



**UNODC**

United Nations Office on Drugs and Crime

# Implementing drug use surveys in low and middle income countries

**Kamran Niaz, MBBS, MPH**

**Epidemiologist**

**Drug Research Section**

**Research and Trend Analysis Branch**



**UNODC**

United Nations Office on Drugs and Crime

## Challenges in implementing drug use surveys

- Household surveys –
  - self reported behaviour (e.g, drug use)
  - Marginalized groups not included (that have a higher rate of drug use)
  - Social stigma
  - Legal sanctions for drug use
  - Under reporting of some substances



**UNODC**

United Nations Office on Drugs and Crime

## UNODC approach

- Support countries in understanding the extent and pattern of drug use in the country
- Mixed methods and triangulation
  - Household survey
    - Direct/self reported use of drugs
    - Indirect – drug use among the social network (network scale up)
  - High risk/problem drug use study
    - Multiplier/benchmark
    - Multiplier derived from the high risk drug users
    - Benchmark – administrative data



# UNODC

United Nations Office on Drugs and Crime

**Network Scale up**



## How Many People Do You Know?: Efficiently Estimating Personal Network Size

Tyler H. McCORMICK, Matthew J. SALGANIK, and Tian ZHENG

In this article we develop a method to estimate both individual social network size (i.e., degree) and the distribution of network sizes in a population by asking respondents how many people they know in specific subpopulations (e.g., people named Michael). Building on the scale-up method of Killworth et al. (1998b) and other previous attempts to estimate individual network size, we propose a latent non-random mixing model which resolves three known problems with previous approaches. As a byproduct, our method also provides estimates of the rate of social mixing between population groups. We demonstrate the model using a sample of 1,370 adults originally collected by McCarty et al. (2001). Based on insights developed during the statistical modeling, we conclude by offering practical guidelines for the design of future surveys to estimate social network size. Most importantly, we show that if the first names asked about are chosen properly, the estimates from the simple scale-up model enjoy the same bias-reduction as the estimates from our more complex latent nonrandom mixing model.

**KEY WORDS:** Latent nonrandom mixing model; Negative binomial distribution; Personal network size; Social networks; Survey design.

## SCALE-UP METHODS AS APPLIED TO ESTIMATES OF HEROIN USE

CHARLES KADUSHIN, PETER D. KILLWORTH, H. RUSSELL BERNARD, ANDREW A. BEVERIDGE

*The feasibility of using the network scale-up method to estimate heroin use is described. A random sample was asked "How many people do you personally know" who use heroin, and how many in other subpopulations – robbery, assault, burglary, auto-theft victims, binge drinkers, and marijuana users – whose size is more accurately known. A model estimated the overall number of persons each respondent knew and the size of each subpopulation. Estimates of the subpopulation are compared with known subpopulation sizes to assess the plausibility of the model. Data came from the 1999 survey evaluating the "Fighting Back" substance prevention program. Fourteen sites with clear political boundaries were used (n=5892). Heroin use varied from city to city. Rates estimated for heroin use correlated .832 with the level of respondents' sense of "crime in their neighborhood." The average ratio between the known populations and the estimates is .943. Members of each subpopulation, especially drug users, tended to know more people within their own subpopulation.*

## Counting hard-to-count populations: the network scale-up method for public health

H Russell Bernard,<sup>1</sup> Tim Hallett,<sup>2</sup> Alexandrina Iovita,<sup>3</sup> Eugene C Johnsen,<sup>4</sup> Rob Lyerla,<sup>5</sup> Christopher McCarty,<sup>6</sup> Mary Mahy,<sup>7</sup> Matthew J Salganik,<sup>8</sup> Tetiana Saliuk,<sup>9</sup> Otilia Scutelnicuic,<sup>10</sup> Gene A Shelley,<sup>11</sup> Petchsri Sirinirund,<sup>12</sup> Sharon Weir,<sup>13</sup> Donna F Stroup<sup>14</sup>

### ABSTRACT

Estimating sizes of hidden or hard-to-reach populations is an important problem in public health. For example, estimates of the sizes of populations at highest risk for HIV and AIDS are needed for designing, evaluating and allocating funding for treatment and prevention programmes. A promising approach to size estimation, relatively new to public health, is the network scale-up method (NSUM), involving two steps: estimating the personal network size of the members of a random sample of a total population and, with this information, estimating the number of members of a hidden subpopulation of the total population. We describe the method, including two approaches to estimating personal network sizes (summation and known population). We discuss the strengths and weaknesses of each approach and provide examples of international applications of the NSUM in public health. We conclude

samples of a population as well as a method to uniquely identify which individuals were recruited in more than one sample. Synthetic estimates and multivariate indicator methods are computationally intensive and may require data for each area in the country for which the estimate will apply.

A potential solution is a relatively new (to public health) technique for estimating the size of hidden or hard-to-reach populations: the network scale-up method (NSUM). We describe the background of the method, the results of its applications in public health, and an evaluation of its strengths and limitations. Finally, we report areas of further work in research and public health implementation for improving the method's utility for programming and planning, based on the consensus of an expert panel (see online supplementary appendix 1).



American Journal of Epidemiology  
© The Author 2011. Published by Oxford University Press on behalf of the Johns Hopkins Bloomberg School of Public Health.  
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/2.0>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Vol. 174, No. 10  
DOI: 10.1093/aje/kwr246  
Advance Access publication:  
October 14, 2011

### Practice of Epidemiology

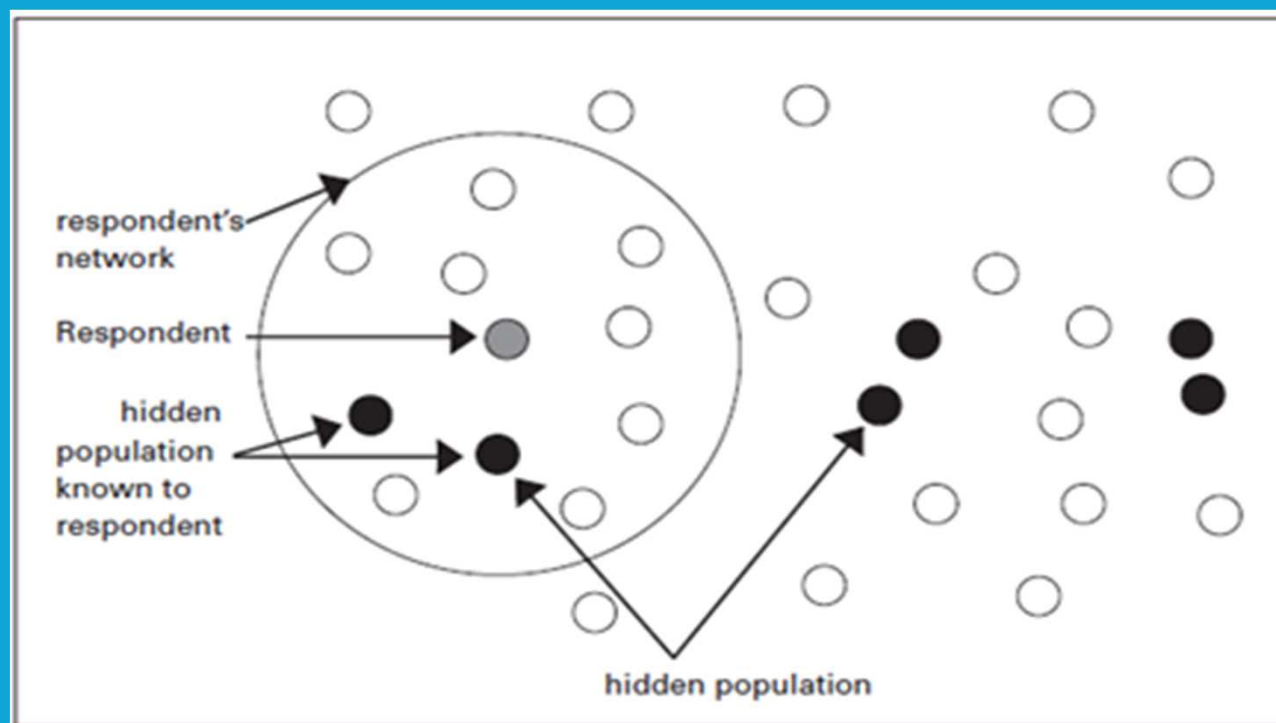
#### Assessing Network Scale-up Estimates for Groups Most at Risk of HIV/AIDS: Evidence From a Multiple-Method Study of Heavy Drug Users in Curitiba, Brazil

Matthew J. Salganik\*, Dimitri Fazito, Neilane Bertoni, Alexandre H. Abdo, Maeve B. Mello, and Francisco I. Bastos

\* Correspondence to: Dr. Matthew J. Salganik, Department of Sociology and Office of Population Research, Princeton University, 145 Wallace Hall, Princeton, NJ 08544 (e-mail: mjs3@princeton.edu).

## Network scale up

- People's social network ... set of people they know ... are on average representative of the general population





**UNODC**

United Nations Office on Drugs and Crime

## How does it work:

- In a random sample that is representative of the general population
  - How many people do you know?
  - How many people do you know who use drug x?

Estimated size of the sub population	=	Total # of members in the subpopulation from all participant networks	x	Size of the general population
		Total # of members from all participant networks		



**UNODC**

United Nations Office on Drugs and Crime

## Estimating personal network size

- How many people do you know.....
- Knowing some characterized by:
  - Live in the area of interest
  - You know them they know you
  - You have had contact with them over 1 or 2 years
  - You could contact them if needed





**UNODC**

United Nations Office on Drugs and Crime

## Two methods to estimate personal network

- Known population method
  - Number of people they know various population of known size (people named Michael; primary school teachers - 0.1% to 4 % of the population)
    - Knows 5 people named Michael,
    - 2 million people named Michael
    - Total population is 90 million
    - $(5/2000000) \div 90 \text{ million total population} = 225$  size of the network
- Internal consistency checks with the existing data
- Can lead to under reporting in larger population and over reporting in smaller populations

## Two methods to estimate personal network ....

- Summation method
  - No or unreliable data for known populations
  - Participants asked to enumerate people they know in a list of specific relationships or categories
  - exclusive relationship types (family, co-workers, neighbours, friends)
  - Comprehensive list of relationship type eliminating overlap
    - Culturally relevant
    - Limitation - lead to over counting from overlaps



**UNODC**

United Nations Office on Drugs and Crime

## Two main biases in network scale up

- Transmission error
  - Respondent is unaware of someone in network (is heroin user) – especially when behaviour is stigmatized – underestimation
- Barrier effect
  - Social barriers (ethnicity, race, occupation, location of residences) causes variation in likelihood a respondent will know the people with behaviour (underestimation)



**UNODC**

United Nations Office on Drugs and Crime

## Use in some studies

- Deaths in Mexico earthquake
- Women who have been raped – Mexico
- HIV prevalence among women who have been raped, US
- Heroin use – US
- Populations most at risk of HIV (PWID, MSM, Sex workers) – Ukraine, Moldova, Rawanda
- People who use drugs heavily, Brazil,
- UNAIDS Manual on Estimating size of hidden population



**UNODC**

United Nations Office on Drugs and Crime

## Applying network scale up (UNODC experience)

- Pakistan – national household survey on drug use (50,000 respondents)
- Self reported drug use in past 12 months
  - cannabis 0.5%
  - Heroin 0%
  - Non medical use of prescription opioids 1.4%



## Pakistan.....

7.1 Often people use different things in order to avoid worries, stress etc, can you please tell me if any of your Friends, Acquaintances or Other People in your community use any of the following substances?

Type	Q 7.1a: Friends	Q 7.1b: Acquaintance	Q 7.1c: Others	Q 7.1d: Approximate total numbers (number)
	1. Yes 2. No	1. Yes 2. No	1. Yes 2. No	
a) Solvents/Inhalants (such as Thinner, Glue)				
b) Methamphetamine				
c) Cocaine				
d) Ecstasy				
e) Cannabis (Bhang)				

- 6 -

f) Cannabis (Charas)				
g) Herion				
h) Hallucinogens (LSD,PCP)				
i) Others (specify				

Using Dunbar number 150 as average size of network

Problem drug use survey(using treatment multiplier bench mark)

Combined to get

Prevalence of

- Cannabis 3.5%
- Heroin 0.8%



**UNODC**

United Nations Office on Drugs and Crime

## Nigeria – drug use survey

- Household survey Self reported use of substances (40,000 across 36 states and Federal Capital)
- NSUM - Known population method
- Problem drug use assessment (RDS – benchmark) (9,400 across 36 states and Federal Capital)



## In cognitive and pre-testing of the questions

QN3. Now I'm going to ask you how many people you know personally who fit the following definitions. Remember, the definition to know someone means that you recognize them and they recognize you by sight or name, and you have a way to contact each other (phone, address, email), and you have been in contact in the past-two years.

Category	Number
a) Of the women you know, how many gave birth in the past-year?	
b) How many of the women you know personally gave birth in the past-year but did not survive (child-birth)?	
c) How many girls aged 10-14 do you know who are married?	
d) How many boys between the ages of 15-19 who are attending SSS do you know?	
e) How many girls between the ages of 15-19 who are attending SSS do you know?	
f) How many women do you know who died last-year?	
g) How many men do you know who died last-year?	
h) How many men do you know who are employed in the police force?	
i) How many people do you know who are employed by <u>Nipost</u> (Nigerian postal service)?	
j) How many medical doctors do you know personally that are currently working in the country?	
k) How many nurses do you know personally?	
l) What is the number of secondary school teachers that you know personally?	
m) What is the number of people doing their military service that you know personally?	

- Note to Henry & Technical team: Please try to see if there could be other categories that can be used here that are of known populations sizes through census, or other sources/registers). We need a minimum of 10 categories that could work well in most settings.





**UNODC**

United Nations Office on Drugs and Crime

## Final social network categories

*Now I'm going to ask you some questions that will help us understand the size of your personal network. So, how many people who fit the following definitions, you know personally, with whom you have had a meal in the past-year...*

Category	Number
Q 4.1: Of the women you know personally, how many gave birth in the last 12 months?	
Q 4.2: How many young men aged 15-19 do you know personally who are attending secondary school?	
Q 4.3: How many young women aged 15-19 do you know personally who are attending secondary school?	
Q4.4: How many women do you know personally who died in the last 12 months?	
Q 4.5: How many secondary school teachers that you know personally?	
Q 4.6: How many nurses do you know personally?	
Q 4.7: How many people do you know personally who work for the Nigerian postal service (NIPOST)?	



## Question on drug use among the social network

### SECTION 9: Information about substance use by people personally known and in the household

*Often people use different substances, some of which we have mentioned above, in order to avoid worries, stress, etc. Can you please tell me if any of the people you personally know, and with whom you have had a meal in the past year, use ... in this area*

Type of substance  <i>(The names in <b>bold</b> are commonly used local names) use flash cards (pictures of drugs)</i>	Q 9.1: People personally known using...  1. Yes 2. No <input type="checkbox"/> Next Type	Q 9.2. How many
a) Cannabis (herb or resin (hashish)) <b>[Wee Wee; Weed; Marijuana; Mary &amp; Joan; Choko; Yoyo; Kush; Skunk; Green Leaf; Ghanja; Grass; Indian Hemp; Blaze; Taba; Ndedeko; Bendel Market; Genye]</b>		
b) Prescription opioids or painkillers such as tramadol or codeine <b>[Relief; TM; Tar; Tramol]</b>		



**UNODC**

United Nations Office on Drugs and Crime

## Comparison of results

### Self reported

- Cannabis use 1.4%
- Heroin use – 0.03%
- Non medical use of opioids (tramadol) 3.8%

- National estimate using NSUM , MBM
- Cannabis use – 10.4%
- Heroin use – 0.1%
- Non medical use of opioids (tramadol) 4.8%



**UNODC**

United Nations Office on Drugs and Crime

## Conclusion

- A more comprehensive and complete picture of the extent of drug use in the population
- Addressing under-reporting
- Would require more implementation in other countries
- Development of methodological guide