Form Approved Through 6/30/2012 OMB No. 0925-0001

Department of Health and Human Services
Public Health Services

Grant Application

Do not exceed character length restrictions indicated.

LEAVE BLANK—FOR PHS USE ONLY.

Type	Activity	Number
Review Group		Formerly
Council/Board (Month, Year)		Date Received

1. TITLE OF PROJECT *(Do not exceed 81 characters, including spaces and punctuation.)*
HIV and residential mobility among men who have sex with men over the lifecourse

2. RESPONSE TO SPECIFIC REQUEST FOR APPLICATIONS OR PROGRAM ANNOUNCEMENT OR SOLICITATION ☐ NO ☒ YES
(If "Yes," state number and title)
Number: N/A Title: UW Center for AIDS Reseaerch, 2012 New Investigator Award

3. PROGRAM DIRECTOR/PRINCIPAL INVESTIGATOR

3a. NAME (Last, first, middle)	3b. DEGREE(S)	3h. eRA Commons User Name
Cassels, Susan	PhD MPH	scassels

3c. POSITION TITLE
Assistant Professor

3d. MAILING ADDRESS *(Street, city, state, zip code)*
Box 359931
325 9th Ave
Seattle, WA 98104

3e. DEPARTMENT, SERVICE, LABORATORY, OR EQUIVALENT
Epidemiology & Global Health

3f. MAJOR SUBDIVISION

3g. TELEPHONE AND FAX *(Area code, number and extension)*
TEL: (206) 897-1758 FAX: (206) 744-3693

E-MAIL ADDRESS:
scassels@uw.edu

4. HUMAN SUBJECTS RESEARCH	4a. Research Exempt	If "Yes," Exemption No.
☐ No ☒ Yes	☒ No ☐ Yes	

4b. Federal-Wide Assurance No.	4c. Clinical Trial	4d. NIH-defined Phase III Clinical Trial
FWA-00006878	☒ No ☐ Yes	☒ No ☐ Yes

5. VERTEBRATE ANIMALS ☒ No ☐ Yes — 5a. Animal Welfare Assurance No.

6. DATES OF PROPOSED PERIOD OF SUPPORT *(month, day, year—MM/DD/YY)*		7. COSTS REQUESTED FOR INITIAL BUDGET PERIOD		8. COSTS REQUESTED FOR PROPOSED PERIOD OF SUPPORT	
From	Through	7a. Direct Costs ($)	7b. Total Costs ($)	8a. Direct Costs ($)	8b. Total Costs ($)
3/1/2013	2/28/2015	$54,619	$54,619	$108,805	$108,805

9. APPLICANT ORGANIZATION
Name: University of Washington
Address: 4333 Brooklyn Ave. NE
Box 359472
Seattle, WA. 98105

10. TYPE OF ORGANIZATION
Public: → ☐ Federal ☒ State ☐ Local
Private: → ☐ Private Nonprofit
For-profit: → ☐ General ☐ Small Business
☐ Woman-owned ☐ Socially and Economically Disadvantaged

11. ENTITY IDENTIFICATION NUMBER
91-6001537
DUNS NO. 605799469 Cong. District WA-007

12. ADMINISTRATIVE OFFICIAL TO BE NOTIFIED IF AWARD IS MADE
Name: Carol Rhodes
Title: Interim Director, Office of Sponsored Programs
Address: 4333 Brooklyn Ave. NE
Box 359472
Seattle, WA. 98105
Tel: (206) 543-4043 FAX: (206) 685-1732
E-Mail: osp@uw.edu

13. OFFICIAL SIGNING FOR APPLICANT ORGANIZATION
Name: Carol Rhodes
Title: Interim Director, Office of Sponsored Programs
Address: 4333 Brooklyn Ave. NE
Box 359472
Seattle, WA. 98105
Tel: (206) 543-4043 FAX: (206) 685-1732
E-Mail: osp@uw.edu

14. APPLICANT ORGANIZATION CERTIFICATION AND ACCEPTANCE: I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with Public Health Services terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

SIGNATURE OF OFFICIAL NAMED IN 13. *(In ink. "Per" signature not acceptable.)*

DATE

PROJECT SUMMARY (See instructions):

Although recent studies have helped define the proportion of the total U.S. population comprised of men who have sex with men (MSM), demographic information on the MSM population remain very limited. Understanding MSM migration patterns is critical for HIV surveillance and epidemiologic studies. This information is critical in estimating HIV incidence and prevalence in MSM, and in assessing HIV prevention and care programs at the population-level. We also need to understand when, where, and why MSM migrate, since residential mobility may be a significant factor in social, behavioral, and structural determinants of ongoing HIV transmission among MSM. This application proposes preliminary research designed to develop methods for estimating age-specific rates of migration to Seattle and HIV risk behavior among MSM. The work described represents a first step in a new demographic research agenda designed to measure mobility among MSM and understand how mobility affects HIV risk and linkage to care over the lifecourse. Our specific aims are:

1. To develop, validate, and adapt a culturally-appropriate survey instrument to retrospectively capture a) age-specific migration rates since age 15, and b) past 12 month HIV risk behavior for MSM in Seattle
2. To assess the feasibility of collecting retrospective migration and HIV sexual risk behavior from 100 MSM, aged 18 – 59, from the Public Health STD Clinic at Harborview Medical Center
3. To estimate preliminary age-specific migration rates, stratified by HIV status, race/ethnicity, and birth cohort, and to identify significant migrant sending areas from the sample obtained in Aim 2.

This work will provide preliminary data for a NIH R01 to elucidate how MSM residential mobility biases HIV surveillance data, and how mobility affects HIV risk and linkage to care over the lifecourse.

RELEVANCE (See instructions):

HIV surveillance metrics vary substantially depending on assumptions about who is currently living with HIV in the surveillance area, yet little is known about migration rates of men who have sex with men. This project will support HIV surveillance efforts in Seattle & King County and nationally by providing estimates of age-specific migration rates for MSM in Seattle, and methods for generating similar estimates elsewhere.

PROJECT/PERFORMANCE SITE(S) (if additional space is needed, use Project/Performance Site Format Page)

Project/Performance Site Primary Location		
Organizational Name: University of Washington		
DUNS: 605799469		
Street 1: 325 9th Ave	Street 2:	
City: Seattle	County: King	State: WA
Province:	Country: USA	Zip/Postal Code: 98104
Project/Performance Site Congressional Districts:		

Additional Project/Performance Site Location		
Organizational Name:		
DUNS:		
Street 1:	Street 2:	
City:	County:	State:
Province:	Country:	Zip/Postal Code:
Project/Performance Site Congressional Districts:		

SENIOR/KEY PERSONNEL. See instructions. *Use continuation pages as needed* to provide the required information in the format shown below. Start with Program Director(s)/Principal Investigator(s). List all other senior/key personnel in alphabetical order, last name first.

Name	eRA Commons User Name	Organization	Role on Project
Susan Cassels	scassels	UW	PI

OTHER SIGNIFICANT CONTRIBUTORS

Name	Organization	Role on Project
TBN	UW	Medical Assistant
Matthew Golden	UW	Primary mentor
Steven Goodreau	UW	Mentor
Kyle Crowder	UW	Mentor

Human Embryonic Stem Cells ☒ **No** ☐ **Yes**

If the proposed project involves human embryonic stem cells, list below the registration number of the specific cell line(s) from the following list: http://stemcells.nih.gov/research/registry/eligibilityCriteria.asp. *Use continuation pages as needed.*

If a specific line cannot be referenced at this time, include a statement that one from the Registry will be used.

Cell Line

Program Director/Principal Investigator (Last, First, Middle): Cassels, Susan

DETAILED BUDGET FOR INITIAL BUDGET PERIOD DIRECT COSTS ONLY	FROM 3/1/2013	THROUGH 2/28/2014

List PERSONNEL *(Applicant organization only)*
Use Cal, Acad, or Summer to Enter Months Devoted to Project
Enter Dollar Amounts Requested *(omit cents)* for Salary Requested and Fringe Benefits

NAME	ROLE ON PROJECT	Cal. Mnths	Acad. Mnths	Summer Mnths	INST.BASE SALARY	SALARY REQUESTED	FRINGE BENEFITS	TOTAL
Susan Cassels	PD/PI	4			95,004	31,668	8,519	40,187
TBN	Medical Assistant	2			40,000	6,666	2,266	8,932
SUBTOTALS →								49,119

CONSULTANT COSTS	
EQUIPMENT *(Itemize)*	
SUPPLIES *(Itemize by category)*	
TRAVEL Travel to 1 domestic conference	2,000
INPATIENT CARE COSTS	
OUTPATIENT CARE COSTS	
ALTERATIONS AND RENOVATIONS *(Itemize by category)*	
OTHER EXPENSES *(Itemize by category)* $3,000 for DatStat programming 10 cognitive interviews @ $50/interview = $500	3,500

CONSORTIUM/CONTRACTUAL COSTS	DIRECT COSTS	
SUBTOTAL DIRECT COSTS FOR INITIAL BUDGET PERIOD *(Item 7a, Face Page)*		**$** 54,619
CONSORTIUM/CONTRACTUAL COSTS	FACILITIES AND ADMINISTRATIVE COSTS	
TOTAL DIRECT COSTS FOR INITIAL BUDGET PERIOD		**$** 54,619

BUDGET FOR ENTIRE PROPOSED PROJECT PERIOD
DIRECT COSTS ONLY

BUDGET CATEGORY TOTALS	INITIAL BUDGET PERIOD *(from Form Page 4)*	2nd ADDITIONAL YEAR OF SUPPORT REQUESTED	3rd ADDITIONAL YEAR OF SUPPORT REQUESTED	4th ADDITIONAL YEAR OF SUPPORT REQUESTED	5th ADDITIONAL YEAR OF SUPPORT REQUESTED
PERSONNEL: *Salary and fringe benefits. Applicant organization only*.	49,119	46,186			
CONSULTANT COSTS					
EQUIPMENT					
SUPPLIES					
TRAVEL	2,000	2,000			
INPATIENT CARE COSTS					
OUTPATIENT CARE COSTS					
ALTERATIONS AND RENOVATIONS					
OTHER EXPENSES	3,500	6,000			
DIRECT CONSORTIUM/ CONTRACTUAL COSTS					
SUBTOTAL DIRECT COSTS *(Sum = Item 8a, Face Page)*					
F&A CONSORTIUM/ CONTRACTUAL COSTS					
TOTAL DIRECT COSTS	54,619	54,186			

TOTAL DIRECT COSTS FOR ENTIRE PROPOSED PROJECT PERIOD **$** 108,805

JUSTIFICATION. Follow the budget justification instructions exactly. Use continuation pages as needed.

Budget justification

Personnel

Susan Cassels, PhD MPH, Principle Investigator (effort: 4 calendar months in year 1, 3.6 calendar months in year 2) is an Assistant Professor in Epidemiology & Global Health, core faculty in the CFAR Sociobehavioral Core, and research affiliate at the Center for Studies in Demography and Ecology. Dr. Cassels is a demographer and epidemiologist and has been working in the field of social and behavioral determinants of HIV for the past 7 years. She has expertise in mathematical and statistical methods, including demographic and epidemic modeling, and has conducted research on migration and HIV in international settings. She also has experience leading data collection efforts. This last summer she led a cross-sectional, ego-centric study of migration, sexual networks and HIV risk in Accra, Ghana using an event history calendar. Her study team completed 589 interviews (including 104 linked cohabiting or spousal partners), and successfully tested >90% of the respondents for HIV.

Dr. Cassels will be responsible for the overall administration and direction of the study. Duties include human subjects approval, development of the survey instrument and implementation in CASI, oversight of validation process, oversight of subject recruitment and data collection, statistical analyses, scientific writing, and crafting an R01 proposal.

TBN, Medical Assistant (effort: 2.4 calendar months in years 1 & 2), will be hired to assist with data collection at the PHSKC STD clinic. They will recruit, screen, and enroll respondents, and will administer the CASI survey in the STD clinic.

Raises and fringe benefits for personnel. 3% raise for faculty in year 2. Fringe rates set by UW based on employee classification (faculty @ 26.9%, staff @ 34.0%)

Travel

$2,000 each year: Travel costs include airfare, hotel, and per diem to attend and present research findings at one domestic conference each year (e.g. Population Association of America annual meeting).

Services and other expenses

Cognitive interviewing: 10 interviews @ $50/interview = $500 (year 1)

CASI programming: $3,500 (year 1)

Interview incentives: 100 participants @ $40 each = $4,000 (year 2).

STD clinic chart abstraction: $2,000 (year 2).

RESOURCES

Follow the 398 application instructions in Part I, 4.7 Resources.

UW Center for Studies in Demography and Ecology (CSDE). The CSDE supports population research and training at the UW. It also functions as a regional center that gives population scientists at affiliated institutions in the Pacific Northwest access to cutting-edge demographic infrastructure and services. The CSDE provides research support services and educational opportunities to its members, including Dr. Cassels, through its statistical and Geographic Information Systems consulting, computer services, graduate student, postdoctoral and mid-career professional training, administrative support for grants, library collection and information services, support in use of biomarkers in research, and weekly research seminar.

Contribution of CSDE to the Proposed Project: Dr. Cassels is a CSDE affiliate, uses CSDE office space part time, and interacts with CSDE staff on a daily basis. CSDE's professional staff will support survey design, spatial visualization and data analyses, and interpretation of findings. The project will make use of direct access to CSDE's statistical consulting services and computing network: 22 dedicated servers, including five redundant-storage (RAID) file servers provide a total of 20 Terabytes of secure file storage and five multicore Windows Terminal Servers providing access to GIS and Statistical software.

UW School Of Public Health (UW-SPH). The scientific environment at the University of Washington (UW) to support this project is excellent. Dr. Cassels is a faculty member in the Department of Epidemiology; faculty research is highly interdisciplinary and the large number of faculty working in HIV/AIDS and sexually transmitted diseases provides many opportunities for collaboration, consultation and generation of new ideas. Dr. Cassels also has a joint appointment in the Department of Global Health and is a core faculty member of the UW CFAR Socio-behavioral and Prevention Reseasrch Core.

Contribution of the UW-SPH to the Proposed Project: Dr. Cassels has office space at the Harborview Medical Center campus. The facility has over 200 offices and workstations, 10 conference rooms, two of which have videoconferencing capabilities, a classroom equipped for distance learning, and high-speed internet, both wired and wireless. This space is the home to several centers, all of which have considerable resources and intellectual support for research in sexually transmitted diseases. The CFAR physically brings together behavioral, clinical, basic, and epidemiologic scientists along with strong biostatistical support, further fostering interdisciplinary research and cross-fertilization. CFAR also offers a number of career development awards and hosts journal clubs and other venues for organizing peer groups and developmental support.

Public Health – Seattle & King County (PHSKC) operates a comprehensive, community-wide HIV/STD Control Program under the direction of Dr. Matthew Golden, a Professor of Medicine at the UW. The program's STD clinic is one of the few STD clinics in the US that is fully integrated into an academic medical center. It occupies 9,200 square feet of newly renovated space in Harborview Medical Center, with 24 examination/counseling rooms. The STD Clinic served patients during 12,346 visits in 2010. Approximately 31% of clinic patients are men who have sex with men, 25% are women, and 45% are heterosexual men; 40% of patients are racial/ethnic minorities.

Contribution of PHSKC to the Proposed Project: Dr. Golden will facilitate access to study subjects at the PHSKC STD clinic and to STD clinical data. A medical assistant at the PHSKC STD clinic will coordinate subject recruitment, screening, and enrollment.

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Susan Cassels	Assistant Professor
eRA COMMONS USER NAME (credential, e.g., agency login) scassels	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of California at Santa Barbara, Santa Barbara, CA	B.S.	1998	Mathematical Science
Princeton University, Princeton, NJ	M.A.	2003	Demography
Princeton University, Princeton, NJ	Ph.D.	2005	Demography
Center for Studies in Demography and Ecology, and the Center for AIDS Research, University of Washington, Seattle, WA	Postdoctoral fellowship	2005 - 2010	Demography & Epidemiology
University of Washington, Seattle, WA	MPH	2010	Epidemiology

A. Personal Statement

The main objectives of this work are to develop and validate a survey to capture information on age-specific residential mobility and HIV risk for men who have sex with men, and to estimate preliminary age-specific migration rates stratified by HIV status, race/ethnicity, birth cohort, and markers of risk behavior. The validated survey instrument and preliminary migration rate estimates will support a NIH R01 proposal to 1) test whether and how MSM migration rates differ than heterosexuals, 2) estimate how MSM migration affects HIV surveillance data, and 3) clarify the role of MSM migration in individual, partnership, and population-level HIV risk.

Dr. Susan Cassels is a demographer with training in epidemiology whose research is in the areas of migration, mathematical modeling, social network analysis, and infectious disease epidemiology, specifically HIV and other sexually transmitted diseases. She has expertise in mathematical and statistical methods, including demographic and epidemic modeling, and has conducted research on migration and HIV in international settings. She has published manuscripts in AIDS, *Journal of Population Research*, *AIDS and Behavior*, *Current Opinion in HIV and AIDS*, and *Sexually Transmitted Diseases* on topics including migration and health, sexual network characteristics, and social and behavioral risk of STD transmission. Her current research is focused on human mobility and its affects on sexual network structure and HIV transmission in Ghana, funded by an NICHD K99/R00 grant. This last summer she led a cross-sectional, ego-centric study of migration, sexual networks and HIV risk in Accra, Ghana using an event history calendar.

In addition to her research experience, Dr. Cassels is well positioned to succeed in the proposed work because of her excellent collaborators and supportive research environment. Her mentoring team has expertise in HIV epidemiology among MSM (Golden, Goodreau), residential mobility in the U.S. (Crowder), data collection in the STD clinic (Golden), and demographic methods (Goodreau, Crowder). Dr. Cassels is also an affiliate of the Center for Studies in Demography and Ecology, who will provide valuable statistical and GIS support, a member of the Network Modeling Group (Martina Morris, PI) that meets weekly and provides a stimulating research environment for sharing preliminary findings, and core faculty of the UW CFAR Sociobehavioral Core.

B. Positions and Honors

Positions and Employment

2005 Lecturer, Princeton University, Princeton, NJ
2010 – present Assistant Professor, Departments of Epidemiology and Global Health, University of Washington, Seattle, WA
2011 – present Faculty Affiliate, Center for Studies in Demography & Ecology, University of Washington, Seattle, WA

Other Experience and Professional Memberships

2000 - Population Association of America
2002 - Population and Environment Research Network
2005 - International Union for the Scientific Study of Population
2005 - Society for Epidemiologic Research

Honors

1998 Phi Beta Kappa

C. Selected peer-reviewed publications

1. **Cassels S**, Curran SR, and Kramer R. (2005). "Do migrants degrade coastal environments? Migration, natural resource extraction and poverty in North Sulawesi, Indonesia." *Human Ecology* 33(3): 329-363.
2. **Cassels S**. (2006). "Overweight in the Pacific: Links between Foreign Dependence, Global Food Trade, and Obesity in the Federated States of Micronesia." *Globalization and Health* 2(10): 1-8. (PMCID: PMC1533815)
3. de Sherbinin, A, Carr D, **Cassels S**, and Jiang L. (2007) "Population and Environment." *Annual Review of Environment and Resources* 32: 345 – 373. (PMCID: PMC2792934)
4. Pearson, CR., Kurth AE, **Cassels S**, Martin DP, Simoni JM, Hoff P, Matediana E, and Gloyd S. (2007) "Modeling Transmission Risk among HIV-positive Mozambicans Three Months before Initiating HAART." *AIDS Care* 19(5): 594-604.
5. **Cassels S**, Clark SJ, and Morris M. (2008) "Mathematical Models for HIV Transmission Dynamics: Tools for social and behavioral science research." *Journal of Acquired Immune Deficiency Syndromes JAIDS* 47(Supplement 1): S34 – S39.
6. **Cassels S**, Pearson CR, Kurth AE, Martin DP, Simoni JM, Matediana E, and Gloyd S. (2009) "Discussion and revision of the mathematical modeling tool described in the previously published article "Modeling HIV Transmission risk among Mozambicans prior to their initiating highly active antiretroviral therapy." *AIDS Care* 21(7): 858-862. (NIHMSID # 373632)
7. **Cassels S**, Menza TW, Goodreau SM, and Golden MR. (2009) "HIV serosorting as a harm reduction strategy: Evidence from Seattle, Washington." *AIDS* 23(18): 2497-2506. (PMCID: PMC2886722)
8. **Cassels S**, Pearson CR, Walters K, Simoni JM, and Morris M. (2010) "Two-Spirit Native Americans' Sexual Partnerships: Sexual risk and concurrency as a function of sexual partnering groups." *Sexually Transmitted Diseases* 37(4): 272-278. (PMCID: PMC3118268)
9. UNAIDS Reference Group on Estimates, Modelling, and Projection: Working Group on measuring Concurrent Sexual Partnerships. (2010) "HIV: consensus indicators are needed for concurrency." *Lancet* 375(9715): 621-622.
10. **Cassels S**, Menza TW, Goodreau SM, and Golden MR. (2010) "Available evidence does not support serosorting as an HIV risk reduction strategy -- Author's Reply." *AIDS* 24(6): 936–938.
11. **Cassels S** and Singer B. (2010) "Population Decline Induced by Gonorrhea and Tuberculosis Transmission: Micronesia during the Japanese Occupation, 1919 – 1945." *Journal of Population Research* 27(4): 293-313. (PMCID: PMC3109672)

12. **Cassels S** and Goodreau SM. (2011) "Interaction of mathematical modeling and social and behavioral HIV/AIDS research." *Current Opinion of HIV/AIDS* 6:119 – 123**.** (PMCID: PMC3091501)

13. Pearson CR, **Cassels S**, Kurth AE, Montoya P, Micek M, and Gloyd S. (2011) "Change in Sexual Activity 12 months after ART initiation among HIV-positive southern Africans." *AIDS and Behavior* 15(4): 778 – 787.

14. Goodreau SM, **Cassels S,** Kasprzyk D, Montaño D, Greek A, and Morris M. (2012) "Concurrent partnerships, Acute Infection and HIV Epidemic Dynamics among Young Adults in Zimbabwe." *AIDS and Behavior* 16(2): 312-322.

15. **Cassels S**, Manhart L, Jenness S, and Morris M. "Is migration a risk factor for HIV spread? HIV acquisition and concurrency in Zimbabwe." Under review at *Sexually Transmitted Diseases.*

D. Research Support

Ongoing Research Support

K99/R00 HD057533 Cassels, S. (PI) 9/2008 – 8/2013
Migration to Urban Slums, Sexual Networks, and HIV in Ghana
The long-term objective of this research is to use dynamic network-based mathematical models of human migration and HIV transmission dynamics for designing and evaluating HIV prevention interventions.
Role: PI

International Pilot Award Cassels, S. (PI) 3/2011 – 2/2012
HIV Testing and Migration in an African Slum: Using a Network Perspective
This pilot grant is funded through the University of Washington Center for AIDS Research International Core (P30 AI27757). The main objectives are to estimate the prevalence of HIV among inhabitants of Agbogbloshie, Ghana, aged 18 – 49 and to establish point estimates of HIV prevalence among migrants, non-migrants, and their partners for use in validating a mathematical model.
Role: PI

P30 AI27757 Holmes, K.K. (PI) 06/2008 – 05/2013
Center for AIDS Research
This is a center grant to support research in HIV prevention.
Role: Core faculty in Sociobehavioral and Prevention Research Group

Pending Research Support

R21 NICHD Cassels, S. (PI) 06/2013 – 05/2015
Mobility and STI in young adult sexual networks: implications for epidemiologic models and racial disparities
This project will examine the role of mobility in sexual network characteristics and risk of sexually transmitted infections by race during the highly unstable years of young adulthood (age 18 – 24) in the U.S.
Role: PI

Royalty Research Fund, UW Cassels, S. (PI) 04/2013 – 03/2014
Residential mobility, race/ethnicity and HIV risk among men who have sex with men
The objective of this proposed work is to explore the role of residential mobility among MSM and its nuanced relationship with HIV risk in five gay migrant urban destinations, at multiple scales, and with particular attention to variable relationships by age and race. We will use National HIV Behavioral Surveillance data from Seattle, San Francisco, Los Angeles, New York, and Washington, D.C.
Role: PI

Completed Research Support

Emerging Opportunity Grant Cassels, S. (PI) 12/2007 – 06/2008
HIV serosorting among men who have sex with men: Modeling HIV transmission dynamics

This grant was funded through the UW Center for AIDS Research (P30 AI27757). We propose to develop a deterministic mathematical model of HIV transmission to study how serosorting among men who have sex with men (MSM) affects an individual's risk of acquiring HIV and how it impacts population-level HIV transmission dynamics.
Role: PI

Royalty Research Fund, UW Goodreau, S. (PI) 03/2007 – 12/2007
Evaluating the role of circular migration on population-level HIV prevalence
The objective of this project is to develop analytic methods in order to study migration in South Africa to understand its role in fueling the HIV epidemic. Our model will provide the methodological means for predicting the magnitude of this effect, and identify critical points for behavioral interventions.
Role: postdoctoral researcher

A. Specific Aims

Although recent studies have helped define the proportion of the total U.S. population comprised of men who have sex with men (MSM), demographic information on the MSM population remain very limited. Understanding MSM migration patterns is critical for HIV surveillance and epidemiologic studies. In particular, we need to be able to define age-specific migration rates by race/ethnicity for the MSM population in different areas. This information is critical in estimating HIV incidence and prevalence in MSM, and in assessing HIV prevention and care programs at the population-level. We also need to understand when, where, and why MSM migrate, since residential mobility may be a significant factor in social, behavioral, and structural determinants of ongoing HIV transmission among MSM. This application proposes preliminary research designed to develop methods for estimating age-specific rates of migration to Seattle and HIV risk behavior among MSM. The described work represents a first step in a new demographic research agenda designed to measure mobility among MSM and understand how mobility affects HIV risk and linkage to care over the lifecourse. Our specific aims are:

1. To develop, validate, and adapt a culturally-appropriate survey instrument to retrospectively capture a) age-specific migration rates since age 15, and b) past 12 month HIV risk behavior for MSM in Seattle
2. To assess the feasibility of collecting retrospective migration and HIV sexual risk behavior from 100 MSM, aged 18 – 59, from the Public Health STD Clinic at Harborview Medical Center
3. To estimate preliminary age-specific migration rates, stratified by HIV status, race/ethnicity, and birth cohort, and to identify significant migrant sending areas from the sample obtained in Aim 2.

This work will provide preliminary data for a NIH R01 to elucidate how MSM residential mobility biases HIV surveillance data, and how mobility affects HIV risk and linkage to care over the lifecourse. This work will also support HIV surveillance efforts in Seattle & King County and nationally by providing estimates of age-specific migration rates for MSM in Seattle, and methods for generating similar estimates elsewhere.

B. Significance

MSM living in urban areas have high rates of residential mobility [1], and are overrepresented in selected urban areas in the U.S. [2]. There are an estimated 8.8 million gay, lesbian, and bisexual (GLB) persons in the U.S.

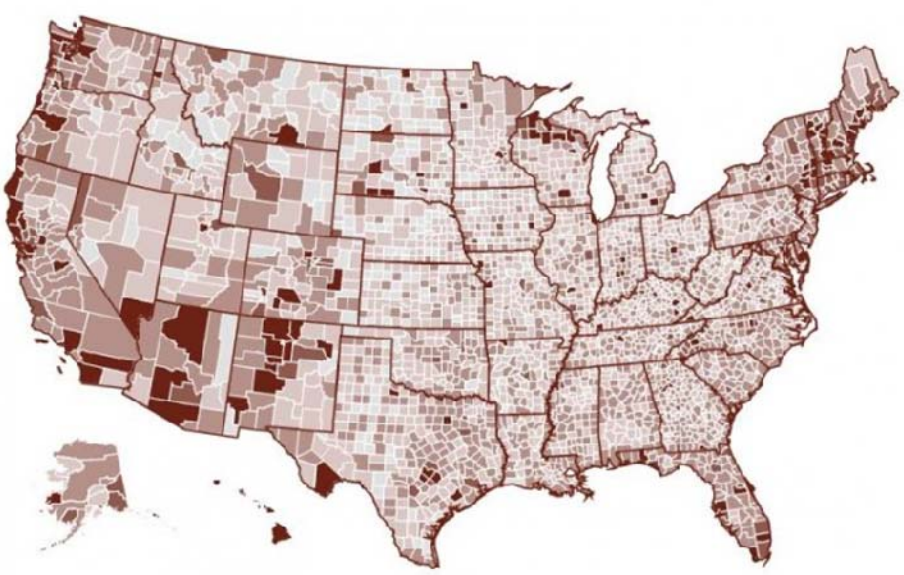

Figure 1: Number of same-sex couples per 1,000 households in each county (The Williams Institute)

GLB individuals live in nearly every congressional district in the U.S. (see Figure 1) [3], but are disproportionately represented in particular cities [1, 4]. Washington, D.C. (8.1%) , San Francisco (8.2%), and Seattle (6.5%) top the list for the highest percentage of GLB individuals [5].The places in which MSM live and how they move appear to be different than heterosexual populations in the U.S., but nationally representative research on MSM demography is challenging due to lack of data and identification issues. Some research use US Census microdata to study GLB migration nationally, but these studies are limited to same-sex couples [1, 2, 6-8].Smaller studies have been able to characterize MSM migration to select cities; the Urban Men's Health Study found that 82% of MSM residing in four large urban areas were in-migrants, and they were disproportionately young, white, childless [9], and highly educated [1].

Better estimates of MSM migration rates could significantly improve HIV surveillance data, and thus be used to correctly assess engagement in care and evaluate interventions. Currently, HIV surveillance metrics, such as the proportion of people living with HIV/AIDS (PLWHA) engaged in continuous care, vary substantially depending on assumptions made about who is in the denominator (see Figure 2) [10]. A man who has not linked to care in the last six months because he moved to a new city (and possible sought care elsewhere) does not represent a public health failure; however, most published surveillance estimates are not adjusted for out-migration [11]. The proportion of PLWHA engaged in continuous care in Seattle & King County ranges from 66% if only known out-migrants are excluded from the denominator, to 72% if PLWHA with no lab report since 2005 are excluded, to 81% (and thus meeting the national strategy target) if people without at least one visit in the last year are excluded [10]. Adjusting for migration will be particularly important if MSM migration rates significantly vary by sexual orientation, age, birth cohort, or race/ethnicity.

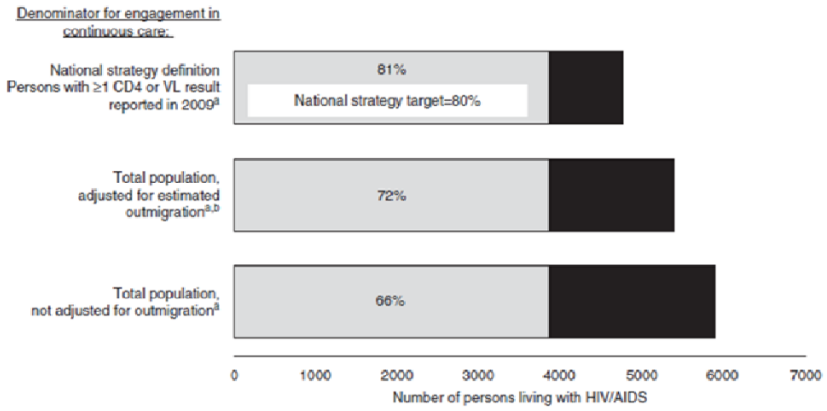

Figure 2: Estimates of proportion of PLWHA in Seattle & King County engaged in continuous care under three assumptions

Residential mobility may also be significantly associated with HIV social, behavioral, and structural risk. Research on migration and HIV among MSM is limited [12, 13], but suggests that gay migrants may be more vulnerable to HIV due to greater sexual opportunities combined with social isolation, poverty, limited knowledge of sexual disease transmission, and anonymity. Residential mobility by MSM may include multiple scouting trips and possible return home to establish a sense of identity [14-17]. Migration may be an opportunity to "come out"[18] or to explore one's sexuality [19, 20]. Additionally, a lack of social connections to home communities can lead to sexual exploration [21-24]. A recent study suggested that the association between HIV status and migration could be non-linear and dependent on immigration status [25]. They found that among Latino MSM, HIV prevalence was higher in foreign born MSM who immigrated >5 years ago and in Latino non-migrants compared to men who migrated <5 years ago [25]. This finding is similar to the Hispanic paradox, which suggests that immigrants may be in fact "healthier" than non migrants and that this advantage declines with time in the U.S.[26]. New MSM in-migrants may have lower HIV prevalence than non-migrants in an urban area if they originate from low HIV prevalence sexual networks. With time, increased sexual risk behavior and exposure to higher HIV prevalence networks could lead to increased incidence in urban in-migrants. On the other hand, HIV-positive men may move for very different reasons, such as seeking a less stigmatizing community or better medical care [6, 27-30]. Additional research disentangling residential mobility and risk of HIV acquisition and transmission over the lifecourse is needed and may be useful in informing prevention interventions targeted at MSM.

C. Innovation

This proposed adds a much needed **demographic perspective to HIV epidemiology and public health**. Residential mobility and health (broadly defined) is a significant area of study in demographic research, but MSM are an understudied population in this field. Demographic estimates of MSM population size, growth, density and distribution are sorely needed to support HIV surveillance efforts. The combined expertise of the PI and mentorship team – HIV epidemiology among MSM, methodological expertise, public heath practice, residential mobility, and demographic methods – will lead to innovative scientific contributions in the fields of social and behavioral HIV research as well as demography.

We will **demonstrate the importance of adjusting for migration in surveillance estimates**. Our point estimates of MSM migration rates will be used to adjust published population-based metrics of engagement in care, and our innovative methods will be useful for generating similar estimates elsewhere. Lastly, this preliminary work represents a first step in a larger study aimed to understand how patterns of residential mobility, especially during adolescent and young adulthood, affect HIV risk over the lifecourse. Recent work

has highlighted the importance of using a **lifecourse perspective to understand HIV epidemiology in MSM**, and this work extends that approach.

D. Approach

Overview of project: The long-term objective of this work is twofold: to estimate how MSM residential mobility biases HIV surveillance data and to investigate residential mobility and HIV risk over the lifecourse. We will take the first steps toward these objectives by developing, validating, and piloting a survey of mobility and HIV risk behavior for 100 MSM from the Public Health STD Clinic at Harborview Medical Center.

Study team: Dr. Cassels is a demographer and epidemiologist with a long standing interest in mobility, sexual networks, sexually transmitted diseases and mathematical modeling. Dr. Matthew Golden, the director of the Public Health – Seattle & King County HIV/STD Program and professor of medicine at the UW, will be her mentor for this research. Dr. Steven Goodreau (associate professor, Anthropology), an expert in HIV epidemiology among MSM, and Dr. Kyle Crowder (professor, Sociology), an expert in residential mobility and health in the U.S, will also provide mentorship and guidance on this project. We will work with a newly hired Medical Assistant at the STD clinic to screen and recruit eligible participants.

Participants and setting: Eligible participants will be recruited through the Public Health STD clinic at Harborview. Participants will be men 18 – 59 years who report same-sex sexual activity in the past 12 months.

Aim 1: To develop, validate, and adapt a culturally-appropriate survey instrument to retrospectively capture a) age-specific migration rates since age 15, and b) past 12 month HIV risk behavior for men who have sex with men in Seattle.

Survey design*:* The cross-sectional survey instrument will use event history techniques to retrospectively collect data on characteristics of residential moves in 5-year categories since age 15. We will pair this with ego-centric data on sexual risk behavior and characteristics of the last three sexual partnerships in the last 12 months. The survey will be implemented using computer assisted self interviews (CASI). We will program the CASI instrument with DatStat (computer survey software), and the survey will be assigned a unique URL to begin data collection. Participants will complete our survey directly after they complete routine clinical CASI on the computers in the STD clinic.

Survey measures*:* Socio-demographic measures will include age, race, marital status, education, and income. Questions on residential mobility & migration will include current place of residence (where individual sleeps most nights), dates (month/year) and locations of origin and destination (zip code (if available), city, and county) for each move since age 15; reason for each move; with whom moved; and with whom lived. We will also ascertain country of birth and parent's birth to identify foreign born and 2nd generation immigrants. Ego-centric sexual risk behavior measures will include age, sex, race, and geographic location for the last 3 anal sex partners within last 12 months. Partner-specific questions on dates of first and last sex, whether they expect to have sex again, typical location of sex, frequency of sex acts, type of sex acts, condom use, HIV status and disclosure will also be asked. HIV testing behavior measures will be date of last test, date of first positive test (if applicable), and where testing took place. We will also obtain HIV status and testing history with chart abstraction.

Validation & adaptation*:* We will validate and adapt the questionnaire so that it is understandable to our study population and accurately captures the intended information. The survey will be tested on a sub-sample of 10 MSM using experimentally validated pre-test procedures, involving coding the quality of the questions and interviewer-respondent interaction during cognitive interviewing. The cognitive interviews will involve going through the entire survey tool in detail with each respondent. Two techniques will be used to elicit respondent responses: 1) "think-alouds," where respondents are asked to think out loud or verbalize their thoughts as they attempt to understand a question, retrieve any information from memory necessary to answer it, and formulate their response; and 2) respondents will complete the instrument and then go over it with the interviewer retrospectively. Probes will be used to clarify respondents' statements, and elicit any problems or concerns about each individual item. In both cases, the aim is to clarify the respondent's experience with the measure. We will modify and improve the instrument with feedback from the cognitive interviews.

Aim 2: To assess the feasibility of collecting retrospective migration and HIV sexual risk behavior from 100 MSM, aged 18 – 59, from the Public Health STD Clinic at Harborview Medical Center.

The feasibility of a future study will be assessed in regards to the ability to identify and obtain consent from eligible MSM at the STD clinic (# contacted, rate of accrual). We will also assess recall bias: if a move is reported, does the amount of missing data regarding move characteristics vary significantly by time since move (#missing/don't know for migration characteristics).

Aim 3: To estimate preliminary age-specific migration rates, stratified by HIV status, race/ethnicity, and birth cohort, and to identify significant migrant sending areas from the sample obtained in Aim 2.
Hypotheses: HIV surveillance: I hypothesize that preliminary MSM migration rates, calculated at 5-year age intervals, will improve population-based metrics for engagement in care. Migration and HIV risk: I hypothesize that associations between migration and HIV risk depend on time since migration. HIV-positive men are more likely to move than HIV-negative men. HIV-negative men who recently migrate will exhibit higher HIV risk behavior and have higher incidence of HIV than non-migrants. Recent migrants test more frequently than non-migrants.
Preliminary analysis*:* The main outcome will be a table of age-specific migration rates – the number of migrants within 5-year age groups per 1000 persons of that age group – by type of move (non-movers, move within same county, different county same state, and different state). We will use descriptive statistics to examine migration rates stratified by HIV status and HIV risk behaviors, including partnership mixing by race and age, UAI in the last year and HIV testing frequency. We will also explore how migration rates vary by race/ethnicity, and by birth cohort. Preliminary migration rates will be used to adjust population-based metrics for the engagement in care (the proportion to PLWHA with 2 or more visits 3 or more months apart) calculated by PHSKC. The denominator will be the expected number of MSM living with HIV/AIDS in the last year, accounting for high rates of migration. Secondary analyses include bivariate tests of association: I will test the bivariate association of migration, defined by discreet categories of time since last move to Seattle, with HIV status (if available from chart abstraction), risky sexual behavior (defined as any unprotected anal intercourse in last 12 months), and testing frequency (none, one, or 2+ tests).
Flow maps: We will represent migration flows with GIS mapping technology, to visualize the origins of migrant flows to Seattle. We will not have sufficient power to incorporate spatial statistics; rather, this map will simply highlight significant migrant sending areas. We will collaborate with the GIS statistical staff at CSDE to generate the maps.
Sample size and precision: As a preliminary study, the primary purpose of this research is to determine the effect size for design of a subsequent study of residential mobility and HIV risk. Specifically, I will obtain point estimates and variance around age-specific migration rates for MSM. Confidence intervals around point estimates: Given a sample size of 100, I will have a confidence interval of +/- 9% on all prevalence estimates. Confidence intervals around the stratified estimates will be larger. Because of the small sample size, power to detect differences in migration rates by HIV status or HIV risk behaviors will be limited.
:

Timeline	Year 1				Year 2			
	1	2	3	4	1	2	3	4
Survey design & adaptation	**	**	**					
Cognitive interviewing		**	**					
Subject recruitment				**	**			
Data collection				**	**	**	**	
Data analysis						**	**	**
Manuscript preparation & submission						**	**	**
R01 preparation and submission							**	**

Limitations: The study is limited in that we will only capture in-migrants and not out-migrants or migrants that came to Seattle and since returned home, thus our preliminary migration rates may be biased. Study participants will be MSM who attend STD clinics, and may not represent MSM in Seattle. Lastly, we may not be able to disentangle timing of moves and seroconversion. HIV-positive men may be more likely to migrate, but new migrants may be at higher risk of acquiring HIV infection. Additional prospective work can address causality.

E. Future work:

The validated survey instrument and preliminary migration rate estimates will support a NIH R01 proposal, broadly aimed to 1) test whether and how MSM migration rates differ than heterosexuals, 2) estimate precisely how MSM migration affects HIV surveillance data, especially with regard to race/ethnicity and birth cohort, and 3) examine how MSM migration affects risk of HIV acquisition over the lifecourse.

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Protection of Human Subjects

Risks to the Subjects

Human Subjects Involvement and Characteristics: The goals of the proposed investigation require participation from human subjects. One hundred (100) study participants aged 18 – 59 will be recruited from the PHSKC STD clinic, and will reflect the socio-economic and demographic characteristics of MSM that attend the STD clinic. To participate in the study, the participants will need to be male, able to complete an interview in English, have had sexual contact with another man in the last 12 months, and able to give personal consent to participate. We will obtain Human Subjects approval prior to conducting Study.

Sources of Materials: Informants will be the men. Each participant will be asked to complete one ~45 minute assessment, using a computer assisted survey information collection system (CASI). With event-history interviewing techniques, information about residential mobility in 5-year increments over the lifecourse as well as information on sexual partnerships, sexual risk behaviors, HIV testing history and knowledge of HIV status over the last 12 months will be gathered from participants responses in the survey. All measures will be completed confidentially and will be used only for research purposes. Chart abstractions will also be obtained for each subject.

Potential Risks and Procedures to Reduce Them: There are two primary potential risks associated with participation in this study. First, there may be discomfort answering study questions. Many of the questions that the men are asked will be of a personal nature. Answering these questions may cause discomfort, or be perceived as intrusive. The second potential risk is breach of confidentiality. Participants will be asked about HIV status and sexual behaviors with a number of partners. These results could pose a risk, if the information were known and linked to identifiable individuals. Data are kept confidential by implementation of a number of protections described in the "Protection against Risk" section below.

Adequacy of Protection against Risks.

Recruitment and Informed Consent: We will recruit participants from the PHSKC STD clinic using flyers and referrals from the nurse practitioners. At the time of the study, we may be able to advertise in a "research repository" where STD clinic patients can search for studies in which they are eligible. Interested men will be screen for eligibility by the medical assistant. Consent for participation will be documented in person. The consent form will address the voluntary nature of participation, participant rights, the risks and benefits of participation, data retention and storage information, protections for and limits to confidentiality, a description of the study activities, that they are free to refuse to answer particular questions or quit the study at any time, and procedures for reporting complaints and/or adverse events to the investigators and to the University of Washington Human Subjects Review Committee.

Protection against Risk: We will take steps to protect participants against potential risks posed by their participation in this research. Participants are informed of all procedures beforehand, and they must go through the informed consent process to ensure they understand and agree to the study procedures. The risk of discomfort will be minimized by ensuring that participants are aware that they will be asked personal questions as part of the study, that their participation is voluntary, and that they are able to quit or skip items at any time. Confidentiality will be insured through a number of means. All participants will be assigned a unique study number, and all study materials will be labeled with numbers, not names. Participants' responses will never be disclosed to anyone outside the study without their written permission. All study information will be stored in locked cabinets, and computer files will be maintained on secure servers and protected by passwords. Individual subjects will never be identifiable in reports and scientific papers.

Potential Benefits of the Proposed Research to the Subjects and Others.

Participants will benefit by the knowledge that they are contributing to the scientific process. In appreciation for their participation, individuals who participate in the study will receive $40 for the 45 minute interview.

Importance of the Knowledge to Be Gained

The general population will benefit from the knowledge that will be generated about residential mobility and HIV risk among MSM in Seattle. This study has the potential to be an important first step to understand how MSM mobility affects HIV risk and linkage to care over the lifecourse. The risks to subjects in this study are considered low in relation to the potential benefits to the individuals that participate and ultimately to communities.

UNIVERSITY OF WASHINGTON

Center for AIDS and Sexually Transmitted Diseases
A World Health Organization Collaborating Center
for AIDS and STD

Ann Collier MD
Professor of Medicine
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325 9th Avenue, Box 359929
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September 21st, 2012

Dear Ann,

I am writing in support of Dr. Susan Cassel's application for the CFAR New Investigator Award, "Patterns of residential mobility among men who have sex with men (MSM) in Seattle: Implications for HIV surveillance and transmission risk." I have read and discussed the application with Susie and am supportive of its submission.

The need to integrate demographic perspectives into HIV research is increasingly obvious. Our past failure to pay close attention to the migration patterns of persons with HIV in the U.S. has now become a major national concern as public health authorities and researchers attempt to more consistently use HIV surveillance data to direct interventions and to assess engagement in care and antiretroviral use at the population-level. This is impossible without accurately defining the population's movement. We need to know which persons living with HIV live where. It's clear that MSM move a lot, but it's not clear if the patterns of mobility differ between MSM and heterosexuals. It's also not clear how migration affects individual's risk behavior and the spread of infection at the population-level. Understanding these issues has implications for HIV epidemiology and prevention, but it also important in understanding transmission patterns for infections such as resistant *Neiserria gonorrhoeae*, and I suspect in understanding health issues in MSM generally. This field is wide open and, based on my experience reviewing applications in study sections populated primarily by social scientists, I believe that the work Susie proposes will be very appealing to NIH. However, before applying for a large NIH grant, we need some to conduct formation research and collect preliminary data. The work Susie proposes will do that.

I've known Susie since 2008. I was a co-mentor on her NIH K99/R00 grant on migration, sexual networks, and HIV in Ghana, and I helped support her transition from a post-doctoral fellow to an assistant professor in 2010. She is making excellent progress toward becoming an independent researcher, and funding this project would be an important step in her continued career development, particularly as it represents a new area of research that builds on her established expertise.

As Susie's primary CFAR mentor on the project, I will work with her and the rest of the study team to accomplish the goals defined in the application. I will facilitate her access to study subjects to be recruited through the PHSKC STD clinic and to STD clinic data. I will also work with her and with other collaborators on the project to help Susie develop her research plans in this area with the ultimate goal of preparing an NIH R01 application.

Sincerely,

Matthew Golden MD, MPH
Professor of Medicine, University of Washington
Director, Public Health – Seattle & King County HIV/STD Program

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September 21st, 2012

Susan Cassels
Box 359931
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Dear Dr. Cassels,

Thank you for the invitation to serve as a CFAR Mentor for your proposed research study, entitled "**Patterns of residential mobility among men who have sex with men in Seattle: Implications for HIV surveillance and transmission risk."** I am excited about participating and strongly support this application to conduct formative research in the area of residential mobility among men who have sex with men and HIV risk over the lifecourse. Your research is poised to make substantial contributions to our knowledge on at least two important topics: the social processes of residential selection within an understudied population, and the potential implications for population health.

As a CFAR Mentor, I have read and discussed your application with you and I am supportive of its submission. I will work directly with your team to provide guidance and meet quarterly to provide support on both conceptual and analytic issues in the study of residential mobility. Specifically in year 1 I will support the questionnaire design, and in year 2 I will support data analysis and the development of your R01 application.

My own research experience positions me to provide solid mentoring in support of your work on residential mobility. Much of my research over the past fifteen years focuses on processes of migration and inter-neighborhood mobility and the implications for individual health and behavior. My specific contributions have focused on: the micro-level mobility processes that reinforce residential segregation by race and ethnicity; stratification in processes of neighborhood attainment; and the effects of conditions in neighborhoods, surrounding residential areas, and broader housing markets on processes of residential differentiation.

As a sociologist and demographer, I am eager to join forces with you and your multidisciplinary mentoring team on your exciting new study and wish you the best of luck in your endeavors.

Sincerely,

Kyle Crowder
Professor, Sociology
Research affiliate, Center for Studies in Demography and Ecology

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26 September 2012

Susan Cassels
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Dear Dr. Cassels,

Thank you for the invitation to act as a CFAR Mentor for your proposed research study, entitled "**Patterns of residential mobility among men who have sex with men in Seattle: Implications for HIV surveillance and transmission risk."** We have worked together for many years, and I am pleased to continue to mentor you and support your proposed work to conduct formative research on residential mobility among men who have sex with men and HIV risk over the lifecourse.

As a member of your mentoring team, I have read and discussed your application and I am supportive of its submission. I will work directly with you and your mentoring team to provide guidance and be available on an as-needed basis to support the development and implementation of your project and R01 submission in year two of this application.

As you know, my work is clearly relevant to your project and will enable me to provide expert mentorship. I have been researching and publishing on HIV epidemiology among men who have sex with men (MSM) for the past ten years. My specific contributions have focused on using mathematical models and social network analysis to explore transmission dynamics among MSM. I just published two articles in the *Lancet* on HIV prevention successes and challenges for MSM and the global epidemiology of HIV infection among MSM.

Given my training in demography and expertise in HIV epidemiology among MSM, I am thrilled to support your work on HIV and migration among MSM. I feel that integrating demographic perspectives into the field of HIV epidemiology will increasingly inform and support prevention efforts, especially with the recent emphasis on improving the cascade of care.

I look forward to working with you and your multidisciplinary mentoring team on this exciting study and wish you the best of luck in your endeavors.

Sincerely,

Steven M. Goodreau
Associate Professor, Anthropology