



# **Time Location Sampling:**

## A Short Review

As it was mentioned in the (Responding previous issue. Driven Sampling), the most at risk populations (MARPs) for HIV/AIDS are usually hidden and belong to hard to reach subgroups in nearly all countries. We cannot apply the conventional sampling methods to recruit a representative sample. Nowadays, several alternative sampling methods have been designed to overcome such a problem; Time Location Sampling (TLS) is one of these methods.

#### History and rational

TLS was first used for behavioral surveillance among men who had sex with men (MSM) in the United States in the early 1990's. The rational was that if we could approach the places which the members of a target population came together regularly in specific dates, we would have access to most of study samples. We call these places "venues". Venues are specified by place and time.

From a broader view, TLS is a modified cluster sampling. In a cluster sampling, we classify a population into clusters such as schools, villages, clubs, etc. and choose some clusters randomly to recruit our subjects. A cluster sampling has maximum efficiency when there are minimum variation between clusters and maximum variation within clusters.

In other words, we hope the characteristics of subjects in selected clusters have minimum differences with the characteristics of subjects in other clusters.

In TLS, we define our clusters based on the venues. For example, a club is not a unique cluster; according to the characteristics of its attendees at different times on different days, we may count it as several clusters. So, each cluster may be counted as many as fourteen when attendees' characteristics of early and late evening differ during seven days of a week. Generally speaking, if we select enough places and times, we may expect to have a representative sample of the target population.

#### Sampling frame

Similar to other types of probability sampling, we ought to have a sampling frame which is a list of subjects or a list of clusters. In order to make the sampling frame for a TLS, we need a map of all possible places that MARPs can be found in as well as days and times that they gather together. It is called the "Universe of Venues". Similar to a cluster sampling, in TLS, we select some of the venues randomly from the universe of venues.

### **TERMINOLOGY**

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**Venue:** Locations (by days and times) where the target population congregate.

**Venue-Day-Time periods (VDTs):** About four-hour blocks of time that a venue works during a day, week or month. All venues included in sampling frames have at least one VDT per month.

**Sampling frame:** A list of venues with at least one VDT, which is expected to produce 8 eligible participants during a four-hour period.

**Formative assessment**: Qualitative research conducted before a survey begins, consisted of focus group discussions, indepth interviews, mapping or observations of the target population and individuals who work with them.

**Incentive:** This is a reward or reimbursement given to participants in a TLS study.

**Enumeration:** Enumeration is the process of counting people who appear to fit the eligibility criteria of the target population and who attend the identified venues during enumeration or sampling events.

**Appointment card:** After recruitment, when the questionnaire is finished and the blood sample is collected, each participant will receive a card for counseling. (S)he can refer to a specific clinic to ask for his/her result of blood testing or any other services.

**Field coordinator:** (S)he acts as a field manager in charge of choosing the best suitable enumeration area type, putting other staff in the right place, counting every potentially eligible person, and monitoring for the safety of environment during field working hours.

**Weights:** The probability that an individual be included in the study is varied from one venue to another. It depends on the size of the venue and the number of enrolled persons at that venue. So, weights in TLS represent the probability sampling for each person which is calculated by dividing the probability of being enumerated to the probability of being interviewed at each venue.

**Cluster Sampling:** In this technique, the total population is divided into groups (or clusters) and a random sample of the groups is selected.

#### Data collection

During the data collection in venues, a field coordinator enumerates all potentially eligible persons (belongs to the target population) that enter the enumeration area or cross the enumeration line (**Figure 1**). Some of them will be approached and interviewed if they have the eligibility criteria.

Figure 1- Two type of enumeration area; you have to choose one of them, according to the flow and direction of the people in the venue.



#### Actions to be taken

In order to find out when and where the MARPs congregate, you have to run pre-study activities, mostly as a formative assessment. It includes literature review. identifying community stakeholders, interviewing the key informant people, and having focus group discussions with the members of target population. Once the initial list of the venues is identified through formative assessment, different types of enumeration methods are conducted to days and times determine the of high attendance, estimate the size of eligible MARPs during these times, and determine the best suitable type of enumeration, line or area.

Since the pattern of participation of our target population may change, we have to update the universe of venues periodically, say monthly, even during the data collection period. For example, we may exclude those venues which are not operating during the following month. Generally, the main tasks of an action plan for upcoming month are as follow:

- Creating/updating Universe of Venues
- Excluding days that our staff will not work
- Highlighting special social events in the upcoming months

- Randomly selecting, without replacement, 14-16 venues from the updated list
- Completing the calendar week by week and continue this until all the included venues are scheduled
- For each scheduled venue, selecting two alternative venues by random in order to ensure the staff can use their times efficiently if the primary venue is closed for unexpected reasons.

As a result, you would reach an action plan which will be used as a sampling guideline (sampling calendar) of the forthcoming month by project staff. **Figure 2** illustrates an example of a two-day schedule.

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
	1	2	3	4	5	6
		Arg square		Neshat Park		
		8:00-12:00		14:00-18:00		
		A. Bagh-e-Melli square		A. Motahari Park		
		B. Moshtagh square		B. Terminal Bus station		
7	8	9	10	11	12	13*
14	15	16	17	18	19	20*
	*					
21	22	23	24	25	26	27*
28	29	30	31			
Numbers indicate the colordon date						

Figure 2- Sampling Calendar (for only two days)

Numbers indicate the calendar date.

\* Holidays – the days that staff are off.

A and B are the two alternatives for each venue day time periods (VDTs).

#### Recruitment

During the data collection, we should record the number of eligible subjects that participate in venues. It should also be noted that enumeration is counting any potentially eligible person that attends the enumeration area during the recruitment process. More often a systematic random sample of these eligible subjects will be approached; the team members ask the behavioral questions in a private area and then collect biological sample; a van or mobile unit is required for taking biological specimens.

As the study team reaches the venue, the field coordinator notifies the venue owner/workers that they will conduct the survey. (S)he starts the enumeration after directing the staff to their proper work spot. This count will be used as the probability weight during the analysis process (see following section). An incentive and appointment card including a unique survey code for each recruited person is delivered after the data collection. All the participants are invited to a counseling session at a later date in order to receive their examination results and further consultations.

#### Analysis

As mentioned above, TLS is a modified cluster sampling. Therefore, we have to analyze the data accordingly. The data of subjects from high flow venues are more important for us since they are representative of a bigger proportion of the target population. Therefore, we have to weigh the data, based on the size of each venue, by counting all potentially eligible persons entering the enumeration area or crossing the enumeration line. Furthermore, we should consider the clustering of data. In other words, we cannot assume that the recruited subjects in a venue are entirely independent. Survey analysis is the recommended method which considers the clustering of the data and puts appropriate weights in the analysis. Special statistical software, such as STATA or SAS, is recommended for running such advance statistical analysis.

#### Special consideration

TLS is not always the best choice to study MARPs. TLS is not recommended when the hidden populations do not congregate in specific areas or attendees of venues are different from others who do not congregate in the venues. Since TLS requires special teams to run fieldworks, safety is always a main concern; in case of an emergency situation, staff should quit the recruitment and leave the venue immediately. When safety in the field cannot be guaranteed, other sampling methods, such as RDS, may be a good alternative. Any public or private location which is attended by the population of interest can be included in the universe of venues, except the ones which provide medical, social, or any preventive/ treatment services. This may reduce the number of venues and make it hard to find enough eligible venues in the sampling frame.

#### Drawback / executive troubles

Although the concept is simple, there are many administrative complexities. The most important issues are listed here:

- How can we find the list of venues?
- How can we be confident about their working days and times?
- As the result of our study, do people change their habits?
- What kind of enumeration is the most appropriate one?
- Among those who attended in the venue, whom should be enrolled in the study?
- How can we distinguish repeated cases from the new ones?
- How can we ensure the safety of our staff in the field?

#### Summary

TLS recruits individuals from specific locations during specific time periods, randomly. It is considered to be a random sampling method, if the sampling frame includes mostly all venues and the size of the target population attending these venues is enough and also recorded accurately. So, we expect to have a non zero chance for each member of the interested target population to be captured in venues.

#### Bibliography

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