***Dr. Neora Pick,*** Medical Director, Oak Tree Tree Clinic (Children's and Women's Health Centre of BC), Canada

13:30-13:55	***Title:*** *Initiation of an Outreach Program to Alouette Correctional Centre for Women: An Inter-professional Collaborative Approach to HIV Care* ***Dr. Neora Pick,*** Medical Director, Oak Tree Clinic (Children's and Women's Health Centre of BC), Alouette Correctional Centre for Women, Canada
13:55-14:20	***Title:*** *Knowledge, Attitudes, Beliefs, and Decision-making of Pregnant and Parenting Women of African Heritage at Risk for or Living with HIV/AIDS: A Cross National Study* ***Dr. Gloria B. Callwood,*** Associate Professor, University of the Virgin Islands, USA
14:20-14:45	***Title:*** *Indirect Injection Equipment Reuse: Historic Epidemic Blood Borne Virus Transmission and Continuing Unsafe Practices* ***Dr. Savanna Reid,*** WHO Consultant, University of Nevada School of Community Health Sciences, USA
14:45-15:10	***Title****: Process of Establishment of a Military Network in the Fight against HIV: Case of REMAFOC/AIDS (West and Central Africa Military Network against AIDS), Acquires and Challenges* ***Dr. Guehi Andre***, Director, Health Service of the Armed Forces & Ministry of Defense,C?te d'Ivoire, African
15:10-15:35	***Title:*** *Tracking HIV Expenditures on Prevention Interventions Targeting Populations at Higher Risk for HIV in the Caribbean* ***Dr. Nyla Lyons,*** Program Specialist-HIV Surveillance,Centers for Disease Control and Prevention Global AIDS Program,Trinidad and Tobago
15:35-15:55	**Coffee Break**

HIV 101: Basic Science of AIDS	
Time: 15:55-17:35, December 1, 2011 (Thursday) .	
Chair:	***Dr. Mario Clerici,*** Professor, University of Milano, Italy
15:55-16:45	***Title:*** *Immunologic and Genetic Correlates of Resistance to HIV Infection* ***Dr. Mario Clerici***, Professor, University of Milano, Italy
16:45-17:10	***Title:****HIV Suppression by Host Restriction Factors and Viral Countermeasures* ***Dr. Yong Xiong,*** AssociateProfessor, Yale University, USA
17:10-17:35	***Title:*** *The Evolutionary Significance of Certain Amino Acid Substitutions and Their Consequences for Immunogenicity Toward HLA's A*0201 and B*27* ***Dr. Anton Dormer,***Associate Professor, Washington Adventist University, USA

HIV 102: HIV Diagnostics and Biotherapy and Management of HIV-associated Diseases	
Time: 8:30-09:20, December 2, 2011 (Friday)	
Chair:	***Dr. Kutikuppala Surya Rao,*** Head, Dr.Kutikuppala Surya Rao Hospital, India
08:30-08:55	***Title:*** *Dermatologic Manifestations of HIV* ***Dr. Ronald M. Harris,*** Professor, Irvine Medical Center, University of California, Irvine, USA
08:55-09:20	***Title:*** *Eradication of HIV-infection by Treatment with Gc Protein-derived Macrophage Activating Factor (GcMAF)* ***Dr. Nobuto Yamamoto,*** Director & Professor, Socrates Institute for Therapeutic Immunolog, USA
09:20-09:40	**Coffee Break**

HIV 103: Community Engagement in AIDS Control	
Time:09:40-10:55, December 2, 2011 (Friday)	
Chair:	***Dr. Gil H Odendaal,*** Director, HIV/AIDS Initiative at the Saddleback Church, USA
9:40-10:05	***Title:*** *Pedagogical Theories and Practices in Mobilizing Civil Society for Effective Community Engagement in AIDS Control* ***Dr. Gil H Odendaal,*** Director, HIV/AIDS Initiative at the Saddleback Church, USA
10:05-13:30	***Title****: Study on Relationship between HIV Prevention and RH Advocacy* ***Dr. Junqing Wu***,Professor, Shanghai Institute of Planned Parenthood Research, China
10:.30-10:55	***Title:*** *Caring for People Living with HIV/AIDS and Their Families through Community Engagement in Malaysia* ***Dr. Ismail Baba,***Dean, University Sains Malaysia, Malaysia

HIV 104: HIV, Epidemiology & Prevention	
Time: 13:30-17:30, December 2, 2011 (Friday) Place: Room No.	
Chair:	***Dr. Reza Nassiri,*** Professor, Michigan State University, USA
Co-Chair	***Dr. Ying-Hen Hsieh,*** Professor, Department of Public Health and Center for Infectious Disease Education and Research, China Medical University Taichung, Taiwan
13:30-13:50	***Title:****HIV Prevention Measures in the Island of Hispaniola: Perspective on Capacity-Building* ***Dr. Reza Nassiri,***Professor & Dean, Michigan State University, USA
13:50-14:10	***Title:*** *HIV/AIDS Epidemiology in Cuba, 1986-2008: Modeling the Impact of Changes in Detection Measures*

	Dr. Ying-Hen Hsieh, Professor, Department of Public Health and Center for Infectious Disease Education and Research, China Medical University Taichung, Taiwan
14:10-14:30	***Title:*** *Epidemiology of HIV in Australia's Aboriginal and Torres Strait Islander Population: A Review* ***Dr. Saifur Rahman,*** Epidemiologist & Post Doctoral Research Fellow, University of New England, Australia
14:30-14:50	***Title:*** *Reconstructing the Epidemic History of HIV-1 Expansion in Asia: Understanding the Genesis of Asia's AIDS Epidemic* ***Dr. Yutaka Takebe,*** Chief (retired), National Institute of Infectious Diseases, Japan
14:50-15:10	***Title:*** *Study on Urban Community AIDS Network Management* ***Dr. Guohua Qi,*** Director**,** Changchun Municipal Health Bureau, Changchun People's Municipal Government, China
15:10-15:30	**Coffee Break**
15:30-15:50	***Title:*** *Maternal and Child Survival in Families Living with HIV/AIDS* ***Dr. Karen P. Beckerman,*** Associate Professor, Albert Einstein College of Medicine, USA
15:50-16:10	***Title****: HIV- serodiscordant Couples: Psycho Social Characteristics – A Study at Center for AIDS Treatment (CAT) Dr. Kutikuppala Surya Rao Hospital, Visakhapatnam, India* ***Dr. Kutikuppala Surya Rao,*** Head, Dr.Kutikuppala Surya Rao Hospital, India
16:10-16:30	***Title:****The Impact of Provider-initiated Routine HIV Counseling and Testing during Outpatient Care on Promoting Safer Sexual Behaviors in Uganda* ***Dr. Susan M. Kiene,*** Assistant Professor, Alpert Medical School of Brown University, USA
16:30-16:50	***Title:*** *Review of the Impact of HIV on the African-American Population of the US： With 3- minute "Safer Sex" Intervention for Primary and Secondary Prevention of HIV in Medical Offices* ***Dr. Karen W. Krigger,***Associate Professor, University of Louisville, USA
16:50-17:10	***Title:*** *The Translation of HIV Prevention Research into Policy and Practice in Africa* ***Dr. Geoffrey Setswe,*** Professor, Monash University, South Africa
17:10-17:30	***Title:*** *Addressing the HIV/AIDS Epidemic Drivers- The Challenges that Face the Higher Education Sector in South Africa. Are We Turning the Tide within Higher Education Sector* ***Dr. Ramneek Ahluwalia,***Head, Higher Education HIV/AIDS Programme (HEAIDS), South Africa

HIV 105: HIV Drug Discovery and Clinical Sciences of HIV	
Time: 8:30-11:20,December 3, 2011（Saturday）	
Chair	***Dr. Carol A. Harris,*** Professor, Albert Einstein College of Medicine, USA
Co-Chair	***Dr. Guohua Qi*** **,** *Director***,** Changchun People's Municipal Government, China
08:30-08:55	***Title:*** *HIV and TB-entwined Epidemics* ***Dr. Carol A. Harris,*** Professor, Albert Einstein College of Medicine, USA
08:55-09:20	***Title:*** *Nanoscale Drug Targeting for Eradicating HIV Infection* ***Dr. Patrick J Sinko,*** Profesor & Associate Vice President, Rutgers – The State University of New Jersey, USA
09:20-09:45	***Title:*** *Management of Lipoatrophy in HIV Patients with Facial Fillers* ***Dr. Gerald Pierone Jr,*** Executive Director , AIDS Research and Treatment Center of the Treasure Coast , USA
09:45-10:10	***Title:*** *Topical Microbicides for HIV Prevention: Current Development and Challenges* ***Dr. Haitao Yang,***Senior Research Investigator, Population Council, USA
10:10-10:30	**Coffee Break**
10:30-10:55	***Title:****Treatment of Lipid Disorders in HIV Infected Patients Receiving Anti-retroviral Therapy* ***Dr. Joseph Cadden,*** Assistant Professor, University of Southern California, USA
10:55-11:20	***Title:****The Potential Use of Topical Estrogen to Reduce the Risk of HIV Infection in Men* ***Dr. Andrew J. Pask,*** Associate Professor, University of Connecticut, USA

Paper Presented

Title: HIV/AIDS Epidemiology in Cuba, 1986-2008: Modeling the Impact of Changes in Detection Measures

Abstract.

A nonlinear compartmental model is developed for the HIV detection system in Cuba with different types of detections. We analyze the dynamics of this system and compute the reproduction numbers. We obtain estimates for the detection related parameters during two separate time periods to reflect the timeline of the implementation of various types of searches. We also estimate the magnitude of Cuban HIV epidemic and the mean time for detecting a person infected with HIV. The reproduction numbers for each time period are also computed from the sets of values of the parameters. We found that random screening is most important as a mean of surveillance, since there will always be an epidemic if the averaged total number of infections by an infective detected through random screening exceeds one. Moreover, local asymptotic stability for DFE can be achieved if (i) random screening is sufficiently effective and (ii) infection by detected HIV-positive individuals is minimal. Our results highlight the importance of education of known infectives to prevent further infections. If the average number of infections by a known infective exceeds unity (due to inefficient detection by random screening or lack of behavior change by the known infectious), the endemic equilibrium is always unstable and it is possible for the total number of infectious would increase without bound, provided that the initial infective population sizes are large and outside the domain of attraction of the disease-free equilibrium (DFE). On the other hand, if it is less than one, then either the DFE or the endemic equilibrium is globally asymptotically stable, leading to a more manageable epidemic, even if the disease is not eradicated. Fitting the 1986-2008 HIV data to obtain the model parameter estimates indicates that the HIV epidemic in Cuba is currently approaching an endemic equilibrium.

國科會補助專題研究計畫出席國際學術會議心得報告

日期:101 年 9 月 17 日

計畫編號	NSC　100－2115－M－039－002－		
計畫名稱	愛滋病數學建模分析研究		
出國人員 姓名	謝英恒	服務機構 及職稱	中國醫藥大學公共衛生學系教授
會議時間	101 年 7 月 12 日至 101 年 7 月 15 日	會議地點	北京
會議名稱	第六屆地壇國際感染病會議		
發表題目	Evaluating the transmissibility of 2009 pH1N1 during Summer and Fall/Winter Waves		

一、參加會議經過

本人於 201272 月 12 日至 7 月 15 日前往北京市參加第六屆地壇國際感染病會議，並發表邀請論文: Evaluating the transmissibility of 2009 pH1N1 during Summer and Fall/Winter Waves。會議地點在北京國際會議中心。參加學者眾多約有美、菲律賓、義大利、新加坡等百餘位學者、研究人員，包括中研院陳建仁副院長等數位國內研究學者。共有約 60 幾個邀請論文、40 幾個 free papers、百餘個 poster 發表，及幾個 satellite symposiums 與 panel discussions。本人的邀請演講(invited talk)，共有約 20 人出席。

二、與會心得

本人在會議期間中有很多機會和舊識及新交的各國學者密集討論雙方有興趣的世界各國愛滋病流行病學的最近趨勢及利用建模分析進行研究的可行性，頗有助於本人未來研究。另外本人並自費在北京多停留兩天前往中國疾病防治中心(China CDC)討論進行中有關中國愛滋病建模分析合作研究。我們並深入討論未來合作研究的方向

及機制。

五、攜回資料名稱及內容：會議 program 及摘要集

六、最後感謝國科會補助機票及生活費，使本人得以成行並對本人執行國科會專題研究計劃之進行受益良多。

15 JULY 2012, SUNDAY

07:30 - 09:10 Free Paper Presentation 3

Meeting Room 309
Moderators: Wing-Cheong Yam, Hong Kong
Hong-Xin Zhao, Beijing

07:30 - 09:10 Free Paper Presentation 4

Meeting Room 310
Moderators: Siqi Lu, Beijing
Ih-Jen Su, Tainan

09:15 - 10:45 Concurrent Session 9
Virus Evolution and Dissemination

Meeting Room 309
Moderators: Wing-Hong Seto, Hong Kong
Vijaykrishna Dhanasekaran, Singapore

09:15 - 09:35 **Coronavirus diversity, phylogeny and interspecies jumping**
Patrick C.Y. Woo, Hong Kong

09:35 - 09:55 **Long-term evolution and transmission dynamics of swine influenza A virus**
Vijaykrishna Dhanasekaran, Singapore

09:55 - 10:15 **Emergence and transmission pathways of human enterovirus 71**
Wenbo Xu, beijing

10:15 - 10:35 **Evaluating the transmissibility of 2009 pH1N1 during Summer and Fall/ Winter Waves**
Ying-Hen Hsieh, Taipei

10:35 - 10:45 **Discussion**

6th Ditan International Conference on Infectious Diseases
第六届地坛国际感染病会议

Oral Sessions

Paper Presented

Title: Evaluating the transmissibility of 2009 pH1N1 during Summer and Fall/Winter Waves **Abstract**.

Background In order to compare the transmissibility of the 2009 pH1N1 pandemic during successive waves of infections in summer and fall/winter in the Northern Hemisphere, and to assess the temporal changes during the course of the outbreak in relation to the intervention measures implemented, we analyse the epidemiological patterns of the epidemic in Taiwan during July 2009-March 2010.

Methods We utilize the multi-phase Richards model to fit the weekly cumulative pH1N1 epidemiological data (numbers of confirmed cases and hospitalizations) as well as the daily number of classes suspended under a unique "325" partial school closing policy in Taiwan, in order to pinpoint the turning points of the summer and fall/winter waves, and to estimate the reproduction numbers R for each wave.

Results Our analysis indicates that the summer wave had slowed down by early September when schools reopened for fall. However, a second fall/winter wave began in late September, approximately 4 weeks after the school reopened, peaking at about 2-3 weeks after the start of the mass immunization campaign in November. R is estimated to be in the range of 1.04-1.27 for the first wave, and between 1.01-1.05 for the second wave.

Conclusions Transmissibility of the summer wave in Taiwan during July-early September, as measured by R, was lower than that of the earlier spring outbreak in North America and Europe, as well as that of the winter outbreak in Southern Hemisphere. Furthermore, transmissibility during fall/winter in Taiwan was noticeably lower than that of the summer, which is attributable to population-level immunity acquired from the earlier summer wave and also to the intervention measures that were implemented prior to and during the fall/winter wave.

國科會補助計畫衍生研發成果推廣資料表

日期:2012/09/17

國科會補助計畫	計畫名稱: 愛滋病數學建模分析研究
	計畫主持人: 謝英恆
	計畫編號: 100-2115-M-039-002- 學門領域: 常微分方程

無研發成果推廣資料

100 年度專題研究計畫研究成果彙整表

計畫主持人：謝英恆	計畫編號：100-2115-M-039-002-
計畫名稱：愛滋病數學建模分析研究	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	1	1	100%		
國外	論文著作	期刊論文	1	1	100%	篇	Ying-Hen Hsieh*, Yuhua Ruan, Cathy W. S. Chen, Wei Shi, Dongliang Li, Fengji Luo, and Yiming Shao. (2012) HIV prevalence and underreporting of men who have sex with men in Beijing. Int J STD AIDS August 2012 23:606-607.
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	

	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無						

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：■已發表 □未發表之文稿 □撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）(以 500 字為限)

有學術發表或公衛應用參考價值;主要發現或其他有關價值:本研究成果顯示在 2005-2007 年兩次血清採樣期(sampling period)之間，所有可估計的北京男同性戀族群的愛滋病病毒(HIV)流行指標的上升趨勢是值得引起人們的關注，尤其是未來愛滋病病毒感染者所需要的長期醫療負擔。對中國大陸愛滋病疫情，乃至其對台灣未來愛滋病防治規劃的影響，有指標性的貢獻。