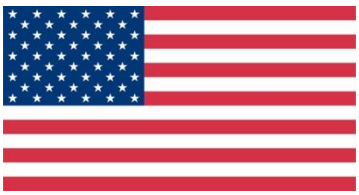
Estimating the Prevalence of Child Sex Trafficking in Maharashtra, India

Time II

October 2022



Estimating the Prevalence of Child Sex Trafficking in Maharashtra, India, Time II, was conducted in Maharashtra from September 2022 to October 2022 by Two Six Technologies (TST) in collaboration with scholars at the University of California, Los Angeles (UCLA).

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The opinions, findings, and conclusions stated herein are those of the authors and do not necessarily reflect those of the United States Department of State or GFEMS.

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Additional information about this study may be obtained from Two Six Technologies, 901 N. Stuart Street, Suite 1000, Arlington, VA 22203; Website: https://twosixtech.com

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Two Six Technologies, University of California, Los Angeles, and the Global Fund to End Modern Slavery. (2022). *Estimating the Prevalence of Child Sex Trafficking in Maharashtra, India, Time II*.

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Acronyms

CAPI	Computer Assisted Personal Interviewing
GFEMS	Global Fund to End Modern Slavery
TST	Two Six Technologies
CST	Child Sex Trafficking
IJM	International Justice Mission
GoI	Government of India
MCMC	Markov chain Monte Carlo
NACO	National AIDS Control Organization
NGO	Nongovernmental Organization
NSUM	Network Scale-Up Method
OSEC	Online Sexual Exploitation of Children
POCSO	Protection of Children from Sexual Offences
RDD	Random Digit Dialing
RDS	Respondent-Driven Sampling
TIP Office	Office to Monitor and Combat Trafficking in Persons
TLS	Time-Location Sampling
UCLA	University of California, Los Angeles
ICTs	Information & Communications Technologies

Executive Summary

In 2020, Two Six Technologies (IST Research), in collaboration with the University of California, Los Angeles (UCLA) and through funding from the U.S. Department of State's Office to Monitor and Combat Trafficking in Persons via the Global Fund to End Modern Slavery (GFEMS),[1] was able to estimate the prevalence of child sex trafficking in Maharashtra, India. This initial study (Time I) employed a hybrid approach, using the Network Scale-Up Method (NSUM) to obtain a point estimate of the child sex trafficking (CST) subgroup through a general population survey, then Respondent-Driven Sampling (RDS) to refine this information via surveys targeting adult sex workers.[2] This method allowed the research team to validate each method's findings, identify biases potentially missed by a single-method approach, and draw conclusions on the development of the commercial sex environment as it pertains to child trafficking in Maharashtra. Time I was also a remote endeavor, with all engagements conducted via telephone with local support for robust and rapid data collection despite the COVID-19 pandemic. In Time I, findings indicated that there were approximately 29,000 sex workers in Maharashtra in early 2020 (95% Confidence Interval [CI]: 14,000, 52,000). Among this population, roughly 7,900 (about 27.2%) were under the age of 18 (95% CI: 2,600, 15,000).

In 2022, the same research team conducted a second study (Time II), replicating the aforementioned methods and remote engagement. TST found approximately 42,000 sex workers were in Maharashtra in late 2022 (95% CI: 13,000, 80,000). Among this number, about 6,000 (14%) were under the age of 18 (95% CI: 0, 17,000; Table 5 reproduced below). Through data triangulation with response data from RDS surveys of adult sex workers in Maharashtra, TST assessed nearly 8% of *current* adult sex workers entered the commercial sex industry while underage. TST also found that 3.5% of adult sex workers admitted to knowing a CST victim. This is a slight reduction from Time I wherein 5.6% (17 of 301) of surveyed adult sex workers acknowledge knowing a CST victim. In aggregate, these Time II findings may ostensibly suggest an increase in the prevalence of sex work and a decrease in the prevalence of CST since Time I; however, neither finding appears to statistically significantly differ from the estimates obtained in Time I. Moreover, the confidence intervals of point estimates for the same key populations are wider in 2022 than in 2020, indicating an increase in uncertainty driven by several factors within the survey response data.

[1] IST Research, University of California, Los Angeles, and the Global Fund to End Modern Slavery. (2020). *Estimating the Prevalence of Child Sex Trafficking in Maharashtra, India, Time I.*

[2] The authors recognize that as part of what they refer to as sex work, there are situations in which people engaged in this industry are doing so against their will or are doing so for reasons related to personal or economic vulnerability. For this study, sex trafficking is focused exclusively on individuals in the industry under 18 years of age, in alignment with the definition of sex trafficking outlined in the Trafficking Victims Protection Act (TVPA).

Table 5 – Estimated percentages of the target populations among the total population of Maharashtra and estimated sizes of the target populations

	Estimated percentage of the key populations among the total population of Maharashtra (Time I)			Estimated size of the key populations (Time I)		
	Lower 95% CI	Estimate	Upper 95% CI	Lower 95% CI	Estimate	Upper 95% CI
Sex workers	0.010% (0.011%)	0.033% (0.023%)	0.063% (0.042%)	13,000 (14,000)	42,000 (29,000)	80,000 (52,000)
Victims of child sex trafficking[3]	0.000% (0.002%)	0.005% (0.006%)	0.013% (0.012%)	0 (2,600)	6,000 (7,900)	17,000 (15,000)

TST also detected a dramatic decrease in overall personal network size among the general population and sex worker respondents. This phenomenon in conjunction with TST's NSUM and RDS response data concerning CST (i.e., very few adults, and very few adult sex workers, reported knowledge of CST victims) may suggest a growing disconnect between adult sex workers and CST victims. It is plausible, given emerging COVID-19 research on social isolation, that sex workers may be working or communicating in smaller networks. The Time II study also provides new information concerning the impact of isolation on hidden population detection, estimation, and participation in trafficking or informal commerce. Decentralization and isolation among hidden population members significantly affects the RDS sampling process, and risks inducing new coverage bias in RDS results. Network sparsity due to increased isolation within a general population may also impact the granularity of NSUM estimate results, particularly if respondents' personal network reports provide less granular information due to lower overall social connectivity.

In Time II, the research team also investigated buyer behavior to improve data triangulation, leading TST to estimate Maharashtra's local commercial sex industry buyer population to be approximately 134,000 in 2021 (95% CI: 68,000, 228,000). Among these buyers, approximately 14,000 (10%) paid to have sex with children between 15 and 17 years of age (95% CI: 0, 37,000). Among these 14,000 buyers, about 6,500 (46%) arranged the transaction digitally (95% CI: 0, 23,000). By comparison, in Time I, TST estimated that there were about 35,000 local buyers of the commercial sex industry in 2019 in Maharashtra (95% CI: 22,000, 54,000). Among these buyers, about 9,000 (26%) paid to have sex with children 17 years old and younger (95% CI:

[3] Minors (individuals under the age of 18) are not able to legally provide consent and thus should not be referred to as "sex workers." For this data point, involvement in the sex industry refers to exchanging sexual services for monetary or in-kind remuneration (to oneself or a third party).

4,200, 15,200). In 2020, TST found that among the 9,000 buyers who paid to have sex with someone aged 17 or younger, more than 3,200 (36%) arranged the transaction digitally (i.e., via web sites or social chat applications; 95% CI: 1,700, 5,400). The Time II results demonstrate an increasing reliance on digital technologies to facilitate CST as the percentage of buyers who arranged those transactions digitally increased from 36% to 46%. TST did not directly survey respondents concerning online sexual exploitation of children (OSEC), but among adult sex workers who provide digital sexual services, 66% of their customers were reported to be local to Maharashtra.

Of additional note, the prevalence of sex work and CST in Maharashtra appears to be in constant flux as sex workers have moved in and out of the sex industry during the COVID-19 era. In Time I, 55% of sex workers stated they knew someone who had entered the industry due to the COVID-19 pandemic; 41% knew at least one individual who had exited the industry due to the pandemic. In Time II, 41% of sex workers stated they knew someone who had entered the industry due to the COVID-19 pandemic; 38% knew at least one individual who had exited the industry due to the pandemic.

While the study methods allowed the research team to estimate the number of CST victims in Maharashtra, point estimates may understate the size of this population. Study participants may be reluctant to acknowledge or unaware of an associate's connection with the sex industry (transmission bias) and may even be hesitant to respond accurately due to the stigma of sex commerce, affecting results. These limitations and mitigating approaches are delineated within the body of this report. Notwithstanding, the results suggest the number of CST victims in Maharashtra is notable, and that the "market" for CST is evolving to become more integrated with information and communications technologies (ICTs). In particular, the growing digital footprint of sex commerce in Maharashtra and the increased risk of isolated instances of CST made feasible through digital marketing and facilitation platforms call for a redoubling of measures to understand, track, and answer the evolving threat in a sophisticated and technologically integrated fashion.

Introduction

India is considered a significant source, destination, and transit country for sex trafficking, with the children of migrant laborers and people from scheduled castes or tribes among the most vulnerable to trafficking.[4] Sex trafficking has been tied to socioeconomic factors like poverty, illiteracy, and inadequate livelihood options,[5] which have been exacerbated by the COVID-19 pandemic. Many women and children have experienced re-trafficking due to economic distress, and children of economically disadvantaged families face increased risk due to parental loss of employment and school closures.[6] Furthermore, the pandemic has also led to an increased reliance on decentralized networks of commercial sex work, as well as shifts to virtually sustained or enabled sex trafficking.[7]

Victims are often lured or duped by traffickers,[8] who have increasingly leveraged social media, including mobile dating applications, for recruitment. This process is complicated by encrypted digital communications and payment applications that eliminate trails connecting perpetrators to crimes, granting them greater anonymity, security, and convenience.

In 2022, internet and social media use in India grew by 34 million (5%) and 19 million (4%) users, respectively,[9] increasing opportunities for buyers to exploit digital spaces. The expanding options for buyers in these markets and the persistence of traditional venues necessitate effective counter-trafficking methods, for both online and traditional forms of and pathways into sex trafficking, and robust legislation to prosecute offenders.

While Maharashtra has bolstered its anti-trafficking efforts through increased funding to anti–human trafficking units (AHTUs) and cells (AHTCs), the US Department of State reports these units may be insufficiently funded, equipped, or directed to address this burgeoning issue.[10]

Designing a comprehensive counter-trafficking effort requires understanding the victimized populations' size or prevalence, and understanding how the issue is evolving over time within a geography of interest. Improved measurements and new methods can enhance the targeting and implementation of interventions and provide crucial information to decision-makers for

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[4] Office of Monitor and Combat Trafficking in Persons. (2022). *2022 trafficking in persons report*: India. US Department of State https://www.state.gov/reports/2022-trafficking-in-persons-report/india/

[5] Ministry of Women and Child Development. (2021) *Annual report 2020–2021.* https://wcd.nic.in/sites/default/files/WCD_AR_English%20final_.pdf

[6] Office of Monitor and Combat Trafficking in Persons. (2022). *2022 trafficking in persons report*: India. US Department of State https://www.state.gov/reports/2022-trafficking-in-persons-report/india/

[7] GFEMS. Red Light Refracted: Impacts of COVID-19 on Commercial Sexual Exploitation in Maharashtra. *Policy Brief.* https://www.gfems.org/wp-content/uploads/2021/06/COVID_CSE_Dec2020_G03RAPCSE03-1.pdf

[8] Ministry of Women and Child Development. (2017) *Annual report 2016–2017.* https://wcd.nic.in/sites/default/files/FINAL%20WCD_AR_English%202016-17.pdf

[9] We Are Social. (2022). *Digital in 2022: India.* https://datareportal.com/reports/digital-2022-india

[10] Office of Monitor and Combat Trafficking in Persons. (2022). *2022 trafficking in persons report*: India. US Department of State https://www.state.gov/reports/2022-trafficking-in-persons-report/india/

better resource allocation. Nevertheless, population-level prevalence estimates for sex trafficking can be challenging to derive and interpret. Ethical and legal considerations can limit survey research into trafficking that includes minors, the furtive nature of these high-risk populations can complicate estimation, and victims, buyers, and traffickers may all be reluctant to participate in research due to associated stigma.[11]

[11] US Department of State. (2019). *India: 2019 trafficking in persons report.* https://www.state.gov/reports/2019-trafficking-in-persons-report-2/india/; Ministry of Women and Child Development. (2017) *Annual report 2016–2017.* https://wcd.nic.in/sites/default/files/FINAL%20WCD_AR_English%202016-17.pdf

Review of Existing Research

Prevalence Studies of Sex Trafficking in India

Global Slavery Index estimates from 2018 ranked India 57th of 167 countries for overall modern slavery, estimating that 6 out of every 1,000 Indians allegedly lived in modern slavery.[12] At the time of that report, 55% of India's population was considered vulnerable to exploitation; however, the economic distress caused by the COVID-19 pandemic has likely exacerbated those estimates,[13] particularly those in the most vulnerable social strata. While the scope of CST is not defined in these estimates or well-documented in existing literature, studies investigating India's commercial sex industry and adjacent communities may be useful for understanding this population.

Recent child trafficking research in India is limited. Das and Mishra investigated the prevalence of child labor trafficking in 2011 using household surveys in Bihar,[14] finding 7.7% of children in the same were victims of trafficking. In 2020, Bau et al.,[15] using household-level data from India's National Sample Survey demonstrated that 9% of children in rural India between the ages of 5 and 17 reported work instead of school as their primary activity.

In contrast, several investigations assessed the size of India's overall commercial sex industry. In 2022, Sahu et al. estimated 868,000 sex workers in India.[16] Additionally, using data from a large-scale survey (*n* = 23,980) that employed conventional or time location clusters, Sahu et al. reported that 11.6% started sex work before the age of 18 years. In a 2001 study across Mumbai, Thane, Pune, and Sangli found prevalence rates of adult sex workers as a proportion of all adult women in these cities to be 0.5%, 0.4%, 0.4%, and 0.2%, respectively.[17] Various studies investigated the relationship between this industry and phenomena such as HIV using RDS to estimate the sizes of associated populations and define correlations with several public health issues.[18] Further, Erausquin, Reed, and Blankenship's 2011 study used RDS to identify

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[12] The Global Slavery Index. (2018). *India.* https://www.globalslaveryindex.org/2018/data/country-data/india/

[13] The Global Slavery Index. (2018). *India.* https://www.globalslaveryindex.org/2018/data/country-data/india/

[14] Das, M., & Mishra, S. (2011). *Stolen Childhoods: A Study of Child Trafficking in the Kosi Region of Bihar.* [eBook edition]. Save the Children India. https://resourcecentre.savethechildren.net/node/5464/pdf/5464.pdf

[15] Bau, N., Rotemberg, M., Shah, M., & Steinberg, B. (2020). Human Capital Investment in the Presence of Child Labor. NBER Working Paper 27241. https://www.nber.org/papers/w27241.

[16] Sahu, D. , Ranjan, V. , Chandra, N. , Nair, S. , Kumar, A. , Arumugam, E. , Camara, B. and Rao, M. (2022) Impact of TI Programmes Intervention under National AIDS Control Programme among Female Sex Workers in India: Evidence from Integrated Biological and Behavioural Survey, 2014-15. World Journal of AIDS, 12, 83-96. doi: 10.4236/wja.2022.122007. https://www.scirp.org/journal/paperinformation.aspx?paperid=117748

[17] Family Health International. Mapping of commercial sex access points and relevant service outlets in Maharashtra, 2001. https://childhub.org/system/tdf/library/attachments/fhi_2001_mapping_of_sex_access_in_maharashtra_may_04_1.pdf

[18] Armstrong, G., Humtsoe, C., & Kermode, M. (2011). HIV risk behaviours among injecting drug users in Northeast India following scale-up of a targeted HIV prevention programme. *BMC Public Health, 11*(6), S9. https://doi.org/10.1186/1471-2458-11-S6-S9

relationships between policing behaviors and HIV prevalence among sex workers in Andhra Pradesh.[19]

Several studies also investigate the rate of underage entry into India's commercial sex industry, although these studies are less recent, and none consider the rate of underage entry into the commercial sex industry after the onset of the COVID-19 pandemic. Erausquin, Reed, and Blankenship investigated this topic, in their 2011 study, among sex workers in Andhra Pradesh and found 20% had entered the industry before the age of 18.[20] In 2011, Gupta et al. published a similar survey in Andhra Pradesh and found approximately 15% of participants entered the industry before 18.[21] Mukherjee and Mukherjees' 2004 study,[22] which sampled sex workers across 27 different geographies, found 36% of surveyed participants had entered the industry before 18 years of age. Finally, a study by Yadav et al. that used two-stage cluster sampling and Time-Location Sampling (TLS) across Maharashtra, Andhra Pradesh, and Tamil Nadu from 2009 to 2010 indicated that 16% of sex workers entered the industry before the age of 20.[23]

Investigations related to sexually transmitted diseases (STDs) have also provided valuable data related to the prevalence of children in the commercial sex industry. Brahme et al. collected historical data from 1993 to 2002 in Pune, which indicated that 43% of sex workers screened for STDs entered the industry before 16.[24] Silverman et al.'s convenience sample of HIV-positive sex workers from 2008 to 2009 study provided similar findings, in that 50% of respondents had entered the industry before the age of 18.[25] TST was unable to find a comparable, prior statewide study specific to Maharashtra after 2001; however, the aforementioned studies reveal the prevalence and severity of this issue.

The Time I report was one of the first to estimate the population size and traits of CST victims in Maharashtra at a state level across the public and private commercial sex trade. In this study,

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[19] Erausquin, J. T., Reed, E., & Blankenship, K. M. (2011). Police-related experiences and HIV risk among female sex workers in Andhra Pradesh, India. *Journal of Infectious Diseases, 204*(suppl 5): S1223–S1228. https://doi.org/10.1093/infdis/jir539

[20] Erausquin, J. T., Reed, E., & Blankenship, K. M. (2011). Police-related experiences and HIV risk among female sex workers in Andhra Pradesh, India. *Journal of Infectious Diseases, 204*(suppl 5): S1223–S1228. https://doi.org/10.1093/infdis/jir539

[21] Gupta, J., Reed, E., Kershaw, T., & Blankenship, K. M. (2011). History of sex trafficking, recent experiences of violence, and HIV vulnerability among female sex workers in coastal Andhra Pradesh, India. *International Journal of Gynecology and Obstetrics*, *114*(2), 101–105. https://doi.org/10.1016/j.ijgo.2011.03.005

[22] Mukherjee, K. K., & Mukherjee, S. S. (2004). *Girls/women in prostitution in India. A national study*. Gram Niyojan Kendra.

[23] Yadav, D., S. Ramanathan, P. Goswami, P., Ramakrishnan, L., Saggurti, N., Sen, S., George, B., & Paranjape, R. (2013). Role of community group exposure in reducing sexually transmitted infection related risk among female sex workers in India. *PloS one, 8*(10). https://doi.org/10.1371/journal.pone.0078361

[24] Brahme R, Mehta S, Sahay S, et al. (2006). Correlates and trend of HIV prevalence among female sex workers attending sexually transmitted disease clinics in Pune, India (1993–2002). *Journal of Acquired Immune Deficiency Syndromes*, 41(1):107–113.

[25] Silverman, J. G., N. Saggurti, Cheng, D. M., Decker, M. R., Coleman, S. M., Bridden, C., Pardeshi, M., Dasgupta, A., Samet, J. & Raj, A. (2013). Associations of sex trafficking history with recent sexual risk among HIV Infected FSWs in India. *AIDS and Behavior, 18*(3), 555–561. http://doi.org/10.1007/s10461-013-0564-3

TST estimated the adult sex worker population in Maharashtra to be roughly 29,000, and about 7,900 (27.2%) were under the age of 18 in early 2020.

The International Justice Mission's (IJM's) commercial sexual exploitation of children study in Mumbai is another recent study that closely relates to the Time II investigation.[26] This study, which relied on venue-based approaches to engage with CST victims, found that:

- 15% of surveyed public establishments in Mumbai were associated with CST,
- the prevalence rate of CST victims as a proportion of all sex workers in these public establishments was approximately 5.5%; and
- after visiting 43 locations for "private networks," 12% of sex workers surveyed in these networks were CST victims.[27]

The IJM report noted the threat posed by private networks to counter-trafficking organizations and law enforcement, particularly as these networks are difficult to investigate and measure—demonstrated by IJM's use of extensive, longitudinal relationships to survey a small number of workers (214) within this market.

In conjunction with these investigations, the impact of the COVID-19 pandemic must also be considered. Specific research concerning the pandemic's effects on CST is still limited or nonexistent; an early study conducted by NORC at the University of Chicago, using data collected by Two Six Technologies, found that demand for virtual sex in Maharashtra initially grew following the onset of lockdowns, but results were unclear as to whether or not this trend would last. Moreover, digital recruitment, solicitation, and payment were on the rise, as well as a shift away from traditional "red light areas" to more private and decentralized locales. A number of studies concerning adjacent topics—including child labor, intimate partner violence, and illicit crime—offer further context on how the pandemic may have influenced this population. Kaur and Byard note that a "1% rise in poverty may be associated with at least a 0.7% increase in numbers of children working,"[28] detrimentally affecting impoverished families in India, where an estimated 10 million children are engaged in or seeking work. In conjunction with these findings, Kulkarni and Singh report that increased unemployment is a statistically significant factor influencing crime rates as unemployed persons seek new means to survive.[29] Aneja and Ahuja contribute to the research on pandemic-related crime increases, reporting a

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[26] Parks, A. C., Macwan, S., Rusk, A. G., Fernandes, C., Walavalkar, M., Alfanso, S., Nanda, L., Newbigging, S., Morley, S., Mane, P., Symon, K., Blagg, K., Lacey, V., Pyke, K., West, L., & Sumitra, H. (2017). Commercial sexual exploitation of children in Mumbai: Findings in public establishments, private networks and survivor perspectives. *International Justice Mission.* https://www.ijmindia.org/files/library/CSES%20Study%20Report%20Rev%20%28Final%20Prevalence%20Study%29.pdf

[27] Parks, A. C., Macwan, S., Rusk, A. G., Fernandes, C., Walavalkar, M., Alfanso, S., Nanda, L., Newbigging, S., Morley, S., Mane, P., Symon, K., Blagg, K., Lacey, V., Pyke, K., West, L., & Sumitra, H. (2017). Commercial sexual exploitation of children in Mumbai: Findings in public establishments, private networks and survivor perspectives. *International Justice Mission.* https://www.ijmindia.org/files/library/CSES%20Study%20Report%20Rev%20%28Final%20Prevalence%20Study%29.pdf

[28] Kaur, N. & Byard, R. W. (2021). Prevalence and potential consequences of child labour in India and the possible impact of COVID-19 – A contemporary overview. *Medicine, Science and the Law, 61*(3), 208–214. doi:10.1177/0025802421993364

[29] Kulkarni, A. & Singh, S. (2021). A critical study of Covid-19 pandemics on crime rates in India. *Review of Socio-Economic Perspectives*, *6*(3), 41–46. doi:10.19275/RSEP119

45% increase in domestic violence cases against women 25 days following India's national lockdown in 2020.[30] Kumar and Anupama reinforce these findings, noting reports of violence against women increased 50% from 2019 to 2021 and are expected to increase another 14% in 2022.[31] These studies demonstrate the second and third-order effects of the COVID-19 pandemic in adjacent research. However, child sex trafficking intersects violence and crime, portending a dangerous predicament for this population.

While prior research indicates that Maharashtra hosts a significant commercial sex industry, few studies have highlighted the characteristics of sex worker and CST victim populations in Maharashtra at a statewide level or investigated buyer behaviors, which may offer valuable insights in assessing the effectiveness of counter-trafficking programs. Further, few studies have employed the estimation models leveraged for this Time II study to measure changes in the prevalence of CST over time, particularly in an economically distressed environment as created in the aftermath of the COVID-19 pandemic. Methods of estimation were consistent in Time I and II, with both studies similarly employing NSUM for point estimates and RDS for comparison and direct engagement with / data collection from an adjacent population.

Prevalence Estimation Methodologies

Network Scale-Up Method

Overview of the Network Scale-Up Method

NSUM circumvents traditional barriers to estimating the size of hidden or hard-to-reach populations by using measures based on the general population's network structures. Assuming that respondents (1) have random social ties, (2) are aware of their network members' characteristics and conditions, and (3) can provide accurate information concerning members within their networks, NSUM can deliver credible estimates using indirect approaches.

Through NSUM, participants are asked a series of "how many X do you know" questions, where X corresponds to several subpopulations of known and unknown size.[32] Known population sizes are used as reference groups whose size and scope have been measured while unknown groups correspond to the hidden populations of interest, such as CST victims in this study. However,

[30] Aneja, R., & Ahuja, V. (2021). An assessment of socioeconomic impact of COVID-19 pandemic in India. *Journal of Public Affairs, 21*(2), e2266. doi:10.1002/pa.2266

[31] Kumar, P., & Anupama, A. (2022). Impact of Covid-19 pandemic on prevalence of complaints related to violence against women in India – A cross-sectional comparative research study from 2014 to 2022? Research Square. doi:10.21203/rs.3.rs-1357110/v1

[32] For more information on this "game of contacts," see McCarty, C., Killworth, P. D., Bernard, H. R., Johnsen, E. C., & Shelley, G. A. (2001). Comparing two methods for estimating network size. *Human Organization*, *60*, 28–39. http://doi.org/10.17730/humo.60.1.efx5t9gjtgmga73y

NSUM does not require respondents to identify *who* in their networks are part of target subgroups, including themselves, which encourages truthful responses. Following data collection, a statistical model adjusts for differences between polled groups in the NSUM survey instrument (i.e., reference groups and hidden populations) and "scales up" the network data from all respondents to build and calibrate an accurate estimation of the sizes of the hidden populations. The effects of outliers are also reduced through pooling for more accurate estimates.

Potential Biases and Limitations of the Network Scale-Up Method

Theoretical respondents of an NSUM study would have heterogeneous networks composed of various groups and be aware of the associations held by members in their network as well as the subgroups to which they belong. However, this is rarely the case. Because NSUM relies on assumptions for implementation, several forms of bias may affect the quality of the data set. While these limitations are delineated below, the Study Design identifies mitigation techniques to address those issues in this study.

Forms of Bias. *Transmission bias* occurs when a respondent knows a member of a hidden population but is unaware the person is affiliated with that population.[33,34,35] This lack of awareness may create errors in estimate; however, several approaches exist to account for this bias. Maltiel et al. introduced a Bayesian model that assumes all known populations have no transmission bias.[36] For hidden population size estimation, each hidden population k has a transmission bias coefficient T_k between 0 and 1, indicated by the prior $T_k \sim Beta(\eta k, Vk)$. The transmission bias modifies the probability distribution of the binomial model for the estimation for the number of people in any given group k that respondent i knows, $Y_{ik} \sim (d_i, T_k \frac{Nk}{N})$.

Feehan and Salganik's generalized scale-up estimator requires direct engagement with the hidden population to determine their "visibility."[37] While these responses may be difficult for researchers to collect and may introduce new biases based on the definition of visibility, this approach reframes the bias issue as a problem solved through sampling and survey design.

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[33] Shelley, G. A., Bernard, H. R., Killworth, P., Johnsen, E., & McCarty, C.. (1995). Who knows your HIV status? What HIV+ patients and their network members know about each other. *Social Networks,* 17(3–4), 189–217. https://doi.org/10.1016/0378-8733(95)00262-M

[34] Shelley, G. A., Killworth, P. D., Bernard, H. R., McCarty, C., Johnsen, E. C., & Rice, R.E. (2006) Who knows your HIV status II? Information propagation within social networks of seropositive people. *Human Organization, 65*(4), 430–444. https://doi.org/10.17730/humo.65.4.08mwg9d3nfy8w9th

[35] Salganik, M. J., Fazito, D., Bertoni, N., Abdo, A. H., Mello, M. B., & Bastos, F. I. (2011). 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. *American Journal of Epidemiology*, *174*(10), 1190–1196. https://doi.org/10.1093/aje/kwr246

[36] Maltiel, R., Raftery, A. E., McCormick, T. H., & Baraff, A. J. (2015). Estimating population size using the Network Scale Up Method. Annals of Applied Statistics, 9(3): 1247–1277. https://doi.org/10.1214/15-AOAS827

[37] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/2F0081175016665425

Response bias is similar to transmission bias. Respondents are aware of people in their network who are members of a hidden population but are unwilling to provide this information because of the possible stigma involved. Like transmission bias, this phenomenon could also influence population estimates (underestimating, that is).

While transmission and responses bias concern a lack of awareness of or an unwillingness to identify network participants who are members of hidden populations, *barrier effects* concern an individual's network structure. NSUM assumes that social ties are random, suggesting personal networks are heterogeneous; however, individual personal networks are often homogeneous—that is, people tend to associate with others like themselves.[38] Further, sex workers and CST victims, in the case of this study, are not randomly distributed in the general population; thus, some respondents have a higher probability of knowing people who are members of these populations.[39,40] Systematically excluding respondents who are more likely or less likely to know members of the hidden population of interests would lead to underestimates or overestimates, respectively. Therefore, gathering a representative sample of respondents from the study geography is essential.

Other potential factors influencing underestimation relate to the particular model used. For example, whether the estimated personal network sizes of respondents are treated as fixed or random has been shown to impact estimate sizes.[41] Many models consider the individual's network size (d_i) as a random coefficient, including Maltiel et al.[42] and Feehan and Salganik.[43] Over time, more respondent-specific weighting approaches have been investigated and developed (e.g., including incorporating sampling weights to apply an overall adjustment to response data based on external data sources), many of which are included and well documented in Feehan's *networkreporting* package.[44]

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[38] Lewis, K., Gonzalez, M., & Kaufman, J. (2012). Social selection and peer influence in an online social network. *Proceedings of the National Academy of Sciences, 109*(1), 68–72. https://doi.org/10.1073/pnas.1109739109

[39] Killworth, P. D., McCarty, C., Bernard, H. R., Shelley, G. A., & Johnsen, E. C. (1998). Estimation of seroprevalence, rape, and homelessness in the United States using a social network approach. *Evaluation Review*, 22(2), 289–308. https://doi.org/10.1177/0193841X9802200205

[40] Zheng, T. Z., Salganik, M. J., & Gelman, A. (2006). How many people do you know in prison? Estimating overdispersion in count data to estimate social structure in networks. *Journal of the American Statistical Association, 101*(474), 409–423. https://doi.org/10.1198/016214505000001168

[41] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/2F0081175016665425

[42] Maltiel, R., Raftery, A. E., McCormick, T. H., & Baraff, A. J. (2015). Estimating population size using the Network Scale Up Method. *Annals of Applied Statistics, 9*(3), 1247–1277. https://doi.org/10.1214/15-AOAS827

[43] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/2F0081175016665425

[44] Feehan, D. M., & Salganik, M. J. (2014). networkreporting package (Version 0.1.1). *R Foundation for Statistical Computing*. https://cran.r-project.org/web/packages/networkreporting/index.html

NSUM may also suffer from *recall bias* as respondents grapple to estimate the size of subpopulations in their networks. According to Maltiel et al., respondents tend to "underestimate the number of people they know in larger groups because they forget some of these contacts" and "overestimate the number of people they know in small or unusual groups."[45] Survey design can reduce this bias by defining network ties and reference groups so respondents more accurately recall information about their networks. In most studies, this is achieved by targeting relatively small reference groups and hidden populations. For instance, a respondent may know 20 members of a particular subgroup but may struggle to identify each connection, so asking for fewer connections (e.g., 1 or 2 per group) will support quicker recall. For this reason, researchers are encouraged to evaluate whether the hidden populations under investigation are appropriately sized to minimize recall bias. If so, the researchers should also select reference groups within an order of magnitude of the anticipated size range of the hidden population(s).

Confidence Interval Calculation. In addition to bias, the use and interpretation of confidence intervals in NSUM have been criticized for providing anti-conservative coverage rates.[46] Some NSUM methods leveraging Markov chain Monte Carlo (MCMC) processes (e.g., Metropolis-Hastings or Gibbs samplers) examine the convergence of the estimate corresponding to the hidden population(s) under study as a measure of confidence. This is possible in Maltiel and Baraff's NSUM model package, for example.[47] However, this approach differs from confidence intervals derived based on standard error calculations and may be better described as an evaluation of model fit. Feehan and Salganik recently proposed a bootstrap approach to confidence interval estimation to replace the original Killworth method.[48]

Definition of Network Ties. Considering NSUM relies on network relationships, "knowing" an individual can be interpreted in several ways. For example, one respondent may define loose acquaintances as people they know compared to others who interpret this as including only close associates. The strictness or looseness of the definition does not affect the estimate but will require upward or downward adjustments to the scale-up factor that determines the relationship between the personal network and full population sizes. Certain definitions, however, may induce unnecessary bias by systematically omitting alter categories. For instance, many individuals in Maharashtra do not have Facebook accounts and would be excluded from estimates that ask respondents specifically about their Facebook friends. Similarly, a study asking respondents about their neighbors may produce biased results, owing to significantly different responses between respondents who live in cities (e.g., respondents who live in housing complexes with many neighbors) and those who do not. The key considerations in

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[45] Maltiel, R., Raftery, A. E., McCormick, T. H., & Baraff, A. J. (2015). Estimating population size using the Network Scale Up Method. *Annals of Applied Statistics, 9*(3): 1247–1277. https://doi.org/10.1214/15-AOAS827

[46] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/2F0081175016665425

[47] Maltiel, R. and Baraff, A. J. (2015), NSUM: Network Scale Up Method, R package (Version 1.0). https://rdrr.io/cran/NSUM/

[48] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/2F0081175016665425

selecting a definition are that the definition must be consistently applied by all respondents and should minimize the addition of external biases such as barrier effects.

Other Factors. In addition to aforementioned categories, other considerations must be applied to social network models and estimates. If the hidden population is sparse, as with sex workers or CST victims, scale-up estimates may be susceptible to false positives from a small fraction of respondents, which can cause an overestimate. This "needle in a haystack" problem is common in questionnaire approaches to estimating rare events.[49] Sparse network ties to hidden populations may also cause increased estimator variance, though this issue arises from the data collected rather than the estimator itself. The NSUM estimator is calibrated using the relationships between network reports and known population data. Thus, if the known populations used as reference groups contain similarly sparse responses, then the effects of data sparsity inform the model, reducing the effect.

Although the NSUM model does calibrate to the sizes of respondents' networks, the researchers note that the most critical source of information to construct and fit the scale-up estimator is network report data, and that granular information as well as variance within the network report data provide the necessary inputs to achieve robust model fit with usable confidence intervals. As a result of several of the previously named biases and considerations, if personal networks are too small, then the lack of variance will impact estimator precision; if they are too large, then respondents may be more prone to inexactly recalling or reporting the number of network connections they have, which will also impact model precision.

Network Scale-Up Method Applicability to the Investigation

NSUM has been shown to credibly estimate the number of intravenous drug users, sex workers, men who have sex with men (MSM), HIV positivity, and other regional or national epidemics in

[49] Hemenway, D. (1997) Survey research and self-defense gun use: An explanation of extreme overestimates. *The Journal of Criminal Law and Criminology, 87*(4), 1430–1445. https://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=6936&context=jclc

various countries and within specific subpopulations.[50,51,52,53,54,55,56] Other NSUM-based estimates include measuring the number of Americans directly and indirectly affected by the September 11 terrorist attacks and the prevalence of homelessness and sexual assault in the United States.[57,58]

The NSUM estimator has unique benefits for estimating the number of sex workers and CST victims in Maharashtra because recent research and reports from partnered field organizations suggests that the commercial sex industry in India is increasingly moving toward private networks and technology-enabled commerce. IJM's 2017 study of Mumbai indicates that many traffickers are remotely organizing using messaging services such as WhatsApp.[59] If this approach reflects a shift in trafficking organization, then venue-based research will neglect the growing digital component of this domain. In contrast, NSUM estimates obtained from general population survey response data will provide overall estimates, regardless of the modalities used or underlying structural changes in the industry, because its estimate is drawn from data concerning connections between the commercial sex industry and the general population, not on the structure of the industry itself.

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[50] Shokoohi, M., Baneshi, M. R., & Haghdoost, A. A. (2012). Size Estimation of Groups at High Risk of HIV/AIDS using Network Scale Up in Kerman, Iran. *International Journal of Preventive Medicine*, 3(7), pp. 471–476.

[51] Guo, W., Bao, S., Lin, W., Wu, G., Zhang, W., Hladik, W., Abdul-Quader, A., Bulterys, M., Fuller, S., & Wang, L. (2013). Estimating the size of HIV key affected populations in Chongqing, China, using the Network Scale Up Method. *PloS one, 8*(8), p.e71796. https://doi.org/10.1371/journal.pone.0071796

[52] Salganik, M. J., Fazito, D., Bertoni, N., Abdo, A. H., Mello, M. B., & Bastos, F. I. (2011). 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. *American Journal of Epidemiology*, *174*(10), 1190–1196. https://doi.org/10.1093/aje/kwr246

[53] Kadushin, C., Killworth, P. D., Bernard, H. R., & Beveridge, A. A. (2006). Scale-up methods as applied to estimates of heroin use. *Journal of Drug Issues*, *6*, pp. 417-440. https://doi.org/10.1177/002204260603600209

[54] Teo, A. K. J., Prem, K., Chen, M. I., Roellin, A., Wong, M. L., La, H. H., & Cook, A. R., 2019. Estimating the size of key populations for HIV in Singapore using the Network Scale Up Method. *Sexually Transmitted Infections, 95*(8), 602–607. http://doi.org/10.1136/sextrans-2018-053747

[55] Ezoe S., Morooka T., Noda T., Sabin M.L., & Koike S. (2012). Population size estimation of men who have sex with men through the network scale-up method in Japan. *PLoS One, 7*(1). https://doi.org/10.1371/journal.pone.0031184

[56] Sulaberidze, L., Mirzazadeh, A., Chikovani, I., Shengelia, N., Tsereteli, N., & Gotsadze, G. (2016). Population size estimation of men who have sex with men in Tbilisi, Georgia: Multiple methods and triangulation of findings. *PLoS One, 11*(2). https://doi.org/10.1371/journal.pone.0147413

[57] Bernard, H. R., Killworth, P. D., Johnsen, E. C., Shelley, G. A., & McCarty, C. (2001). Estimating the ripple effect of a disaster. *Connections, 24(2),* pp. 18–22.

[58] Killworth, P. D., McCarty, C., Bernard, H. R., Shelley, G. A., & Johnsen, E. C. (1998). Estimation of seroprevalence, rape, and homelessness in the United States using a social network approach. *Evaluation review*, *22*(2), 289–308. https://doi.org/10.1177/0193841X9802200205

[59] Parks, A. C., Macwan, S., Rusk, A. G., Fernandes, C., Walavalkar, M., Alfanso, S., Nanda, L., Newbigging, S., Morley, S., Mane, P., Symon, K., Blagg, K., Lacey, V., Pyke, K., West, L., & Sumitra, H. (2017). Commercial sexual exploitation of children in Mumbai: Findings in public establishments, private networks and survivor perspectives. *International Justice Mission.* https://www.ijmindia.org/files/library/CSES%20Study%20Report%20Rev%20%28Final%20Prevalence%20Study%29.pdf

Respondent-Driven Sampling

Overview of Respondent-Driven Sampling

RDS is a network-based sampling strategy that investigates hidden populations by identifying initial respondents (i.e., "seeds") in the target population, then recruiting them to participate in the study. For hidden population estimates, RDS assumes the people best equipped to access members of these subgroups are their peers.[60]

Initial participants of an RDS study are often recruited through convenience sampling. These seeds recruit peers by referral, allowing researchers to systematically access members of hidden groups. Each seed is limited in the number of participants it can recruit, minimizing the influence of highly connected individual seeds on subsequent referred participants. As early participants recruit and refer subsequent participants and the sample population grows, the effects of the original seeds attenuate,[61] addressing criticisms of RDS based on the common use of a convenience sample to obtain and initiate contact with seeds. As a result, it is possible to obtain an approximate probability sample via RDS when researchers collect social network information that enables them to measure the selection probabilities of referrals from within each respondent's network (i.e., to determine equilibrium).[62]

Referrals are tracked, allowing researchers to assess and adjust for recruitment biases, but this approach does not require subjects to identify their peers. Thus, RDS offers a mechanism to rapidly recruit participants and assess the influence of seeds and referrals across the estimate while preserving the identities of participants in hidden populations, increasing the likelihood that respondents will answer truthfully. Further, RDS' weighting for network size separates it from other referral-based sampling methods that lack the rigor required to be considered probabilistic.

RDS has been proven by Volz and Heckathorn to enable researchers to reach a "network equilibrium," wherein respondents are selected with proportion to network degree.[63] Volz and Heckathorn state that this equilibrium must also be a "unique attracting equilibrium:" a singular

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[60] Heckathorn, D. D. (1997). Respondent-Driven Sampling: A new approach to the study of hidden populations. *Social Problems*, *44*(1), 174–199. https://doi.org/10.2307/3096941

[61] Volz, E., and Heckathorn, D. 2008. Probability based estimation theory for respondent driven sampling. *Journal of Official Statistics*, 24(1):79–97.

[62] Heckathorn, D. D. (1997). Respondent-Driven Sampling: A new approach to the study of hidden populations. *Social Problems*, *44*(1), 174–199. https://doi.org/10.2307/3096941

[63] Volz, E., & Heckathorn, D. 2008. Probability based estimation theory for respondent driven sampling. *Journal of Official Statistics, 24*(1), 79–97. http://www.sverigeisiffror.scb.se/contentassets/ff271eeeca694f47ae99b942de61df83/probability-based-estimation-theory-for-respondent-driven-sampling.pdf

equilibrium for the entirety of the Markov process (i.e., a global selection probability distribution), and one that the system will eventually approach, regardless of its starting state.[64]

Potential Biases and Limitations of Respondent-Driven Sampling

Like NSUM, hidden population estimates using RDS rely on assumptions to function.

1. Respondents can accurately report their network size (i.e., the number of relatives, friends, and acquaintances who are members of the hidden population).
2. Referrals are based on reciprocity; that is, the respondent and the referred individual know one another as members of the hidden population.
3. Sufficient cross-over and networking exist between members of the population to sustain the referral process.
4. Eligible participants are recruited from a respondent's network at random.
5. Sampling occurs with replacement; therefore, the sample size must be small in relation to the population size.

These assumptions require a hidden population with a network capable of sustaining the study and with sufficient diversity over successive participant referrals. To address some of these limitations, several bootstrap methods have been developed to reduce uncertainty.[65]

While many researchers use RDS because it circumvents situations where access to a rigorous or large sample is not possible, the method faces criticism because its initial samples are not probabilistically selected. Despite its reliance on attenuation to reduce the impact of initial seeds, determining whether an RDS sample has become "independent" from the initial seeds, as postulated by Heckathorn, may be difficult.[66] A best practice for researchers interested in instilling RDS with greater rigor is to sample initial seeds probabilistically, avoiding potential sampling biases caused by non-probabilistic initial sample selection.

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[64] Salganik, M. J., & Heckathorn, D. D. (2004). Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology, 34*(1), 193–240. https://doi.org/10.1111/j.0081-1750.2004.00152.x

[65] Baraff, McCormick, and Raftery provide an overview of various bootstraps developed for RDS in their paper, "Estimating uncertainty in Respondent-Driven Sampling using a tree bootstrap method."
Baraff, A. J., McCormick, T. H., & Raftery, A. E. (2016). Estimating uncertainty in Respondent-Driven Sampling using a tree bootstrap method. *Proceedings of the National Academy of Sciences, 113*(51), 14668–14673. https://doi.org/10.1073/pnas.1617258113

[66] Heckathorn, D. D. (1997). Respondent-Driven Sampling: A new approach to the study of hidden populations. *Social Problems*, *44*(1), 174–199. https://doi.org/10.2307/3096941

Study Design

The study design for Time II is similar to the design for Time I.[67] To estimate the prevalence of CST in Maharashtra, TST—with data collection support provided by Convergent View Research and Consultancy (hereafter known as "Convergent") —designed and executed a hybrid approach, leveraging two different samples in support of parallel estimation efforts using NSUM and RDS. NSUM was used for estimations across the general population of Maharashtra, whereas RDS focused on the hidden population of adults in the sex industry in Maharashtra. The following section introduces these methods and draws from the existing research literature to provide context and rationales for their use.

The design of the study enabled measuring the prevalence of CST in two distinct ways. NSUM was used to calculate point estimates of both sex workers and CST victims. Then, using RDS among adult sex workers in Maharashtra, the proportion of sex workers who began working in the industry before the age of 18 was estimated. The RDS estimate was then compared with the two NSUM estimates. By comparing the results of both methods, the potential for biases inherent to a single method is minimized. In addition, the RDS survey of an approximate probability sample of adult sex workers allowed for a deeper study of the broader commercial sex industry in Maharashtra and how it has changed since the Time I survey in 2020.

TST selected these methods, sampling strategies, and estimation techniques based on several factors. A 2020 statistic from The World Bank states that India has 84 mobile phone subscriptions per 100 people, suggesting that nearly 85% of adults living in India may be reached via mobile phone.[68] Due to the continued advice of the Maharashtra government to be cautious in public spaces as a result of COVID-19,[69] the need to reduce logistical burden, and the cost of performing in-person enumeration, random digit dialing (RDD) was identified as an ideal sampling strategy for the general population NSUM survey. This strategy is inexpensive, probabilistic, and has a strong track record in survey research literature.

By law, CST victims in Maharashtra cannot be surveyed.[70] Therefore, TST determined that the most reliable means of indirectly studying this population would be via the adjacent population of adult sex workers. Because sex workers are themselves a hidden population in Maharashtra, and because prior literature and feedback from subject matter experts suggest that the sex

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[67] IST Research, University of California, Los Angeles, and the Global Fund to End Modern Slavery. (2020). *Estimating the Prevalence of Child Sex Trafficking in Maharashtra, India, Time I.*

[68] The World Bank. (2020). *Mobile cellular subscriptions (per 100 people) | Data*. World Bank Data. https://data.worldbank.org/indicator/IT.CEL.SETS.P2?locations=IN

[69] Sinha, S. (2022, October 19). *'Prudent to be cautious': Medical expert after Mumbai civic body issues Covid advisory ahead of festivities*. India Today. https://www.indiatoday.in/coronavirus-outbreak/story/festive-season-maharashtra-bmc-covid-advisory-mumbai-civic-body-coronavirus-rules-expert-advice-2287365-2022-10-19

[70] Ministry of Law and Justice. (2012). The Protection of Children from Sexual Offences Act, 2012. https://wcd.nic.in/sites/default/files/POCSO%20Act%2C%202012.pdf

worker population is too sparsely distributed to be efficiently discovered via random sampling of the general population, traditional sampling strategies were not considered feasible for surveying sex workers for CST prevalence. TST leveraged time-location sampling (TLS), an established method for performing probability sampling of populations of unknown size.[71] TST, Convergent, and Convergent's network of nongovernmental organizations (NGOs) that support sex workers in Maharashtra developed and sampled from a time-location frame drawn from rosters, field observations, and subject matter expertise of sex workers to make initial seed selections. This data was sourced predominantly from public health NGOs that provide free health and wellness checks to sex workers across Maharashtra, and who work with local National AIDS Control Organization (NACO) offices. The sampling frame itself was kept private from the researchers for ethical and privacy reasons throughout the course of the study. Seeds were provided a phone number to call to complete the initial survey via interviewers at the call center. To ensure a large enough sample size to produce a reliable prevalence estimate, RDS was used to propagate the survey across sex worker networks from the initial seeds. All RDS surveys were conducted remotely via computer-assisted telephone interviews (CATI).

Use of the Network Scale-Up Method

NSUM was used to estimate how many sex workers and CST victims the respondents know among all the people they know in Maharashtra. The data needed for this approach was collected through a survey administered to the general population. Using RDD, a probabilistic sampling approach, TST and partners surveyed 1,080 adult members of the general population about their demographics and the people they know in various groups of known and unknown sizes.

In the survey, respondents were asked about their personal network connections who live in Maharashtra and are members of populations of known size (e.g., teachers in public secondary educational institutions) or unknown size (e.g., sex workers or CST victims). The known population approach was also used to estimate the number of alters in a person's network, which required several populations of known size—a minimum of 15—to assist with estimation.[72] When aggregated over all respondents, this information provides the numerator for the maximum likelihood estimator.

TST used current and rigorous procedures to account for sample-based biases and to produce confidence intervals. Sample biases may include, for example, overrepresentation from a particular demographic group in Maharashtra, which the RDD sampling approach may potentially induce. The method for producing confidence intervals is based on Feehan and

[71] Leon, L., Jauffret-Roustide, M., & Le Strat, Y. (2015). Design-based inference in time-location sampling. *Biostatistics, 16*(3), 565–579. https://doi.org/10.1093/biostatistics/kxu061

[72] McCarty, C., Killworth, P. D., Bernard, H. R., Johnsen, E. C., & Shelley, G. A. (2001). Comparing two methods for estimating network size. *Human organization*, *60*(1), 28–39. http://doi.org/10.17730/humo.60.1.efx5t9gjtgmga73y

Salganik's bootstrap approach to standard error measurement, first recommended as an alternative to Killworth et al. in 2016.[73]

The NSUM results include point estimates, a proportion of the total population in the sex worker and CST victim subpopulations, and the proportion of sex workers estimated to be CST victims. Where needed, the proportions of the general population are multiplied by the entire population of Maharashtra, not just the adult population, to accurately estimate the size of both populations.

Definition of Network Ties

In defining personal network ties for this study, TST sought to obtain personal network data that was unbiased and as systematically derived as possible. To account for these considerations, "knowing" a person was required to meet three criteria:

1. The respondent knows the person by face and name.
2. The person knows the respondent by face and name.
3. The respondent has communicated with the person in the last 12 months (for example, in-person or via phone call, text, or social media).

These criteria are also included in the questionnaire provided in Appendix A.

This definition of network ties has multiple advantages over definitions such as nextdoor neighbors, coworkers, or looser acquaintances. Critically, the notion of "network ties" must be consistently understood and applied by all respondents, should provide reasonable variance across reference groups, and should not vary dramatically across geographies, socioeconomic tiers, and so on.[74] This definition is in line with the recommendations of GFEMS's prevalence estimation methodological guidelines,[75] and was developed and empirically tested by TST in collaboration with GFEMS and researchers from the National University of Singapore in 2018. It has also been used in multiple NSUM studies in Asia and Europe. Prevalence estimation researchers from other institutions, including UC Berkeley and UCLA, reviewed this definition.

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[73] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/0081175016665425

[74] As an example of a network tie definition that suffers from strong geographic and economic biases, defining a network tie as "someone living in the same neighborhood" as the respondent, would result in larger numbers of ties reported by individuals living in dense population centers, and fewer ties reported by those who live in more sparsely populated areas.

[75] GFEMS & APRIES. (2021). "Methods of Prevalence Estimation in Modern Slavery: An Introductory Overview." Ed. Laura Gauer Bermudez, David Okech, and Mihir Prakash. https://www.gfems.org/wp-content/uploads/2021/06/21.01.15_GFEMS_MethodologiesBooklet_VF.pdf (Accessed 30 October, 2022)

Managing NSUM Biases and Limitations

Responses to questions such as "How many people do you know who are individuals engaged in the commercial sex industry?" are critical for size estimates. However, as outlined in the methodological review, these responses may be inaccurate due to several biases and effects. TST's approach to bias management in this study was informed by Maltiel et al.[76] and Feehan and Salganik's data selection, design, and estimator adjustment recommendations.[77]

First, to help account for population-specific biases, including response bias and transmission bias, TST carefully selected and pre-tested the set of known populations included in the survey. This testing included large and small groups as well as groups that may be similarly disenfranchised or vulnerable, such as children in foster care, individuals receiving aid under the Slum Rehabilitation Scheme, and people suffering from several ailments, including leprosy. Since the NSUM estimator learns from relationships between personal network data and populations of known size to develop an estimate for a population of unknown size, the simplest way to account for these biases was to provide data that enabled the estimator to model biased responses. Including known populations that exhibit similar network tie patterns due to stigma, social desirability, or lack of knowledge (i.e., transmission bias) enabled the estimator to fit to similarly biased response data.

Feehan and Salganik provide several guidelines for adjusting for both transmission bias and barrier effects as well as a suite of additional sample and survey design–based weighting and adjustment capabilities for NSUM estimation.[78] TST leveraged these capabilities in constructing its NSUM estimates. Moreover, to account for respondent-specific biases, TST used an estimator that leverages sample and respondent weighting as well as variations in personal network reports at the respondent level. In previous studies, this practice has been useful in controlling for transmission bias and barrier effects.[79]

TST weighted responses according to publicly available information from the Indian Census and Government of Maharashtra statistics.[80] This approach accounted for sample-based biases and provided estimates based on the most accurate and representative data possible. These adjustments provided representation regarding region, gender, education, and age and minimized barrier effects. TST also used a resampled bootstrap process during data processing,

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[76] Maltiel, R., Raftery, A. E., McCormick, T. H., & Baraff, A. J. (2015). Estimating population size using the Network Scale Up Method. *Annals of Applied Statistics, 9*(3): 1247–1277. https://doi.org/10.1214/15-AOAS827

[77] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/0081175016665425

[78] Feehan, D. M., & Salganik, M. J. (2014). networkreporting package (Version 0.1.1). *R Foundation for Statistical Computing*. https://cran.r-project.org/web/packages/networkreporting/index.html

[79] Maltiel, R., Raftery, A. E., McCormick, T. H., & Baraff, A. J. (2015). Estimating population size using the Network Scale Up Method. *Annals of Applied Statistics, 9*(3): 1247–1277. https://doi.org/10.1214/15-AOAS827

[80] Data were drawn from: https://mahades.maharashtra.gov.in/ (Accessed 10 July 2020); https://www.censusindia.gov.in/ (Accessed 1 May 2020)

which reduces sampling variance when performing survey-driven estimation.[81] The confidence intervals were also derived from this bootstrap process, which is based on earlier work by Rust and Rao.[82] TST made the decision to use these methods at Time I, reasoning that conservative estimates have greater value than overestimates, and believes that employing them at Time II ensures the best possible comparison points between Time I and Time II. The ability to control for factors such as transmission bias, barrier effects, and recall bias when performing NSUM estimation was (and still is) limited. Some novel attempts to adjust for these factors risk overparameterization, yielding unpredictable and volatile predictions due to overfitting to known population data. Until further research is conducted on these novel methods, TST will continue to utilize the historical and widely accepted methods from the literature.

Use of Respondent-Driven Sampling

Adult sex workers were selected as initial RDS seed participants using TLS. This was performed to nullify the potential risk of network or sample bias risk induced by selecting seeds using nonprobability sampling. Individuals who completed the initial survey at Time I were asked to recruit others in the same target population—that is, sex workers—and were provided an additional incentive for successfully recruiting new participants for Time II. Participants were allowed to recruit a maximum of three participants, and those who completed the survey after being recruited were invited to recruit additional participants.

All respondents were asked several demographic questions, including their age and how long they have worked in the commercial sex industry. This information enabled us to determine their age of entry into the industry, which in turn identifies whether they became a sex worker while underage. Although this does not provide a *current* prevalence estimate of CST, it provides valuable information that can be triangulated with other methods (i.e., NSUM). In addition, respondents were asked how many other sex workers they know and how many of their contacts are CST victims. Although the proportion of CST victims to overall sex workers within adult sex worker respondents' networks is not suitable for prevalence estimation, examining these network reports in the context of other findings can provide insights into the connections between adult sex worker populations and CST victim populations, and into the broader structures of sex worker networks within Maharashtra, providing valuable insights to counter-trafficking researchers and decision-makers.

[81] Feehan, D. M., & Salganik, M. J. (2016). Generalizing the Network Scale-Up Method: a new estimator for the size of hidden populations. *Sociological Methodology, 46*(1), 153–186. https://doi.org/10.1177/0081175016665425

[82] Rust, K., Rao, J. (1996). Variance Estimation for Complex Surveys Using Replication Techniques." *Statistical Methods in Medical Research* 5(3): 283–310. https://doi.org/10.1177/096228029600500305

Managing RDS Biases and Limitations

Whether an RDS sample derived from an initial convenience sample can eventually become entirely "independent" from the convenience sample—and, therefore, be equivalent to a probabilistic sample—continues to be a debate in the literature. However, TST used RDS to augment a sample based on TLS (itself, a probability sampling approach). As such, this study does not face the same methodological risks as researchers who perform RDS using seeds drawn initially from convenience samples.

Although the TLS-RDS sampling approach for sex workers is methodologically sound, even rigorous samples may require weighting. Unfortunately, up-to-date target data is unavailable to granularly weigh the collected responses, and this is often the case when measuring hidden populations. TST used Gile's SS (Sequential Sampler) to weight response data for all population estimates. Gile's SS is a weighting technique for RDS samples based on the inclusion probabilities of members of the sample. The inclusion probabilities are based on the reported network sizes, or how many people a respondent knows within the target population. This approach is the best possible solution given the challenges of normalizing data from a hidden and stigmatized population.

Another hazard faced by the RDS survey is that respondents may face considerable personal and legal risk if they reveal their knowledge of, or connections to, CST victims. To alleviate this hazard, TST and Convergent worked collaboratively designing the RDS engagements to ensure that respondent personal data was kept completely confidential and respondents were fully informed of the data protections and their participant rights. Nonetheless, the potential risk may affect the estimate drawn from sex worker personal network data.

Survey Organization and Implementation

This study was commissioned by GFEMS. Funding for the study came from the US Department of State's Office to Monitor and Combat Trafficking in Persons (TIP Office). The design and execution were carried out and overseen by Two Six Technologies. UCLA provided logistical advice on fielding surveys concerning sex workers and a methodological review of the protocols and research design. Convergent View, a data-driven research and consultancy firm with offices across India, performed field data collection across Maharashtra.

Ethical Review

The entire research design and survey protocol, including the questionnaires and consent forms, received ethical review and approval from Convergent View's Institutional Review Board (IRB) in India, and from Health Media Lab in the United States. TST also conducted a full review of the instrument and protocols with local partners assisting with data collection. No new additions were made based on local partner review; however, one question related to a NSUM reference group was removed after review, in consideration of cultural sensitivities related to political and social structures in the study geography.

Implementation

NSUM data collection was conducted from September 17, 2022, to October 19, 2022, on a geographically representative sample of 1,080 adults in Maharashtra. Each of these respondents was contacted via a geographically stratified RDD approach to participate in a telephone questionnaire. All adults aged 18 years and older were eligible to be interviewed as long as they resided in Maharashtra.

RDS data collection was conducted from September 14, 2022, to October 16, 2022. One hundred thirty-six (136) sex worker seeds were identified using TLS, a random selection process, and with assistance provided by local NGOs. Two hundred three (203) sex workers were referred by these seeds over three waves, bringing the total number of sex workers surveyed to 339. The RDS survey ultimately propagated across eight different districts in Maharashtra.

Sampling Design

The NSUM component used an RDD sample design. RDD is a means of probability sampling individual households from a frame of available telephone numbers; it is distinct from other

telephone-based sampling approaches because it does not rely on a roster.[83] Specifically, to enable the RDD approach, the first five digits of the phone number were required to belong to the state of Maharashtra, and the next five digits were randomly generated. Upon reaching a potential respondent, a set of screening questions first confirmed that they currently lived in any part of Maharashtra state and were willing to continue the interview. This determined the eligibility of individuals to participate in and complete the survey.

The RDS study used TLS to identify the seeds for the RDS referral process and was executed via CATI. The TLS process was managed to ensure confidentiality and protect the personally identifiable information of sex workers. This process involved multiple NGOs in Maharashtra and was overseen by Convergent. The research team only accessed participants' private information to distribute incentives, and only those who needed to distribute incentives had access to their information.

To be eligible to participate in the RDS study, a respondent was required to be an active sex worker, live in Maharashtra, and be 18 or older. Referrals were asked for unique identification codes that indicated who referred them. As part of the RDS survey, mobile financial incentives of Rs. 300 were provided to all respondents who completed the survey. An additional referral incentive of Rs. 300 was provided to each individual who successfully referred another participant, with a max of 3 referral incentives.

Questionnaires

Network Scale-Up Method

For Time I, Two Six Technologies collaborated with several subject matter experts between January 2019 and February 2020 to design and develop the original NSUM questionnaire. Individuals from UCLA, GFEMS, Kantar (the Time I data collector), and other organizations that work with sex workers in Maharashtra (i.e., IJM and local NGOs) reviewed the NSUM questionnaire and provided feedback prior to finalization. The Time II questionnaire built upon the prior work conducted in Time I. The first draft of the Time II questionnaire was identical to the Time I questionnaire. It was reviewed by Convergent in June 2022 and was accepted without refinement. Final modifications were made during pre-tests in September 2022 when field interviewers reported sensitivity issues with a question about a marginalized social group. After discussion with Convergent, this question was removed.

NSUM requires identifying the number of people in the target hidden population(s) known by each respondent, the number of people in various non-hidden population groups known by each respondent, and the size of the respondent's overall personal network. Personal network

[83] Waksberg, J. (1978). Sampling methods for Random Digit Dialing, *Journal of the American Statistical Association, 73*(361), 40–46. https://doi.org/10.2307/2286513

size is indirectly estimated by aggregating the respondent's connections to known and hidden populations. The questionnaire was organized into the following four sections:

- Respondent's background;
- Known populations;
- Target population;
- Personal views and stigmas.

Respondent's background. This section collected information on the respondent's socio-demographic characteristics, including age, sex, state of residence, district of residence, and highest level of education achieved.

Known populations. Estimating the size of the respondent's network requires collecting data on several populations of which the size is already known. During Time I, 16 populations were chosen (e.g., number of teachers, number of doctors) after reviews with external partners. All populations were kept in Time II except "members of scheduled castes" due to the sensitivity issues mentioned above. This was replaced with a question about "members of fisheries co-operative society." The final known populations included in Time II were all located from official census documents and other public records.

Target populations. This section collects the number of persons known by the respondent in each key population of interest, namely the number of sex workers and the number of CST victims.

Stigma toward sex workers. An attempt was made to estimate response bias by measuring the stigma toward sex workers. This measurement helped researchers determine how respondents might adjust their responses due to social desirability bias or whether or not the number of ties between a respondent and a known or hidden population can be explained by underlying personal beliefs.

Respondent-Driven Sampling

The questionnaire began by asking the age of the sex worker to ensure they were 18 years old or older. Those who were at least 18 years old could proceed through the questionnaire. Respondents were then asked whether they were engaged in the commercial sex industry to ensure they met the eligibility requirements of the personal network section. They were also asked how long they had worked in the commercial sex industry.

The personal network section asked respondents how many people they currently knew who were engaged in the commercial sex industry. If they responded with one or more individuals, they were asked how many of them were under the age of 18. These two questions were the same in Time I and II. In Time II, additional questions were added about the impact of the

COVID-19 pandemic on sex workers. Specifically, respondents were asked how many individuals they knew who started engaging in the commercial sex industry during COVID-19 and how many of those individuals are increasingly finding business through online channels instead of brothels. If a respondent answered one or more to any of those questions, they were asked how many of those individuals were under 18. A similar style of questions was asked about individuals who quit the commercial sex industry due to COVID-19 to understand who was exiting the industry.

Time II for RDS added a personal experience section that was not included in Time I. These questions were added to further explore the impact of COVID-19 on sex workers and better understand the extent to which sex work has moved into digital spaces compared to pre-pandemic rates. Sex workers were asked how clients contacted them and paid for services since the start of COVID-19 compared to years prior, and whether and how the services purchased had also changed (i.e., an increase or decrease in the provision of digital sexual services). They were also asked where the majority of their digital clients were located to better understand buyer behavior.

The last section of the questionnaire asked demographic questions, including gender, the highest level of education achieved, and district of residence. These questions were asked to develop a profile of adults engaged in the commercial sex industry. The questionnaire concluded by asking respondents for a mobile phone number so they could receive their incentive. Respondents who provided a phone number were also asked if they wanted to be notified about future survey opportunities. This contact information was held securely and confidentially with local partners and was used strictly to administer incentives. There was no link between the contact information and the actual responses.

Training

Training was conducted in September 2022 by local partners and facilitated by Convergent, with remote supervision from Two Six Technologies. Ten individuals attended the training to work as either team supervisors or interviewers, with two primary trainers attending. Some training staff had previously worked with TST during 2020 training and surveying for the Time I estimate, and were already familiar with the study, methodology, and ethical considerations.

Training allowed the data collection teams to become familiar with the survey's overall purpose and questions and conduct mock interview sessions. The training covered survey research ethics and project-specific ethical norms to be followed, including maintaining the confidentiality of the respondents who provided interviews, the questions and administration procedures, and how to record responses in the software developed for the survey. Team members were also allowed to ask any questions that emerged during training.

Trainees were assigned to two data collection teams, each consisting of a team supervisor and interviewers. Senior staff from Convergent coordinated and supervised the fieldwork activities. Cognitive pretesting took place at Time I; because questionnaire modifications were minimal, no pretesting took place during Time II.

Data Processing

The study data processing began shortly after the fieldwork commenced. Preliminary completed survey data was sent from the local partner to TST, where it was checked for consistency and quality by the research team. Preliminary data processing was a distinct advantage for data quality because TST had the opportunity to review data prior to the conclusion of the field period and make modifications as needed. Some of the minor data quality issues identified in the early NSUM and RDS responses were related to variable names, metadata (i.e., interview start time), respondent validation, and missing data. TST documented the issues and sent them via email to Convergent for review. A majority of the issues were handled via email. A conference call was also held with the Convergent team to discuss any issues that were better discussed verbally. When all issues were resolved, Convergent sent updated files to the TST team. The data entry and editing phase was completed in October 2022.

Response Rates

A total of 3,664 mobile phone numbers were dialed for the NSUM survey:

- 893 were not eligible because of invalid phone numbers;
- 1,317 had unknown eligibility because they did not answer the call, switched off, or were out of network range;
- and 374 refused immediately upon answering or disconnected without any response.

One thousand eighty (1,080) interviews were completed; 1,072 were complete interviews, and 8 were partial interviews. The response rate using the American Association of Public Opinion Research's Response Rate 3 (RR3)[84] was 47%, which includes an estimate of what proportion of cases of unknown eligibility were actually eligible. The cooperation rate using AAPOR's Cooperation Rate 1 (CR1) was 74%. The refusal rate using AAPOR's Refusal Rate 2 (RR2) was 17%. This includes estimated eligible cases among the unknown cases similar to RR3. These numbers are generally within acceptable margins by prior meta-reviews.[85] Since the RDS

[84] American Association of Public Opinion Research. Response Rates - An Overview. AAPOR. Retrieved October 21, 2022, from https://www.aapor.org/Education-Resources/For-Researchers/Poll-Survey-FAQ/Response-Rates-An-Overview.aspx

[85] Groves, R., Peytcheva, E. (2008) The Impact of Nonresponse Rates on Nonresponse Bias: A Meta-Analysis. *Public Opinion Quarterly, 72*(2), pp. 167–189. https://doi.org/10.1093/poq/nfn011

component drew from a TLS-based sample and then grew the sample using the RDS chain-referral process, and therefore did not rely on a traditional sampling frame, TST cannot provide comparable statistics for the RDS survey.

Participant Characteristics

Table 1 displays the population of Maharashtra by region in comparison to the unweighted NSUM sample by region. Tables 2.1 and 2.2 display the unweighted characteristics of the participants in the NSUM sample by age, gender, and education. The average age was 35 years old. The sample was 58% male and 42% female.[86] Additionally, 98% of the sample completed primary school, and 95% completed middle school. The sample was weighted by region, age, gender, and education to ensure representation in the results. TST used the raking procedure for weighting. Further, TST trimmed the weights so no particular respondent would be overly represented. TST set the range for the trim at a minimum of 0.3 and a maximum of 3.

Table 1 – NSUM Respondent Characteristics by Region

The NSUM population included adults 18+ who reside in the state of Maharashtra.

	Population of Maharashtra	NSUM Sample (Unweighted) (Time I)	
Region	Percent	Percent	N
Amravati	10%	15% (9%)	156 (95)
Aurangabad	16%	21% (22%)	224 (224)
Konkan	29%	24% (31%)	255 (323)
Nagpur	11%	20% (13%)	214 (132)
Nashik	16%	14% (16%)	146 (163)
Pune	21%	7% (10%)	77 (99)

Table 2.1 – NSUM Respondent Characteristics (Quantitative)

The NSUM population included adults, 18+ who reside in the state of Maharashtra.

NSUM Sample (Unweighted (Time I))

[86] Time II included much higher rates of female participation due to proactive planning on behalf of TST and Convergent. A significant change for Time II was hiring a substantial number of female interviewers so that female participants would feel more comfortable completing the survey.

Variable	Mean	Standard Deviation	N
Age	35 (37)	10 (11.3)	1,072 (1,126)

Table 2.2 – NSUM Respondent Characteristics (Categorical)

The NSUM population included adults, 18+ who reside in the state of Maharashtra.

NSUM Sample (Unweighted) (Time I)		
Variable	Percent	N
Education		
Below primary	2% (3%)	22 (26)
Primary	3% (3%)	35 (30)
Middle	12% (8%)	130 (81)
Matric/Secondary	29% (31%)	310 (324)
Higher Secondary/Undergraduate	29% (33%)	306 (344)
Graduate and above	25% (22%)	269 (231)
Gender		
Male	58% (92%)	623 (950)
Female	42%	452 (86)

Table 3.1 displays the unweighted characteristics of the RDS sample for the quantitative variables. The mean age was 35, and the mean number of years worked in the commercial sex industry was approximately 10. On average, the respondents knew 12 individuals who worked in the commercial sex industry. Additionally, the standard deviation was 14, indicating that some respondents' networks of sex workers exceeded 50. To be exact, 6 participants had

networks of sex workers above 50, while one respondent reported knowing zero others engaged in the commercial sex industry

Table 3.1 – RDS Respondent Characteristics (Quantitative)

The RDS population included sex workers, 18+, who reside in the state of Maharashtra.

RDS Sample (Unweighted) (Time I)			
Variable	Mean	Standard Deviation	N
Age	35 (35.5)	7 (7.6)	339 (301)
Number of individuals known who engage in commercial sex industry	12 (31.4)	14 (13.8)	339 (301)
Years Worked in Commercial Sex Industry	10 (14.5)	6 (7.8)	339 (301)

Table 3.2 displays the unweighted characteristics of the RDS sample for the categorical variables. While almost 54% of the sample had less than a primary education, 46% had at least a primary education or higher (27% achieving primary, 13% middle, and 5% matric/secondary). 10% indicated that they had entered the commercial sex industry within the past 3 years (i.e., since late 2019). Further, 8% entered the commercial sex while below the age of 18. In Time I, among the seeds, 31% started sex work at age 17 or younger.

Table 3.2 – RDS Respondent Characteristics (Categorical)

The RDS population included sex workers, 18+ who reside in the state of Maharashtra.

RDS Sample (Unweighted) (Time I)		
Variable	Percent	N
Education		
Below primary	54% (29%)	183 (88)
Primary	27% (19%)	92 (57)

Middle	13% (33%)	44 (98)
Matric/Secondary	5% (17%)	16 (50)
Higher Secondary/Undergraduate	1% (< 1%)	2 (1)
Graduate and above	1% (2%)	2 (7)
Started sex work age 17 or younger		
Yes	8% (31%)	26 (16)
No	92% (69%)	313 (35)

Findings

The findings are divided into two sections. The first discusses NSUM results, and the second discusses RDS results. Weighted and unweighted estimates for NSUM findings are provided. Weighted results are presented when making estimates about the population of Maharashtra, and unweighted results are shown when describing the sample. Wherever possible, TST attempts to provide methodological notes related to each finding.

Network Scale-Up Method

Stigma and Personal Beliefs

When the general population was asked how acceptable it is for an individual to engage in commercial sex as a sex worker, 6% responded that it was not acceptable at all; 81% responded that it was acceptable, with responses ranging from slightly acceptable to extremely acceptable; and 13% of participants refused to answer the question. In comparison, in Time I, 58% responded that it was not acceptable at all; 22% responded that it was acceptable, with responses ranging from slightly acceptable to extremely acceptable; and 20% of participants refused to answer the question. It appears that acceptance is higher in Time I than in Time II. This increase may be due to the Indian Supreme Court's 2022 ruling that recognized "sex work" as a profession; although TwoSix did not survey respondents as to why they felt such changes may have arisen, anecdotal data from field workers referenced the ruling as influential on both adult sex workers and the general public.

Known Population Approach

The known populations used and their sizes are presented in Table 4. The mean number of connections (unweighted) for all populations are also presented in Table 4.

Table 4 – Known populations used in the study

Description, size, and data source for the known populations used for network size estimation

Category of population	Size	Source	Mean number of connections (Time I)	Mean number of connections (Time II)
Teachers in public secondary and higher (Std IX to XII) educational institutions	248,300	Economic Survey of Maharashtra, 2021 – 2022	2.408	0.3032
Ayurveda doctors who are officially registered with the Maharashtra Council of Indian Medicine	91,920	Economic Survey of Maharashtra, 2021 – 2022	1.079	0.0709
People who passed away due to a car accident in the past year	13,528	Economic Survey of Maharashtra, 2021 – 2022	0.6834	0.0522
Members of a spinning mill co-operative society	502,300	Economic Survey of Maharashtra, 2021 – 2022	0.4537	0.0233
Formal members of fisheries co-operative society	325,000	Economic Survey of Maharashtra, 2021 – 2022	-	0.0215
Students at Sainiki schools	9,664	Economic Survey of Maharashtra, 2021 – 2022	0.7442	0.0280

People who reported suffering from leprosy (i.e., to GoI) in the past year	22,855	Economic Survey of Maharashtra, 2021 – 2022	0.3041	0.0028
People who were diagnosed with Dengue fever by a doctor in 2021	12,720	Economic Survey of Maharashtra, 2021 – 2022	0.5618	0.0746
Members of families that received rehabilitation under the Slum Rehabilitation Scheme last year	6,201	Economic Survey of Maharashtra, 2021 – 2022	0.3842	0.0476
Children receiving foster care in 2021	38,641	Economic Survey of Maharashtra, 2021 – 2022	0.2664	0.0037
People who suffered from burns that required them to ride in an ambulance in 2021	1,130	Economic Survey of Maharashtra, 2021 – 2022	0.3301	0.0149
People who reported suffering from a case of malaria to the State (i.e., GoI) in 2021	17,365	Economic Survey of Maharashtra, 2021 – 2022	0.5338	0.0149
Mothers who lost their baby within their first year of life in 2021	33,017	Economic Survey of Maharashtra, 2021 – 2022	0.2597	0.0756
Teachers in public primary (Std I to VIII) educational institutions	512,100	Economic Survey of Maharashtra, 2021 – 2022	1.992	0.1035

Perhaps unsurprisingly, the mean numbers of connections are lower across all reference groups as compared to the same network reports across the same reference groups collected in Time I in 2020 (Table 4). In Time I, respondents knew an average of roughly 10 contacts in total across a selection of 13 reference groups used in both Time I and Time II surveys; in Time II, over the identical subset of reference groups, respondents knew an average of 0.8 individuals in total.[87] Because the sample strategy, questionnaires, and modes of population engagement all remained the same between Time I and Time II, TST speculates that this change reflects an external shift within the population.

One potential explanation is a broad and dramatic increase in social isolation in Maharashtra resulting from the COVID-19 pandemic and lockdowns between Time I (2020) and Time II (2022). As previously stated, a network tie is someone a respondent knows by face and name who also knows the respondent by face and name and has been in touch with the respondent over the past 12 months. It is possible that a direct result of partial and complete lockdowns in Maharashtra in 2021, and an indirect result of broader waves of lockdowns across India in 2020 and 2021, is that the average respondent has been in touch with and, therefore, "knows" fewer people than they did in spring 2020.[88] The COVID-19 pandemic may be one potential explanation for this dramatic decrease in mean number of connections between Time I and II, but also may not account for the entirety of the change, or be the sole cause; the origin of this change is not empirically examined in this study. However, this explanation is consistent with emergent research on COVID-19 and social isolation trends in several countries.[89,90]

As in Time I, the data suggest that responses to questions such as "How many individuals engaged in the commercial sex industry do you know?" are aligned with known population. For the most part, the average number of reported connections positively correlates with the known population sizes (Figure 1). This means that as the known population sizes increase, the mean number of people that respondents know in those populations also increase. These results are unweighted.

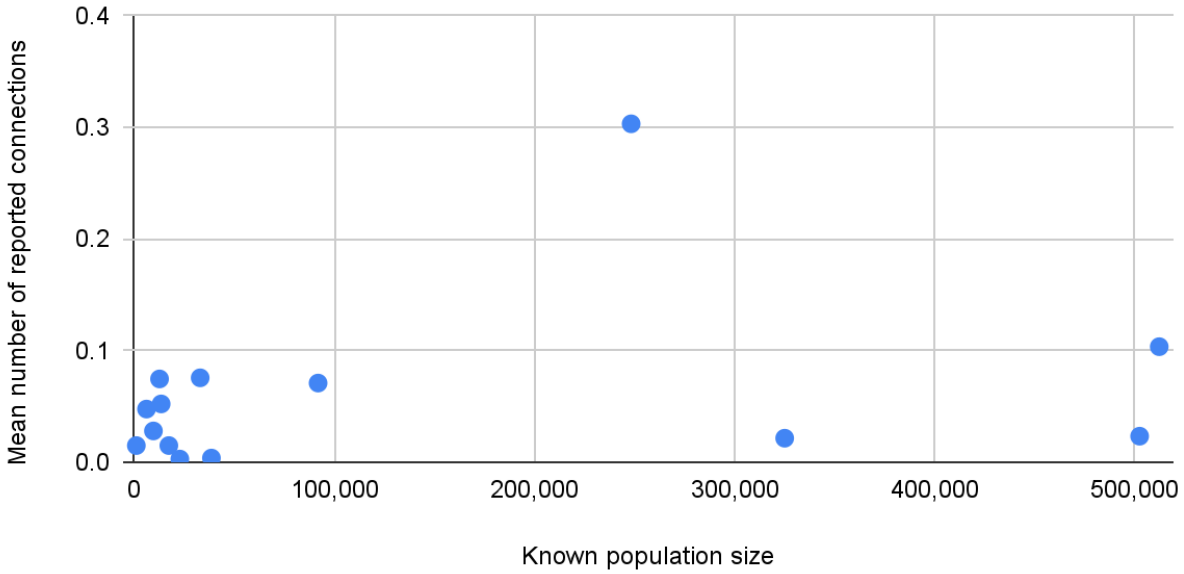
[87] Network connections examined over 13 shared reference groups between the 2020 and 2022 NSUM instruments.

[88] After 20 months, Maharashtra lifts all lockdown restrictions. (2021, November 27). *The Tribune.* https://www.tribuneindia.com/news/nation/after-20-months-maharashtra-lifts-all-lockdown-restrictions-343482

[89] Sugaya N, Yamamoto T, Suzuki N, et al. (2021) Social isolation and its psychosocial factors in mild lockdown for the COVID-19 pandemic: a cross-sectional survey of the Japanese population. *BMJ Open* 2021;11:e048380. doi: 10.1136/bmjopen-2020-048380

[90] Martínez-Garcia, M., Sansano-Sansano, E., Castillo-Hornero, A. et al. (2022) Social isolation during the COVID-19 pandemic in Spain: a population study. *Sci Rep* 12, 12543. https://doi.org/10.1038/s41598-022-16628-y

Figure 1 - Mean number of reported connections and known population size



Prevalence Estimation Findings

The previous section described how the personal network size was calculated. In this section, the personal network size is used as a denominator to estimate the proportion of that network composed of persons who are sex workers or CST victims. This proportion is then "scaled up" to estimate the size of the sex worker and CST victim populations.

Respondents were asked how many sex workers they know (see Appendix A for the actual wording). Those who responded that they knew one or more individuals were then asked, "Among the sex workers that you know, how many are 17 or younger?"

Point Estimates of Hidden Populations

The census estimates that the total population of Maharashtra in 2011 was 112,374,333. Based on the projected growth in the census from 2001 to 2011, Maharashtra's 2021 population is projected at 126,940,126.[91,92] As described earlier, in producing hidden population size estimates, NSUM estimates the average number of people known in each target population. In addition, the method estimates how many people in Maharashtra the respondent knows (i.e., their personal network size, or total out-degree). Thus, the result is the proportion of all people in Maharashtra who are in the target populations. Since the reported proportions relate to all

[91] Maharashtra Population 2011–2022. (2022). *Census 2011.* https://www.census2011.co.in/census/state/maharashtra.html

[92] Due to COVID-19, the 2021 census was not conducted. It is expected that the next census will occur in 2023.

people in Maharashtra, old and young, the full state population is applied to each proportion to determine the estimated sizes of the target populations.

Using the personal network size data drawn from the responses to "known population" questions, the estimated number of sex workers in Maharashtra for Time II is approximately 42,000 (95% CI: 13,000, 80,000), and the estimated number of CST victims is 6,000 (95% CI: 0, 17,000) (Table 5). UNAIDS (2017) estimates that there are approximately 650,000 sex workers across India.[93] Since Maharashtra has 9% of the Indian population, researchers might estimate, based on UNAIDS data, that there are approximately 59,000 sex workers in Maharashtra, which is very close to the Time II estimate. The estimated number of overall sex workers has increased from the Time I estimate at 29,000 (95% CI: 14,000, 52,000), whereas the CST estimate's mean has decreased from 7,900 (95% CI: 2,600, 15,000) to 6,000. Critically, the researchers caution that the confidence intervals of both estimates have grown significantly, indicating **greater uncertainty** in the posterior estimates and therefore less certainty with respect to the true sizes of the hidden populations. This may be a result of the reduced overall personal network sizes, which result in sparser overall network data, and therefore less information and variance by which the scale-up estimator is able to be fitted for population-level estimation. In other words, with significantly smaller personal networks, there is also a necessarily smaller range of possible connections reported, and therefore a lower boundary of the possible total information that may be gathered.

Table 5 – Estimated percentages of the target populations among the total population of Maharashtra and estimated sizes of the target populations

	Estimated percentage of the key populations among the total population of Maharashtra (Time I)			Estimated size of the key populations (Time I)		
	Lower 95% CI	Estimate	Upper 95% CI	Lower 95% CI	Estimate	Upper 95% CI
Sex workers	0.010% (0.011%)	0.033% (0.023%)	0.063% (0.042%)	13,000 (14,000)	42,000 (29,000)	80,000 (52,000)
Victims of child sex	0.000% (0.002%)	0.005% (0.006%)	0.013% (0.012%)	0 (2,600)	6,000 (7,900)	17,000 (15,000)

[93] *UNAIDS Data 2017.* (2017). Joint United Nations Programme on HIV/AIDS (UNAIDS). https://www.unaids.org/sites/default/files/media_asset/20170720_Data_book_2017_en.pdf

trafficking [94]						

Overall, the estimated prevalence of sex workers is roughly 0.033% of the population of Maharashtra. Though there is little prior research on the prevalence of sex workers at the state level, Family Health International's 2001 study indicates the prevalence of female sex workers in hotspots across Maharashtra is 0.4% of all adult women.[95] This is not directly comparable geographically or demographically to this study; however, if TST were to interpret its results as a proportion of all adult women in the state, the statewide prevalence rate amongst women would be roughly 0.11% (with a 95% confidence interval of 0.05% to 0.19%).[96]

Relative to Two Six's Time I NSUM estimate in 2020, the posterior mean of the NSUM estimator is higher (42,000 versus 29,000), but the Time II 95% confidence interval also contains the entirety of the Time I confidence interval (13,000 to 80,000 versus 14,000 to 52,000). This finding suggests a possible increase in the prevalence of overall sex work, but **does not statistically confirm it**; critically, it shows greater uncertainty or across-network variance between general population segments and the population of sex workers.

Between the lower and upper confidence intervals of each estimate, the CST prevalence estimate resulting from NSUM is approximately 14.3% that of the sex worker population estimate, which aligns with some previous research findings in India.[97] The 95% confidence interval of the point estimate range is significantly greater than the number of Protection of Children from Sexual Offences (POCSO) Act cases in Maharashtra involving a penetrative sexual act against a minor (3,508 in 2021, the most recent available year[98]) as well as the 450 child sexual abuse complaints from Maharashtra in 2018–2019 as fielded by Childline, a phone emergency outreach service for child trafficking in India.[99]

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[94] Minors (individuals under the age of 18) are not able to legally provide consent and thus should not be referred to as "sex workers." For this data point, involvement in the sex industry refers to exchanging sexual services for monetary or in-kind remuneration (to oneself or a third party).

[95] *Family Health International. Mapping of commercial sex access points and relevant service outlets in Maharashtra, 2001.* (2001). Child Hub to Protect Children. https://childhub.org/system/tdf/library/attachments/fhi_2001_mapping_of_sex_access_in_maharashtra_may_04_1.pdf

[96] While sex workers are not required to be female, conversations with local NGOs and field data collectors indicated a widespread characterization that sex workers in Maharashtra are overwhelmingly majority-female. Furthermore, all respondents to this RDS survey of sex workers were female.

[97] Akula, S. L. (2006). Situational analysis report on prostitution of boys in India. *ECPAT International.* http://childhub.org/en/system/tdf/library/attachments/ecpat_06_sarop_of_boys_in_india_250806.pdf?file=1&type=node&id=17624

[98] National Crime Records Bureau. (2021). *Table 4A: IPC crimes against children (crime head-wise & state/UT-wise) - 2018*. [Infographic.] https://ncrb.gov.in/sites/default/files/CII-2021/TABLE%204A.2.pdf

[99] Natu, N. (2019, December 26). Maharashtra ranks third in child sexual abuse complaints to Childline. *Times of India.* https://timesofindia.indiatimes.com/city/pune/maharashtra-ranks-third-in-child-sexual-abuse-complaints-to-childline/articleshow/72973159.cms

The CST estimate is proportionately *smaller* than the Time I finding obtained by TST in Time I, which featured a point estimate of 7,900 and a 95% confidence interval of 2,600 to 15,000, resulting in a corresponding CST prevalence rate of 27.2% of the total sex worker population estimate at the time. By comparison, the point estimate at Time II is approximately 25% smaller; however, the confidence interval of the estimate has also grown since 2020, indicating greater uncertainty regarding the estimate. Furthermore, the entirety of the Time I CST estimate's confidence interval is contained within the Time II confidence interval. Relative to Time I, **the change in the point estimate is not statistically conclusive**.[100]

In providing this point estimate, TST acknowledges the potential for underreporting due to response bias among respondents.

Buyers of Commercial Sex

Respondents were also asked about individuals who are buyers of sex workers to help better understand the commercial sex trade. Specifically, they were asked how many individuals purchased sex from someone between 15 and 17 and years old. They were also asked among those who purchased sex from someone under 18 how many completed the transaction digitally.

TST estimates indicate that there were approximately 134,000 local buyers of the commercial sex industry in 2022 in Maharashtra (95% CI: 68,000, 228,000). Among these buyers, approximately 14,000 (10%) paid to have sex with children between the ages of 15 and 17 (95% CI: 0, 37,000). TST also found that among these 14,000 buyers, approximately 6,500 (46%) arranged the transaction digitally (e.g., using websites, Facebook, or WhatsApp; 95% CI: 0, 23,000).

The number of local buyers is a dramatic increase relative to the 2020 estimate of 35,000 (95% CI: 22,000, 54,000). Additionally, the number of buyers who paid to have sex with someone 17 or younger increased from the 2020 estimate of 9,000 (95% CI: 4,200, 15,200), but also features a wide confidence interval that includes the entirety of the Time I confidence interval. These findings suggest several trends. First, since 2020, adult sex work (and particularly, sex work that may be digitally facilitated, marketed, or performed) appears to be growing in public acceptance. One reflection of this trend toward acceptance may be the Indian Supreme Court's 2022 ruling that recognized "sex work" as a profession while maintaining the critical importance

[100] TST notes that the NSUM estimates, confidence intervals, and error estimates are not easily statistically compared across time windows, owing to the unique bootstrap estimation procedure used by the NSUM model. Although this finding may not be taken as conclusive, as a simple point-of-comparison between Time I and Time II estimates for both sex work and CST point estimates, TST compared the Time I and Time II estimates using a Welch's t-test, finding no statistically significant differences in between the posterior means.

of the protections provided under the Immoral Trafficking Prevention Act of 1956.[101] It also may reflect a growing demand for digital facilitation of commercial sex (including child sex trafficking), and a matching increase in the digital provision of such services. In 2022, 46% of those who paid to have sex with someone under 18 arranged it digitally compared to 36% in 2020. However, **the findings do not indicate that the number of buyers who have paid to have sex with CST victims has increase**d **since Time I**; it is not possible to make any conclusions regarding changes in this population's size, except that estimator uncertainty increased relative to Time I.

Percentage of Respondents Who Know Any Groups of Interest

Less than one percent (0.84%) of the 1,080 respondents knew at least one sex worker, and 0.09% knew at least one sex worker under 17; 3.26% knew at least one buyer of a sex worker, 0.30% knew at least one buyer of a child sex trafficking victim between 15 and 17, and 0.09% knew at least one buyer of a child sex trafficking victim under 18 who organized the transaction digitally (Table 6). Since Time I in 2020, all of these percentages have decreased. Our findings with respect to respondents' personal networks, coupled with the NSUM estimator's findings, indicate that this is both a personal network effect and also in some cases a possible population-specific effect. Because personal networks have shrunk more broadly, an exogenous trend of social isolation suggests that respondents know fewer people of every category; even among populations that have grown in absolute size, such as the populations of all buyers who paid for commercial sexual services in Maharashtra.

Table 6 – Percentage of respondents reporting that they know at least one person in the target populations

Target populations	Percentage who know at least one member (Time I)
Sex workers	0.84% (6%)
Child sex trafficking victims under the age of 17	0.09% (2%)
Buyers of commercial sex	3.26% (7%)
Buyers of child sex trafficking victims between the age of 17 and 15	0.30% (3%)

[101] Varsha. (2022, May 26). Supreme court recognizes "sex work" as a profession, issues guidelines to stop abuse against sex workers. B&B Associates, LLP. Newshttps://bnblegal.com/news/supreme-court-recognises-sex-work-as-a-profession-issues-guidelines-to-stop-abuse-against-sex-workers/

Buyers of child sex trafficking victims under the age of 18 who organized the transaction digitally	0.09% (2%)

Respondent-Driven Sampling

The findings from the RDS component of the CST prevalence estimation are summarized below.

Summary

TST and partners executed an RDS survey that targeted adult sex workers, 18 and older, in Maharashtra to provide triangulation data for the NSUM estimate and to better understand the sex worker profile in Maharashtra. The RDS study covered eight districts within Maharashtra: Ahmednagar, Mumbai City, Nagpur, Nashik, Pune, Sangli, Solapur, and Thane.

The target group for the RDS study was adult sex workers, including those who consented to be seeds for the study and the referred individuals who contacted the research team by phone to complete a short interview about their demographics and personal networks. The breakdown of the respondents by district is in Table 7.

Table 7 – RDS respondents by district

Location of Respondents		
	n	%
Ahmednagar	34	10%
Mumbai City	88	26%
Nagpur	41	12%
Nashik	28	8%
Pune	48	14%
Sangli	2	1%
Solapur	34	10%
Thane	64	19%

Sex Worker Network Profile

Using the RDS data, TST examined and characterized sex worker networks, which assisted in triangulating the findings from NSUM and adding deeper context and information concerning the prevalence estimate as well as changes between Time I and Time II. By using two methods, TST was able to explain more fully the prevalence of CST from public (i.e., NSUM) and private (i.e., RDS) standpoints. While the general public can identify the number of people they know in sex work, they are unlikely aware of traits and situations specific to this industry, many of the trends within it, nor the experiences of individuals engaged in the commercial sex industry over time. Hence, by gathering public information on sex work and by privately interviewing sex workers themselves, TST can provide a deeper understanding of CST from both perspectives.

The RDS analysis was performed using RDS Analyst, a well-known analysis software tool for RDS samples.[102] The population estimates for sex workers are listed below.

Table 8 – Age and Network Size of Sex Workers

Population Estimates[103] (Time I)					
	Mean	Standard Deviation	Median	25th Percentile	75th Percentile
Age	34 (34)	7 (7)	35 (33)	29 (29)	39 (40)
sex worker network size	6 (31)	6 (14)	5 (20)	2 (10)	8 (35)

Using Gile's SS estimator,[104] it is estimated that the mean age of adult sex workers in Maharashtra is 34 years old, which is the same as in the Time I study in 2020. The mean sex worker network size is 6, with the lower 25th percentile having network sizes of 2 or below and the upper 75th percentile having network sizes of 8 and above (Table 8). This is lower than in Time I, suggesting that sex workers may work or communicate in smaller networks. As discussed previously, the NSUM survey response data showed that a shrinking of personal networks was also true of the general population of Maharashtra between 2020 and 2022. This trend is thus not unique to the hidden population of sex workers. Rather, it may reflect a more general and potentially longer-term drift toward isolation and fewer social ties; as previously speculated, this may be a result of the pandemic and ensuing lockdowns across Maharashtra.

Table 9 – Education of Sex Workers

Population Estimates[105] (Time I)						
	Below primary	Primary	Middle	Matric/ Secondary	Higher Secondary / Undergraduate	Graduate and above

[102] Handcock, M. S., Fellows, I. E., & Gile, K. J. (2014). RDS Analyst: Software for the analysis of Respondent-Driven Sampling data (Version 0.42). *Hard to Reach Population Methods Research Group.* http://hpmrg.org

[103] Gile's SS weights are used. These weights are based on the inclusion probabilities of members of the sample, which are based on reported network sizes (how many people a respondent knows within the target population).

[104] Gile, K. J. (2011). Improved inference for Respondent-Driven Sampling data with application to HIV prevalence estimation. *Journal of the American Statistical Association*, *106*(493), 135–146. https://doi.org/10.1198/jasa.2011.ap09475

[105] Gile's SS weights are used. These weights are based on the inclusion probabilities of members of the sample, which are based on reported network sizes (how many people a respondent knows within the target population).

Education	52% (30%)	26% (19%)	17% (34%)	4% (16%)	< 1% (< 1%)	1% (1%)

It is estimated that 52% of adult sex workers' highest attained education level is below primary school, 26% have a highest education level of primary school, and 17% have a highest education of middle school (Table 9). In addition, the percentage of sex workers with middle school or below educational attainment (95%) has increased from Time I (83%). Lower educational attainment may lead to a lack of economic opportunities and increased vulnerability. It is possible that economic insecurity may have influenced decision-making among less-educated adults in Maharashtra to enter the commercial sex industry, or that more-educated adults are exiting the commercial sex industry at a faster rate than those who are less highly educated.

Prevalence of Child Sex Trafficking

Child Sex trafficking Among Respondent Peer Networks

Of the 339 sex workers who completed an RDS survey, only 12 (3.5%) stated that they knew a sex worker under the age of 18 and 1 did not answer the question. As discussed in the initial findings, this is a decrease relative to 5.6% (17 of 301) in Time I, suggesting a potential reduction in the prevalence of child sexual exploitation. The researchers caution, however, that this result could also indicate that adult sex worker networks may be more siloed from CST victims than at Time I. Relative to respondent network size, the percentage of CST victims among respondents' total sex worker networks ranged from 0% (most common) to 100% (n=1), with eight respondents reporting a proportion of 20% or higher. Overall, the average incidence of CST among respondents' network of sex workers is approximately 0.5% (95% CI: 0.2% to 1%). In Time I, the average incidence of CST among respondents' networks was approximately 1% (95% CI: 0% to 30%). The average incidence has slightly decreased, but not conclusively so, as the results are still within the Time I confidence intervals.

It is important to note that sex workers may not be aware of the ages of other sex workers in their network, or may choose not to report especially young sex workers as underage because they are unable to confirm them as such. Also, since research interviewers are typically required to report crimes as a matter of organizational policy, human subject research protocol, and research ethics, sex workers may have feared that reporting knowledge of current or ongoing CST to interviewers would obligate the interviewers to report the details of this information and how they obtained it to law enforcement. Although this same disincentive also existed at Time I, the reporting effect may be even stronger now than in 2020, given the Indian Supreme Court's 2022 ruling in favor of providing increased protections for sex workers alongside maintaining rule of law in combatting the sex trafficking of both adults and children.[106]

[106] https://www.outlookindia.com/national/explained-the-supreme-court-order-on-sex-workers-laws-on-prostitution-how-sc-order-changes-things-news-198865 (Accessed October 24, 2022)

As a final note, adult sex workers may not be occupationally or personally connected to a majority of CST victims. This could be the case if a majority of CST takes place through different networks, organizations, and/or platforms (for example, via small private networks that do not operate or advertise within brothels). TST reiterates its earlier methodological caveat that the RDS results in particular are based on degree reports from adult sex workers, and may contextualize the relationships between adult sex workers and CST victims. Responses from individuals within the same referral chain are also not fully independent from one another, and considerable network overlap is possible within referral chains. This increases the risk of overfitting to individual networks. Moreover, TST has consistently detected smaller numbers of network ties among both NSUM and RDS survey respondents relative to Time I; one potential outcome of this shift is that CST may now be *more disconnected* from adult sex work, and therefore harder to detect using network-driven prevalence estimation and analytical methods, including both NSUM and RDS.

Historical CST Among Respondents

All RDS respondents were asked additional questions regarding their involvement in the commercial sex industry. One of the questions asked was how long the respondents had been sex workers. On average, the respondents had been in the commercial sex industry for 9 years, with the lower 25th percentile having been in the industry for 6 years or fewer (Table 10). Because participant ages were already captured, TST was able to use these responses to calculate the ages at which these respondents entered the industry. Due to social desirability concerns, it was hypothesized that this data point would provide more reliable data than directly asking respondents how old they were when they entered the commercial sex trade.

Table 10 – Population Demographics of Sex Workers using RDS Sample

Population Demographics of Sex Workers using RDS Sample					
	Mean	Standard Deviation	Median	25th Percentile	75th Percentile
Years in the commercial sex industry	9	6	8	4	12
Age of entry	24	7	25	20	28

Using the calculations described above, the mean age at which the seeds entered the industry was 24, and the lower 25th percentile began at 20 years old or younger. In reviewing the total sample, 8% entered the industry while under the age of 18. This is lower than the findings

obtained in 2020 (approximately 31%), which, given that the question asked about *historical* entry into the commercial sex industry, suggests an increase in turnover among adult sex workers who began as child sex trafficking victims, if not more broadly among all adult sex workers. Indeed, in 2020 the mean number of years in the commercial sex industry among respondents was 15 (75% CI: 8, 20) as opposed to 9 (75% CI: 4, 12) in Time II.

Another possible explanation for the trend with concerning implications for the commercial sex industry and CST is that RDS across adult sex worker communities may simply not reach many individuals in the commercial sex industry. The shrinking network trend, in concert with increased decentralization, has led to a larger number of relatively isolated, digitally-oriented sex workers; if this is the primary means of entry of new sex workers into the industry, and these individuals are not making connections with others in the industry, then the use of RDS as a method risks increasing coverage bias and non-representativeness over time. The NSUM results, which rely on a wholly separate network mapping mechanism from RDS, are inconclusive with respect to adult sex worker and CST victim populations relative to Time I; however, they do indicate that digital coordination and facilitation of sexual services, including those related to CST victims, are rapidly increasing.

Impact of COVID-19 on the Commercial Sex Industry

TST also directly surveyed adult sex workers regarding the impact of the COVID-19 pandemic on the commercial sex industry. Among respondents, 41% (*n* = 138) stated that they knew of new individuals who had entered the industry due to the pandemic, a dramatic increase from the Time I study's findings (5%), which were collected in spring 2020 during the first six months of the pandemic. Six of the 138 stated they knew of an underage individual entering the industry. By comparison, 38% (*n* = 129) of the 339 respondents stated that they knew at least one individual who had exited the industry due to the COVID-19 pandemic. None of the 129 stated that they knew a victim of child sex trafficking who had left the commercial sex trade. Additionally, among those who knew at least one individual who had exited the industry as a result of the COVID-19 pandemic, 78% (*n* = 102) knew at least one person who was working primarily in brothels prior to quitting.

In interpreting the results of the questions regarding entry into and exit from the commercial sex industry, TST notes the approximate proportion of individuals who have exited the industry relative to the total size of all sex worker networks from all RDS respondents. Summing the sizes of all sex worker networks for all sex workers, TST obtained a total of 4,013; summing the count of all sex workers who left the industry as a result of the pandemic from all respondents, a total of 556. As in Time I, TST notes that these counts are based on degree reports from networks that overlap with one another, since RDS samples are constructed via network referrals; therefore, such counts include duplicate individuals and do not reliable enable the estimation of the rate of turnover within the commercial sex industry. The departures represent roughly 14% of the aggregate network count of sex workers known by the respondent, including duplicates; this is an increase from Time I (4%), but still represents a small minority of network ties.

Table 11 – Changes in client contact at the start of COVID-19 compared to prior years

Changes in client contact at the start of COVID-19 compared to prior years			
	% Reporting Increase	% Reporting Decrease	% Reporting Not Applicable[107]
Physical visits to sex worker locations	35%	59%	6%
Contact through pimps	28%	31%	42%
Contact through phone	45%	16%	39%
Contact through WhatsApp	18%	13%	69%
Contact after seeing Web Ad	2%	11%	87%
Contact through other digital means	1%	7%	92%

Table 12 – Changes in client service requests at the start of COVID-19 compared to prior years

Changes in client service requests at the start of COVID-19 compared to prior years			
	% Reporting Increase	% Reporting Decrease	% Reporting Not Applicable
In-person sex acts	58%	16%	25%
Digital photos and videos	20%	17%	62%
Live-streaming videos	11%	12%	78%

[107] Respondents reported "Not Applicable" in cases where the condition or question did not apply to them. For example, if respondents have never used web ads, then they would not be able to report either an increase or a decrease.

Sex workers were asked various questions about how clients contacted them for services at the start of the COVID-19 pandemic compared to years prior. Responses indicate that in-person visits to venues, and coordination via pimps or other third parties, are both decreasing in frequency overall. For physical visits to sex worker locations, 35% of respondents reported an increase, 59% reported a decrease, and 6% reported not applicable. For contact through pimps, 28% reported an increase, 31% reported a decrease, and 42% reported not applicable. On the other hand, with respect to buyers initiating contact via telephone, 45% reported an increase, 16% reported a decrease, and 39% reported not applicable; for contact via WhatsApp, 18% reported an increase, 13% reported a decrease, and 69% reported not applicable. Lastly, web ads as an advertising mechanism leading to telephone calls saw an overall decrease in frequency of use: for contact via telephone after seeing an ad on the internet, 2% reported an increase, 11% reported a decrease, and 87% reported not applicable. For contact through other digital means (e.g., email, other phone apps), 1% reported an increase, 7% reported a decrease, and 92% reported not applicable.

Sex workers were also asked how client service requests had changed since the start of the pandemic, and reported net increases in both in-person sex acts as well as digital photos and videos. For in-person sex acts, 58% of respondents reported an increase, 16% reported a decrease, and 25% reported not applicable. For digital photos and videos, 20% reported an increase, 17% reported a decrease, and 62% reported not applicable. On the other hand, for live-streaming videos, 11% reported an increase, 12% reported a decrease, and 78% reported not applicable. Respondents who reported an increase or reduction in digital photos and videos or live-streaming videos (21%; $n = 72$) were asked, in their opinion, the source of these digital clients. Sixty-six percent (66%) reported Maharashtra, 33% reported India, and 1% reported international, revealing that for a majority of respondents, the digital commercial sex economy is largely local to Maharashtra.

Conclusions

Two Six Technologies' chief objective in conducting this study was to create a Time II estimate of the size of the CST victim population in Maharashtra, India, using a multi-method, hybridized approach leveraging two different rigorously designed and executed survey engagements. Owing to lack of access to the key population of CST victims as well as legal and ethical sensitivities, TST designed this approach in consideration of (a) the limited number of methods available for estimating the size of the CST victim population in the target geography and (b) the need, wherever possible, to triangulate the estimates obtained in order to minimize the effects of known and unknown biases. Although each of the methods TST used can provide a prevalence estimate, there is *no* method capable of approaching an exact count. In addition, as prevalence estimation continues to be a highly active subdiscipline of survey methodology research, there is currently no gold standard for hidden population prevalence or size estimation.

In this study, TST used NSUM and RDS to estimate the size of the overall sex worker population as well as the CST victim population, and used NSUM to also produce an estimate of the size of the population of buyers who pay for commercial sexual services in Maharashtra, including estimating the subset of buyers who pay for sex with CST victims. To perform NSUM, TST asked the general population about individuals they knew who were currently engaged in the commercial sex industry and, among those individuals, how many were under the age of 18. TST also asked about the number of buyers participating in the commercial sex industry to shed further light on the sex worker and CST victim NSUM estimates. RDS was used to examine the proportion of sex workers who are past and current CST victims based on two different response data points: the peer networks of the respondents and the ages at which the respondents themselves entered the commercial sex industry, and to additionally inform the relationship between the broader commercial sex industry and the subsections of the industry that deal with illicit commerce including CST.

The estimates are also useful because they reinforce and add new information to many findings from the Time I study; namely, that the COVID-19 pandemic has increased vulnerability and led to both entry into and turnover within the commercial sex industry, that commercial sex is increasingly moving to digital advertising, coordination, and even provision, and that a gap exists between CST victims and most adult sex workers that appears to be growing. This growth may be a result of many factors, including the establishment of and articulation of legal protections for commercial sex workers across India, the digitization of many parts of the industry, and the broadly observed, dramatic shrinking of personal networks across the Indian population leading to increased social isolation.

The results from this study offer valuable context for these findings based on the hybrid methodological approach, which served as an effective tool for both prevalence estimation and data triangulation. As described in both the NSUM and RDS findings, the Time II study also finds

new empirical support for the notion that personal networks are smaller than they were prior to the COVID-19 pandemic and ensuing lockdowns. This supports a growing body of research concerning long-term effects of the pandemic and strict lockdowns on personal network structures. Specifically, the findings identify social isolation as a potential factor influencing the detection and measurement of hidden population phenomena, including participation in informal economies and human trafficking, which rely on network connections and latent social network structures to establish point and prevalence estimates. Furthermore, this trend may exist in a feedback loop with increasing reliance on digital communications technologies, as the Time II study's findings consistently indicate a greater reliance on ICTs in facilitating both commercial sex and child sex trafficking. Future hidden population research must consider the methodological risks posed by these emergent phenomena as well as the possibility of newly observed effects that may be explained by them.

Appendix A: NSUM Questionnaire

NSUM Prevalence Estimate of Child Sex Trafficking in Maharashtra State, India

CONSENT FORM
सहमति पत्र

This survey is being conducted by {Convergent}, with partners from the United States, and will ask you questions about your social networks and the economic conditions in Maharashtra. This survey will take approximately 10-minutes to complete the survey.
यह सर्वे {कनवर्जेंट} द्वारा संयुक्त राज्य अमेरिका से पार्टनर्स के साथ आयोजित किया जा रहा है, और इसमें आपसे आपके सोशल नेटवर्क और महाराष्ट्र की आर्थिक स्थितियों के बारे में प्रश्न पूछे जायेंगे। इस सर्वे को पूरा होने में लगभग 10 मिनट का समय लगेगा.

Your participation in this survey is completely voluntary, and you have the right to withdraw at any point during the survey for any reason and without any prejudice. There are no known risks if you decide to participate in this survey, nor are there any costs for you participating in this survey. The information collected in the survey may not benefit you directly, but it will help guide the development of solutions to improve social and economic issues in the state of Maharashtra.
इस सर्वे में आपकी भागीदारी पूरी तरह से स्वैच्छिक है, और आपको सर्वे के दौरान किसी भी समय किसी भी कारण से और बिना किसी पूर्वाग्रह के इसे छोड़ने का अधिकार है। यदि आप इस सर्वे में भाग लेने का निर्णय लेते हैं, तो कोई जोखिम नहीं है, और न ही इस सर्वे में भाग लेने के लिए आपका कोई खर्चा होगा। सर्वे में एकत्र की गई जानकारी से आपको सीधे लाभ नहीं हो सकता है, लेकिन यह महाराष्ट्र राज्य में सामाजिक और आर्थिक मुद्दों को सुधारने के लिए समाधान के विकास में मार्गदर्शन करने में मदद करेगा।

In this survey, you will be asked questions about how many people you know in specific groups of interest. These questions are asked to assist with the prevalence estimation of hard-to-reach groups and will not be used to study or make opinions about respondents and who they know. Please be assured that all of your survey answers will be anonymized and kept completely confidential.
इस सर्वे में, आपसे इस बारे में प्रश्न पूछे जाएंगे कि आप विशेष रुचि वाले समूहों में कितने लोगों को जानते हैं। इन प्रश्नों को दुर्गम समूहों की व्यापकता के आकलन में सहायता करने के लिए कहा जाता है और इसका उपयोग उत्तरदाताओं के बारे में स्टडी करने या राय बनाने के लिए नहीं किया जाएगा और वे किसे जानते हैं। कृपया आश्वस्त रहें कि आपके सभी सर्वे के उत्तरों को गुप्त रखा जाएगा और पूरी तरह से गोपनीय रखा जाएगा।

By continuing with this survey, you acknowledge that your participation in this survey is voluntary, you are 18 years of age or older, and that you are aware that you may choose to terminate your participation in the survey at any time and for any reason.
इस सर्वे को जारी रखते हुए, आप स्वीकार करते हैं कि इस सर्वे में आपकी भागीदारी स्वैच्छिक है, आपकी आयु 18 वर्ष या उससे अधिक है, और आप जानते हैं कि आप किसी भी समय और किसी भी कारण से सर्वे में अपनी भागीदारी को समाप्त करने का विकल्प चुन सकते हैं। "

1

SECTION:1. PHONE SURVEY QUESTIONNAIRE सेक्शन एक: फोन सर्वे प्रश्नावली				
MAHARASHTRA POPULATION SURVEY महाराष्ट्र जनसंख्या सर्वे				
GENERAL INFORMATION सामान्य जानकारी				
S. NO क्रम संख्या	**QUESTIONS** प्रश्न	**CODING CATEGORIES** कोडिंग श्रेणियां	**CODE** कोड	**SKIP TO** यहां पर जाएं
1.	What is your age in completed years? आपकी पूरी आयु (वर्षो में) क्या है? ***TERMINATE IF LESS THAN 18 YEARS*** 18 वर्ष से कम होने पर समाप्त करें	✖✖		
2.	What is your gender? आप पुरुष है या महिला? ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Male] पुरुष	1	
		Female महिला	2	
		Other अन्य	3	
3.	Which state do you currently live in? आप आजकल किस राज्य में रहते हैं? CONTINUE ONLY IF 1 CODED केवल 1 कोड किए जाने पर ही पूछना जारी रखें ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Maharashtra महाराष्ट्र	1	
		Other state अन्य राज्य	2	**Terminate**
		Don't know पता नहीं	3	

S. NO क्रम संख्या	**QUESTIONS** प्रश्न	**CODING CATEGORIES** कोडिंग श्रेणियां	**CODE** कोड	**SKIP TO** यहां पर जाएं
4.	In which district do you live in? आप किस जिले में रहते हैं?	Ahmednagar अहमदनगर	1	
		Akola अकोला	2	
		Amravati अमरावती	3	
		Aurangabad औरंगाबाद	4	
		Beed बीड	5	
		Bhandara भंडार	6	
		Buldana बुलडाना	7	
		Chandrapur चंद्रपुर	8	
		Dhule धुले	9	
		Gadchiroli गडचिरोली	10	
		Gondia गोंदिया	11	
		Hingoli हिंगोली	12	
		Jalgaon जलगांव	13	
		Jalna जलना	14	
		Kolhapur कोल्हापुर	15	
		Latur लातूर	16	
		Mumbai City मुंबई शहर	17	
		Mumbai Suburban बई उपनगर	18	

S. NO क्रम संख्या	QUESTIONS प्रश्न	CODING CATEGORIES कोडिंग श्रेणियां	CODE कोड	SKIP TO यहां पर जाएं
		Nagpur नागपुर	19	
		Nanded नांदेड़	20	
		Nandurbar नंदुरबार	21	
		Nashik नासिक	22	
		Osmanabad उस्मानाबाद	23	
		Palghar पालगढ़	24	
		Parbhani परभनी	25	
		Pune पुणे	26	
		Raigad रायगढ़	27	
		Ratnagiri रत्नागिरि	28	
		Sangli सांगली	29	
		Satara सतारा	30	
		Sindhudurg सिंधुदुर्ग	31	
		Solapur सोलापुर	32	
		Thane थाने	33	
		Wardha वर्धा	34	
		Washim वाशिम	35	
		Yavatmal यवतमाल	36	
5.	What industry do you work in? आपका कार्य किस उद्योग से जुड़ा है? ***Single Coding Only*** सिर्फ एक कोड आ सकता है IF OTHER CODED OPEN FOR SPECIFY यदि अन्य कोड आये तो पूछे	Agricultural & allied activities कृषि और संबद्ध गतिविधियाँ	1	
		Mining & quarrying खनन एवं उत्खनन	2	
		Manufacturing निर्माण	3	
		Electricity, gas and water supply बिजली, गैस और पानी की आपूर्ति	4	
		Construction निर्माण	5	
		Wholesale, retail trade & repair work होलसेल, रिटेलर और मरम्मत कार्य	6	
		Hotel and restaurants होटल और रेस्टोरेंट	7	
		Transport, storage & communications परिवहन, भंडारण और संचार	8	
		Financial intermediation, real estate, and business activities फाइनेंशियल इंटरमीडिएशन, रियल एस्टेट, और व्यावसायिक गतिविधियाँ	9	
		Home maker गृहणी	10	
		Unemployed बेरोज़गार	11	
		Other services (SPECIFY) अन्य सेवाएं (बताये)	99	

6.	What is the highest level of education that you have completed? आपने कहाँ तक पढ़ाई पूरी की है? ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Below primary प्राइमरी से कम	1	
		Primary प्राइमरी	2	
		Middle मध्यम	3	
		Matric/Secondary मैट्रिक/माध्यमिक	4	
		Higher Secondary/Undergraduate उच्चतर माध्यमिक / अंडरग्रेजुएट	5	
		Graduate and above ग्रेजुएट और ज्यादा	6	
7.	Which of the following best describes your current marital status? निम्नलिखित में से कौन आपकी वर्तमान वैवाहिक स्थिति का सबसे अच्छा वर्णन करता है? ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Never Married शादी नहीं की	1	
		Married विवाहित	2	
		Divorced तलाकशुदा	3	
		Separated अलग हो गए है	4	
		Widowed विधवा	5	
Only ask Q 8 if answer to Q 5 is not "Home maker" or "Unemployed" प्रश्न *8* से केवल तभी पूछें जब प्रश्न *5* का उत्तर "गृहणी" या "बेरोजगार" नहीं है।				
8.	In the last 30 days, how much money did you earn from wages from an employer, self-employment, or any other source of income you have? पिछले 30 दिनों में, आपने किसी मालिक/नौकरी, स्व-रोजगार, या आपकी आय के किसी अन्य स्रोत से मजदूरी से कितना पैसा कमाया?	✖✖✖✖✖✖ In numbers (INR) संख्या में (रूपये में)		
How much do you agree or disagree with the following statements? आप निम्नलिखित वाक्यों से कितना सहमत या असहमत हैं?				
9.	Children aged 13 and younger should work to support their family. 13 वर्ष और उससे कम उम्र के बच्चों को अपने परिवार का समर्थन करने के लिए काम करना चाहिए। ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Strongly agree पूरी तरह सहमत	5	
		Somewhat agree कुछ हद तक सहमत	4	
		Neither agree nor disagree ना तो सहमत ना ही असहमत	3	
		Somewhat disagree कुछ हद तक असहमत	2	
		Strongly disagree पूरी तरह असहमत	1	
10.	The exploitation of children aged 13 and younger for labour is a large or widespread problem in India's economy. मजदूरी के लिए 13 वर्ष और उससे कम उम्र के बच्चों का शोषण भारत की अर्थव्यवस्था में एक बड़ी या व्यापक समस्या है।	Strongly agree पूरी तरह सहमत	5	
		Somewhat agree कुछ हद तक सहमत	4	
		Neither agree nor disagree ना तो सहमत ना ही असहमत	3	
		Somewhat disagree	2	

	Single Coding Only सिर्फ एक कोड आ सकता है	कुछ हद तक असहमत		
		Strongly disagree पूरी तरह असहमत	1	
11.	Child (under 18 years old) sex trafficking (the buying and selling of children for sex) is a large or widespread problem in Indian society. बाल (18 वर्ष से कम उम्र के) यौन तस्करी भारतीय समाज में एक बड़ी या व्यापक समस्या है। ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Strongly agree पूरी तरह सहमत	5	
		Somewhat agree कुछ हद तक सहमत	4	
		Neither agree nor disagree ना तो सहमत ना ही असहमत	3	
		Somewhat disagree कुछ हद तक असहमत	2	
		Strongly disagree पूरी तरह असहमत	1	

S. NO क्रम संख्या	**QUESTIONS** प्रश्न	**CODING CATEGORIES** कोडिंग श्रेणियां	**CODE** कोड	**SKIP TO** यहां पर जाएं
12.	In your opinion, how acceptable is it for a man or woman to engage in commercial sex (for example, prostitution)? आपकी राय में, किसी पुरुष या महिला के लिए व्यावसायिक सेक्स (उदाहरण के लिए, वेश्यावृत्ति) में शामिल होना कितना स्वीकार्य है? ***Single Coding Only*** सिर्फ एक कोड आ सकता है	Extremely acceptable अत्यंत स्वीकार्य	5	
		Very acceptable बहुत स्वीकार्य	4	
		Moderately acceptable मध्यम रूप से स्वीकार्य	3	
		Slightly acceptable थोड़ा स्वीकार्य	2	
		Not acceptable at all बिल्कुल भी स्वीकार्य नहीं	1	
		Refused मना कर दिया	6	

People You Know
लोग जिन्हें आप जानते हैं

In the questions below, you will be asked about how many people you **currently know** in specific groups of interest. When we say "currently know", we mean the following:
नीचे दिए गए प्रश्नों में, आपसे पूछा जाएगा कि आप आजकल विशिष्ट रूचि के समूहों में कितने लोगों को जानते हैं। जब हम कहते हैं "आजकल जानते हैं", हमारा मतलब निम्नलिखित है:

1. You know them by face and name
   आप उन्हें चेहरे और नाम से जानते हैं
2. They know you by face and name
   वे आपको चेहरे और नाम से जानते हैं
3. You have communicated with them in the last 12 months (for example, in-person, by phone call, text, or social media).
   आपने पिछले 12 महीनों में उनसे बातचीत की है (उदाहरण के लिए, व्यक्तिगत रूप से, फोन कॉल, टेक्स्ट या सोशल मीडिया द्वारा)।

When counting your number of friends in each group, please try to be very accurate. Take your time to think if needed. Also, only count those people you know who currently match the status of the question.
प्रत्येक समूह में अपने मित्रों की संख्या गिनते समय, कृपया उचित जवाब देने का प्रयास करें। जरूरत पड़ने पर सोचने के लिए अपना समय लें। साथ ही, केवल उन लोगों को गिनें जिन्हें आप जानते हैं जो आजकल प्रश्न की स्थिति से मेल खाते हैं।

S. NO क्रम संख्या	QUESTIONS प्रश्न	CODING CATEGORIES कोडिंग श्रेणियां	CODE कोड	SKIP TO यहां पर जाएं
	Here is an example of how to answer a question: Suppose we ask you how many doctors you know. किसी प्रश्न का उत्तर कैसे दिया जाए, इसका एक उदाहरण यहां दिया गया है: मान लीजिए कि हम आपसे पूछते हैं कि आप कितने डॉक्टरों को जानते हैं • Dr Kulkarni is your cousin's husband, and you met each other for beer last month. Yes, you know Dr Kulkarni. डॉ. कुलकर्णी आपके चचेरे भाई के पति हैं, और आप पिछले महीने बीयर के लिए एक-दूसरे से मिले थे। जी हां, आप डॉ कुलकर्णी को जानते हैं। • Dr Joshi is your neighbor and you spoke to each other last week. Yes, you know Dr Joshi. डॉ जोशी आपके पड़ोसी हैं और आपने पिछले सप्ताह एक दूसरे से बात की थी। जी हां, आप डॉ जोशी को जानते हैं। • Dr Chaudhary is your old school friend but you haven't met or communicated for years. For the purposes of this survey, you do not know Dr Chaudhary. डॉ चौधरी आपके पुराने स्कूल के मित्र हैं लेकिन आप वर्षों से मिले या बातचीत नहीं कर पाए हैं। इस सर्वे के उद्देश्य से आप डॉ चौधरी को नहीं जानते हैं। • Dr Ghosh is your family doctor, and you saw her a few months ago, but she probably doesn't remember your name. For the purposes of this study, you do not know Dr Ghosh. डॉ घोष आपके पारिवारिक चिकित्सक हैं, और आपने उन्हें कुछ महीने पहले देखा था, लेकिन उन्हें शायद आपका नाम याद नहीं है। इस स्टडी के उद्देश्यों के लिए, आप डॉ . को नहीं जानते हैं • Dr Shetty is a friend that you haven't talked to recently, but a colleague told you he recently went on "Kaun Banega Crorepati." Yes, you should report that you know Dr Shetty. डॉ. शेट्टी एक ऐसे दोस्त हैं जिनसे आपने हाल ही में बात नहीं की है, लेकिन एक सहकर्मी ने आपको बताया कि वह हाल ही में "कौन बनेगा करोड़पति" पर गए थे। हां, आपको रिपोर्ट करना चाहिए कि आप डॉ शेट्टी को जानते हैं। You should report knowing three doctors (Dr Kulkarni, Dr Joshi, and Dr Shetty). Now let's begin. आपको तीन डॉक्टरों (डॉ कुलकर्णी, डॉ जोशी और डॉ शेट्टी) को जानकर रिपोर्ट करनी चाहिए। अब चलिए शुरू करते हैं।			

S. NO क्रम संख्या	QUESTIONS प्रश्न	CODING CATEGORIES कोडिंग श्रेणियां	CODE कोड	SKIP TO यहां पर जाएं
	How many people do you currently know in Maharashtra who are… आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो… ***Your answer must be between 0 and 99*** आपका उत्तर ***0*** और ***99*.** के बीच होना चाहिए ***Only an integer value may be entered in this field.*** इस फ़ील्ड में केवल एक पूर्णांक मान दर्ज किया जा सकता है।			
13.	How many people do you currently know in Maharashtra who are teachers in public secondary and higher (Std IX to XII) educational institutions? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो सार्वजनिक माध्यमिक और उच्चतर (कक्षा IX से XII) शैक्षणिक संस्थानों में शिक्षक हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✗✗ In numbers संख्या में		
14.	How many people do you currently know in Maharashtra who are Ayurveda doctors who are officially registered with the Maharashtra Council of Indian Medicine? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो आयुर्वेद डॉक्टर हैं जो आधिकारिक तौर पर महाराष्ट्र काउंसिल ऑफ इंडियन मेडिसिन के साथ रजिस्टर्ड हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✗✗ In numbers संख्या में		
15.	How many people do you currently know in Maharashtra who are blind women between ages 50-59? आप आजकल महाराष्ट्र में ऐसे कितने लोगों को जानते हैं जो 50-59 वर्ष की आयु की दृष्टिहीन महिलाएं हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✗✗ In numbers संख्या में		
16.	How many people do you currently know in Maharashtra that are men who are members of Scheduled Castes and also 90 years old or older? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो अनुसूचित जाति के सदस्य हैं और 90 वर्ष या उससे अधिक उम्र के हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✗✗ In numbers संख्या में		
17.	How many people do you currently know in Maharashtra who are people who passed away due to a car accident in the past year? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो पिछले एक साल में एक कार दुर्घटना में मारे गए हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✗✗ In numbers संख्या में		

	How many people do you currently know in Maharashtra who are… आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो… ***Your answer must be between 0 and 99*** आपका उत्तर *0* और *99* . के बीच होना चाहिए ***Only an integer value may be entered in this field.*** इस फ़ील्ड में केवल एक पूर्णांक मान दर्ज किया जा सकता है।		
18.	How many people do you currently know in Maharashtra who are Members of a spinning mill co-operative society? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो एक कताई मिल सहकारी समिति के सदस्य हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✘✘ In numbers संख्या में	
1	How many people do you know who are formal members of a fisheries co-operative society in Maharashtra? आप कितने लोगों को जानते हैं जो महाराष्ट्र में मत्स्य पालन सहकारी समिति के औपचारिक सदस्य हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✘✘ In numbers संख्या में	
20.	How many people do you currently know in Maharashtra who are Students at Sainiki schools? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो सैनिक स्कूलों के छात्र हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✘✘ In numbers संख्या में	
21.	How many people do you currently know in Maharashtra who are People who reported suffering from leprosy (i.e., to GoI) in the past year? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं, जिन्होंने पिछले एक साल में कुष्ठ रोग (यानी, भारत सरकार को) से पीड़ित होने की सूचना दी थी? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✘✘ In numbers संख्या में	
22.	How many people do you currently know in Maharashtra who are Women between ages 40-49 who are deaf? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो 40-49 आयु वर्ग की महिलाएं हैं जो बहरे हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✘✘ In numbers संख्या में	
23.	How many people do you currently know in Maharashtra who are People who were diagnosed with Dengue fever by a doctor in 2021? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं, जिन्हें 2021 में एक डॉक्टर द्वारा डेंगू बुखार बताया गया था? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✘✘ In numbers संख्या में	
24.	How many people do you currently know in Maharashtra who are Members of families that received rehabilitation under the Slum Rehabilitation Scheme last year?	✘✘ In numbers संख्या में	

	आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो पिछले साल स्लम पुनर्वास योजना के तहत पुनर्वास प्राप्त करने वाले परिवारों के सदस्य हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**		
25.	How many people do you currently know in Maharashtra who are Children who are in foster care under the Bal Sangopan Yojana scheme? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो बाल संगोपन योजना योजना के तहत पालक देखभाल में हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
26.	How many people do you currently know in Maharashtra who are People who suffered from burns that required them to ride in an ambulance in 2021? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं, जो लोग जले हुए थे, जिसके कारण उन्हें 2021 में एम्बुलेंस में जाने की आवश्यकता थी? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
27.	How many people do you currently know in Maharashtra who are People who reported suffering from a case of malaria to the State (i.e., GoI) in 2021? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं, जिन्होंने 2021 में राज्य (यानी, भारत सरकार) को मलेरिया के एक मामले से पीड़ित होने की सूचना दी थी? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
28.	How many people do you currently know in Maharashtra who are People who purchased sex in 2021? महाराष्ट्र में आजकल आप कितने लोगों को जानते हैं जो 2021 में खरीदकर सेक्स करने वाले लोग हैं? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
	Ask Qs 29 to Q 32 only if more than 0 recorded in 28 प्रश्न 28 केवल तभी पूछें जब 32 से क्यू 29. में से अधिक दर्ज किया गया हो 0		
29.	Think about the people you know in Maharashtra who purchased sex in 2021. Among them, what is the highest number of individuals that someone has paid to have sex with in 2021? उन लोगों के बारे में सोचें जिन्हें आप महाराष्ट्र में जानते हैं जिन्होंने 2021 में सेक्स खरीदा था। उनमें से, 2021 में कितने अधिक लोगो ने सेक्स करने के लिए व्यक्तियों को भुगतान किया है? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
30.	Think about the people you know in Maharashtra who purchased sex in 2021, how many do you know who only paid to have sex with someone who is age 18 or older in 2021?	✕✕ In numbers संख्या में	

	उन लोगों के बारे में सोचें जिन्हें आप महाराष्ट्र में जानते हैं जिन्होंने 2021 में सेक्स खरीदा था, आप में से कितने लोग जानते हैं जिन्होंने 2021 में केवल 18 वर्ष या उससे अधिक उम्र के व्यक्ति के साथ यौन संबंध बनाने के लिए भुगतान किया था? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**		
31.	Think about the people you know in Maharashtra who purchased sex in 2021, how many do you know who paid to have sex with someone from age 15 to age 17 in 2021? उन लोगों के बारे में सोचें जिन्हें आप महाराष्ट्र में जानते हैं जिन्होंने 2021 में सेक्स खरीदा था, आप कितने जानते हैं जिन्होंने 2021 में 15 साल से 17 साल की उम्र में किसी के साथ सेक्स करने का भुगतान किया था? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
32.	Think about the people you know in Maharashtra who purchased sex in 2021, how many do you know who paid to have sex with someone age 14 or younger in 2021? उन लोगों के बारे में सोचें जिन्हें आप महाराष्ट्र में जानते हैं जिन्होंने 2021 में सेक्स खरीदा था, आप कितने जानते हैं जिन्होंने 2021 में 14 या उससे कम उम्र के किसी व्यक्ति के साथ यौन संबंध बनाने के लिए भुगतान किया था? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें**	✕✕ In numbers संख्या में	
	Ask Q 33 only if more than 0 recorded in Q 32 **Q 33** *को केवल तभी पूछें जब* **Q 32 .** *में* **0** *से अधिक दर्ज किया गया हो*		

33.	Of the people you know in Maharashtra who paid to have sex with someone age 14 or younger in 2021, what districts did they do it in? महाराष्ट्र में आप जिन लोगों को जानते हैं, जिन्होंने 2021 में 14 या उससे कम उम्र के किसी व्यक्ति के साथ यौन संबंध बनाने के लिए भुगतान किया, उन्होंने किन जिलों में ऐसा किया? ***Purchased sex > 0 & under15 >*** सेक्स खरीदा गया > 0 और 15 से कम > ***(Programmer: For each district selected, follow up with the following question - How many individuals do you know that paid to have sex with someone age 14 or younger in the {enter district selected} district in 2021? Multiple districts can be selected.)*** (प्रोग्रामर: चुने गए प्रत्येक जिले के लिए, निम्नलिखित प्रश्न के साथ फॉलोअप कार्रवाई करें - आप कितने व्यक्तियों को जानते हैं कि *2021* में जिले में *{चुने गए जिले एंटर करे}* जिले में *14* वर्ष या उससे कम उम्र के किसी व्यक्ति के साथ यौन संबंध बनाने के लिए भुगतान किया गया था*?* एक से अधिक जिलों का चयन किया जा सकता है।)		
	District **जिला**	**How many individuals do you know that paid to have sex with someone age 14 or younger in the {enter district selected} district in 2021** आप कितने लोगों को जानते हैं कि वर्ष 2021 में जिले में {चुना गया लिखे} जिले में 14 वर्ष या उससे कम उम्र के किसी व्यक्ति के साथ यौन संबंध बनाने के लिए भुगतान किया गया	
	Ahmednagar अहमदनगर	✖✖ In numbers.संख्या में	
	Akola अकोला	✖✖ In numbers संख्या में	
	Amravati अमरावती	✖✖ In numbers संख्या में	
	Aurangabad औरंगाबाद	✖✖ In numbers.संख्या में	
	Beed बीड	✖✖ In numbers.संख्या में	
	Bhandara भंडार	✖✖ In numbers.संख्या में	
	Buldana बुलडाना	✖✖ In numbers.संख्या में	
	Chandrapur चंद्रपुर	✖✖ In numbers.संख्या में	
	Dhule धुले	✖✖ In numbers.संख्या में	
	Gadchiroli गडचिरोली	✖✖ In numbers.संख्या में	
	Gondia गोंदिया	✖✖ In numbers.संख्या में	
	Hingoli हिंगोली	✖✖ In numbers.संख्या में	
	Jalgaon जलगांव	✖✖ In numbers.संख्या में	
	Jalna जलना	✖✖ In numbers.संख्या में	

	Kolhapur कोल्हापुर	✖✖ In numbers.संख्या में	
	Latur लातूर	✖✖ In numbers.संख्या में	
	Mumbai City मुंबई शहर	✖✖ In numbers.संख्या में	
	Mumbai Suburban बई उपनगर	✖✖ In numbers.संख्या में	
	Nagpur नागपुर	✖✖ In numbers.संख्या में	
	Nanded नांदेड़	✖✖ In numbers.संख्या में	
	Nandurbar नंदुरबार	✖✖ In numbers.संख्या में	
	Nashik नासिक	✖✖ In numbers.संख्या में	
	Osmanabad उस्मानाबाद	✖✖ In numbers.संख्या में	
	Palghar पालगढ़	✖✖ In numbers.संख्या में	
	Parbhani परभनी	✖✖ In numbers.संख्या में	
	Pune पुणे	✖✖ In numbers.संख्या में	
	Raigad रायगढ़	✖✖ In numbers.संख्या में	
	Ratnagiri रत्नागिरि	✖✖ In numbers.संख्या में	
	Sangli सांगली	✖✖ In numbers.संख्या में	
	Satara सतारा	✖✖ In numbers.संख्या में	
	Sindhudurg सिंधुदुर्ग	✖✖ In numbers.संख्या में	
	Solapur सोलापुर	✖✖ In numbers.संख्या में	
	Thane थाने	✖✖ In numbers.संख्या में	
	Wardha वर्धा	✖✖ In numbers.संख्या में	
	Washim वाशिम	✖✖ In numbers.संख्या में	
	Yavatmal यवतमाल	✖✖ In numbers.संख्या में	
	Ask Qs 34 only if more than 0 recorded in Q 31 OR 32 प्रश्न 34 केवल तभी पूछें जब Q 31 या 32 . में 0 से अधिक दर्ज किया गया हो		

34.	Of the people you know in Maharashtra who paid to have sex with individuals age 17 or younger in 2021, how many do you know who organized the transaction digitally (for example, using web sites, Facebook, or WhatsApp)? महाराष्ट्र में आप जिन लोगों को जानते हैं, जिन्होंने 2021 में 17 या उससे कम उम्र के व्यक्तियों के साथ यौन संबंध बनाने के लिए भुगतान किया, उनमे से आप कितने जानते हैं जिन्होंने लेनदेन को डिजिटल रूप से किया था(उदाहरण के लिए, वेब साइटों, फेसबुक या व्हाट्सएप का उपयोग करके)? ACCEPT '0 to 99' *'0* **से** *99'* **स्वीकार करें** ***Purchased sex > 0 & (under15 > 0 OR ages15to17 > 0)*** ख़रीदा गया सेक्स > 0 और (15 से कम> 0 या उम्र 15 से 17 > 0)	✖✖ In numbers संख्या में	
	How many people do you currently know in Maharashtra who are… आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो… ***Your answer must be between 0 and 99*** आपका उत्तर *0* और *99* . के बीच होना चाहिए ***Only an integer value may be entered in this field.*** इस फ़ील्ड में केवल एक पूर्णांक मान दर्ज किया जा सकता है।		
35.	How many people do you currently know in Maharashtra who are mothers who lost their baby within their first year of life in 2021? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो ऐसी माताएँ हैं जिन्होंने अपने बच्चे को उनके जीवन के पहले वर्ष 2021 में खो दिया? ACCEPT '0 to 99' *0* **से** *99'* **स्वीकार करें**	✖✖ In numbers संख्या में	
36.	How many people do you currently know in Maharashtra who are Teachers in public primary (Std I to VIII) educational institutions? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो सार्वजनिक प्राथमिक (कक्षा I से VIII) शिक्षण संस्थानों में शिक्षक हैं? ACCEPT '0 to 99' *0* **से** *99'* **स्वीकार करें**	✖✖ In numbers संख्या में	
37.	How many people do you currently know in Maharashtra who are People who are engaged in the commercial sex industry (i.e., people who are given money to perform sex acts)? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो कमर्शियल सेक्स इंडस्ट्री में लगे हुए हैं (अर्थात, वे लोग जिन्हें यौन क्रिया करने के लिए पैसे दिए जाते हैं)? ACCEPT '0 to 99'	✖✖ In numbers संख्या में	

	0 **से** *99'* **स्वीकार करें**		
	Ask Qs 38 only if more than 0 recorded in Q 37 ***Qs 38*** तभी पूछें जब ***Q 37*** में ***0*** से अधिक दर्ज किया गया हो		
38.	Of the people you currently know in Maharashtra who are of the people who are engaged in the commercial sex industry (i.e., people who are given money to perform sex acts), how many are age 17 or younger? महाराष्ट्र में आप आजकल जिन लोगों को जानते हैं, उनमें से कौन वाणिज्यिक सेक्स उद्योग में लगे हुए हैं (अर्थात, वे लोग जिन्हें यौन क्रिया करने के लिए पैसे दिए जाते हैं), उनमें से कितने लोग 17 वर्ष या उससे कम उम्र के हैं? ACCEPT '0 to 99' *0* **से** *99'* **स्वीकार करें**	✖ ✖ In numbers संख्या में	
	Admin **एडमिन**		
39.	Thank you for completing this survey! इस सर्वे को पूरा करने के लिए धन्यवाद!		

Thank you for your time. Have a great day!
आपके समय के लिए धन्यवाद। आपका दिन अच्छा रहे!

Appendix B: RDS Questionnaire

Instrument Consent for RDS Seeds (CATI)

This survey is being conducted by {Convergent},with partners from the United States. With your help, we hope to reach adults who are engaged in the commercial sex industry – meaning people who are given money to perform sex acts – and learn more about the commercial sex industry in Maharashtra. This survey will take approximately 3-5 minutes to complete and you will receive Rs.300 of mobile airtime for taking the survey. At the end of the survey, we will ask for your help in recruiting other adults who are engaged in the commercial sex industry in Maharashtra to complete the survey. If you choose to help us with recruitment, you willreceive an additional Rs.300 in mobile airtimefor eachadult engaged in the commercial sex industry that you recruit to take the survey. You can recruit a max of two participants to the survey.
यह सर्वे संयुक्त राज्य अमेरिका के भागीदारों के साथ {कनवर्जेंट} द्वारा किया जा रहा है। आपकी मदद से, हम उन व्यक्तियों तक पहुंचने की उम्मीद करते हैं जो कमर्शियल सेक्स इंडस्ट्री में लगे हुए हैं - यानी वे लोग जिन्हें यौन क्रिया करने के लिए पैसे दिए जाते हैं - और महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री के बारे में अधिक जानें। इस सर्वे को पूरा होने में लगभग 3-5 मिनट का समय लगेगा और सर्वे में भाग लेने के लिए आपको मोबाइल एयरटाइम का Rs.300 प्राप्त होगा। सर्वे के अंत में, हम सर्वे पूरा करने के लिए महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री में लगे अन्य वयस्कों की भर्ती में आपकी मदद मांगेंगे। यदि आप भर्ती में हमारी सहायता करना चुनते हैं, तो आपको सर्वे में भाग लेने के लिए भर्ती किए जाने वाले कमर्शियल सेक्स इंडस्ट्री में लगे प्रत्येक व्यक्ति के लिए मोबाइल एयरटाइम में एक अतिरिक्त Rs.300 प्राप्त होगी। आप सर्वे में अधिकतम दो प्रतिभागियों की भर्ती कर सकते हैं।

Your participation in this survey is completely voluntary, and you have the right to withdraw at any point during the survey, for any reason, and without any prejudice. There are no costs for you to participate in this survey. The information collected in this survey may not benefit you directly, but it will increase knowledge about the overall commercial sex industry in the state of Maharashtra. All of your survey responses and your personal information will be kept completely confidential by the research team.
इस सर्वे में आपकी भागीदारी पूरी तरह से स्वैच्छिक है, और आपको सर्वे के दौरान किसी भी समय, किसी भी कारण से, और बिना किसी पूर्वाग्रह के बीच में छोड़ने का अधिकार है। इस सर्वे में भाग लेने के लिए आपके लिए कोई लागत नहीं है। इस सर्वे में एकत्र की गई जानकारी से आपको सीधे लाभ नहीं हो सकता है, लेकिन इससे महाराष्ट्र राज्य में पूरी कमर्शियल सेक्स इंडस्ट्री के बारे में जानकारी बढ़ेगी। आपके सभी सर्वे प्रतिक्रियाओं और आपकी व्यक्तिगत जानकारी को रिसर्च टीम के द्वारा पूरी तरह गोपनीय रखा जाएगा।

In this survey, you will be asked questions about your personal background and the overall commercial sex industry in Maharashtra. There is a risk that you may experience emotional discomfort while answering these questions. If you do, remember that your participation is voluntary, and you may withdraw from this survey at any time if you choose.
इस सर्वेमें, आपसे आपकी व्यक्तिगत जानकारी और महाराष्ट्र में पूरी कमर्शियल इंडस्ट्री के बारे में प्रश्न पूछे जाएंगे। इन प्रश्नों का उत्तर देते समय आपको भावनात्मक परेशानी का अनुभव होने का जोखिम है। यदि आप ऐसा करते हैं, तो याद रखें कि आपकी भागीदारी स्वैच्छिक है, और यदि आप चाहें तो किसी भी समय इस सर्वे से पीछे हट सकते हैं।

By continuing with this survey, you acknowledge that your participation in this survey is voluntary, you are 18 years of age or older, and that you are aware that you may choose to terminate your participation in this survey at any time and for any reason.
इस सर्वे को जारी रखते हुए, आप स्वीकार करते हैं कि इस सर्वेमें आपकी भागीदारी स्वैच्छिक है, आपकी आयु 18 वर्ष या उससे अधिक है, और आप जानते हैं कि आप किसी भी समय और किसी भी कारण से इस सर्वे में अपनी भागीदारी को समाप्त करने का विकल्प चुन सकते हैं।

Do you agree to continue with this survey?
क्या आप इस सर्वे को जारी रखने के लिए सहमत हैं?

- Yes/ हाँ
- No/ नहीं

(Programmer Note: If the answer is no, terminate the survey.)
(प्रोग्रामर के लिए नोट: यदि उत्तर नहीं है, तो सर्वे समाप्त करें।)

SECTION:2. PHONE CHAIN REFERRAL/RDS INSTRUMENT FOR BOTH SEEDS AND NON-SEEDS सेक्शन 2- नॉन सीड्स के लिए फोन चेन रेफरल/आरडीएस उपकरण				
S. NO क्रम संख्या	**QUESTIONS** प्रश्न	**CODING CATEGORIES** कोडिंग कैटेगिरी	**CODE** कोड	**SKIP TO** यहां पर जाएं
Thank you for contacting {Convergent}!This survey will take about 3-5 minutes to complete, and you will receive Rs.300 of mobile airtime for taking the survey. Your participation is completely voluntary, and you have the right to withdraw at any point, for any reason, and without any prejudice. Your responses and personal information will be kept completely confidential. By continuing with this survey, you acknowledge that you are 18 years of age or older. {कनवर्जेंट} से संपर्क करने के लिए धन्यवाद! इस सर्वे को पूरा होने में लगभग 3-5 मिनट का समय लगेगा, और सर्वे में भाग लेने के लिए आपको Rs.300 का मोबाइल एयरटाइम प्राप्त होगा। आपकी भागीदारी पूरी तरह से स्वैच्छिक है, और आपको किसी भी समय, किसी भी कारण से, और बिना किसी पूर्वाग्रह के इसे बीच में छोड़ने का अधिकार है। आपकी प्रतिक्रियाओं और व्यक्तिगत जानकारी को पूरी तरह गोपनीय रखा जाएगा। इस सर्वे को जारी रखते हुए, आप स्वीकार करते हैं कि आपकी आयु 18 वर्ष या उससे अधिक है।				
201.	What is your age in completed years? आपकी पूर्ण आयु कितनी है? ***TERMINATE IF LESS THAN 18 YEARS*** **यदि 18 वर्ष से कम हो तो समाप्त कर दे**	✖✖		
202.	In this study, we hope to reach adults who are engaged in the commercial sex industry – meaning people who are given money to perform sex acts – to learn more about the commercial sex industry in Maharashtra. Are you currently someone who is engaged in the commercial sex industry in Maharashtra? इस स्टडी में, हम महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री के बारे में अधिक जानने के लिए कमर्शियल सेक्स उद्योग में लगे लोगो तक पहुंचने की उम्मीद करते हैं - यानी वे लोग जिन्हें सेक्स करने के लिए पैसे दिए जाते हैं। क्या आप आजकल महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री में लगे हुए हैं? ***TERMINATE IF 'NO' CODED*** **यदि 'नहीं' कोड आये तो समाप्त करें**	Yes हाँ	1	
		No नहीं	2	

SECTION:2. PHONE CHAIN REFERRAL/RDS INSTRUMENT FOR BOTH SEEDS AND NON-SEEDS सेक्शन 2- नॉन सीड्स के लिए फोन चेन रेफरल/आरडीएस उपकरण				
S. NO क्रम संख्या	**QUESTIONS** प्रश्न	**CODING CATEGORIES** कोडिंग कैटेगिरी	**CODE** कोड	**SKIP TO** यहां पर जाएं
203.	How many years have you been working in the commercial sex industry? आप कमर्शियल सेक्स इंडस्ट्री में कितने साल से काम कर रहे हैं? ***ACCEPT NUMBER '0 TO 99'*** **0 से 99 के बीच संख्या स्वीकार करे**	✖✖ In numbers संख्या में		
Personal Network Size Questions **व्यक्तिगत नेटवर्क के आकार के प्रश्न**				
The next two questions will ask you about how many people you currently know in specific groups of interest. Please remember that your responses are completely confidential. अगले दो प्रश्न आपसे इस बारे में पूछेंगे कि आप आजकल विशिष्ट रूचि के समूहों में कितने लोगों को जानते हैं। कृपया याद रखें कि आपके जवाब पूरी तरह से गोपनीय रहेंगे।				
203.	How many people do you currently know in Maharashtra who are engaged in the commercial sex industry? आप आजकल महाराष्ट्र में कितने लोगों को जानते हैं जो कमर्शियल सेक्स इंडस्ट्री में लगे हुए हैं? ***ACCEPT NUMBER '0 TO 99'*** **0 से 99 के बीच संख्या स्वीकार करे** ***IF '0' CODED SKIP TO Q 205***	✖✖ In numbers संख्या में		
204.	Of the people who are engaged in the commercial sex industry who you know in Maharashtra, how many are age 17 or younger? महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री में लगे लोगों में से कितने लोग 17 साल या उससे कम उम्र के हैं? ***ACCEPT NUMBER '0 TO 99'*** **0 से 99 के बीच संख्या स्वीकार करे**	✖✖ In numbers संख्या में		

205.	As a result of the COVID-19 pandemic and lockdown, how many people do you know who have started engaging in the commercial sex industry who were not involved in it before? कोविड-19 महामारी और लॉकडाउन के परिणामस्वरूप, आप कितने लोगों को जानते हैं जिन्होंने कमर्शियल सेक्स इंडस्ट्री में शामिल होना शुरू कर दिया है जो पहले इसमें शामिल नहीं थे?	✖✖ In numbers संख्या में	If '0' coded Go to Q 209
206.	Of those who began working in the commercial sex industry as a result of the COVID-19 pandemic and lockdown, how many are increasingly finding business through online channels instead of brothels? जिन लोगों ने COVID-19 महामारी और लॉकडाउन के परिणामस्वरूप कमर्शियल सेक्स इंडस्ट्री में काम करना शुरू किया, उनमें से कितने वेश्यालयों के बजाय ऑनलाइन चैनलों के माध्यम से बढ़ चढ़ कर काम ढूंढ रहे हैं?	✖✖ In numbers संख्या में	
207.	Of the people you know who have started engaging in the commercial sex industry who were not involved in it before as a result of COVID-19, how many are age 17 or younger? जिन लोगों को आप जानते हैं, जिन्होंने कमर्शियल सेक्स इंडस्ट्री में शामिल होना शुरू कर दिया है, जो पहले कोविड -19 के परिणामस्वरूप इसमें शामिल नहीं थे, उनमें से कितने 17 वर्ष या उससे कम उम्र के हैं?	✖✖ In numbers संख्या में	
208.	Of those age 17 or younger who began working in the commercial sex industry as a result of the COVID-19 pandemic and lockdown, how many are increasingly finding business through online channels instead of brothels? 17 वर्ष या उससे कम उम्र के लोगों ने कोविड -19 महामारी और लॉकडाउन के परिणामस्वरूप कमर्शियल सेक्स इंडस्ट्री में काम करना शुरू किया, उनमें से कितने वेश्यालय के बजाय ऑनलाइन चैनलों के माध्यम से बढ़ चढ़ कर काम ढूंढ रहे हैं?	✖✖ In numbers संख्या में	

209.	As a result of the COVID-19 pandemic and lockdown, how many people do you know who have quit the commercial sex industry? कोविड -19 महामारी और लॉकडाउन के परिणामस्वरूप, आप कितने लोगों को जानते हैं जिन्होंने कमर्शियल सेक्स इंडस्ट्री को छोड़ दिया है?	✖✖ In numbers संख्या में	If '0' coded Go to Q 213
210.	Of those who quit working in the commercial sex industry as a result of the COVID-19 pandemic and lockdown, how many were working primarily in brothels? कोविड-19 महामारी और लॉकडाउन के परिणामस्वरूप कमर्शियल सेक्स इंडस्ट्री में काम करना छोड़ने वालों में से कितने मुख्य रूप से वेश्यालय में काम कर रहे थे?	✖✖ In numbers संख्या में	
211.	Of the people you know who have quit the commercial sex industry as a result of COVID-19, how many are age 17 or younger? जिन लोगों को आप जानते हैं, जिन्होंने कोविड -19 के कारण कमर्शियल सेक्स इंडस्ट्री छोड़ दिया है, उनमें से कितने की उम्र 17 वर्ष या उससे कम है?	✖✖ In numbers संख्या में	
212.	Of those age 17 or younger who quit working in the commercial sex industry as a result of the COVID-19 pandemic and lockdown, how many were working primarily in brothels? 17 वर्ष या उससे कम आयु के उन लोगों में से जिन्होंने कोविड -19 महामारी और लॉकडाउन के परिणामस्वरूप कमर्शियल सेक्स इंडस्ट्री में काम करना छोड़ दिया, कितने मुख्य रूप से वेश्यालय में काम कर रहे थे?	✖✖ In numbers संख्या में	

Personal Experience & Belief Questions **व्यक्तिगत अनुभव और विश्वास से संबंधित प्रश्न**						
The next four questions will ask you about your own experiences and thoughts on the commercial sex industry in Maharashtra. Please remember that your responses are completely confidential. अगले चार प्रश्न आपसे महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री पर आपके अपने अनुभवों और विचारों के बारे में पूछेंगे। कृपया याद रखें कि आपके जवाब पूरी तरह से गोपनीय रहेंगे।						
21	Since the start of the COVID-19 pandemic, how are your clients reaching you to avail services compared to prior to COVID-19? कोविड -19 महामारी की शुरुआत के बाद से, आपके ग्राहक कोविड से पहले की तुलना में सेवाओं का लाभ उठाने के लिए आप तक कैसे पहुँच रहे हैं।	**Means of clients solicitation** **ग्राहकों के पहुंचने के साधन**	**Increased** **बढ़ा हैं**	**Decreased** **घटा हैं**	**Not Applicable** **लागु नहीं होता**	
		Physical visit to Sex worker place सेक्स वर्कर के स्थान पर स्वयं जाकर	1	2	3	
		Through pimps at the sex workers location सेक्स वर्कर्स के स्थान पर दलालों के माध्यम से	1	2	3	
		Through telephone call टेलीफोन कॉल के माध्यम से	1	2	3	
		Through whatsapp व्हाट्सएप के माध्यम से	1	2	3	
		Through telephone call after seeing ad on Internet इंटरनेट पर विज्ञापन देखने के बाद टेलीफोन कॉल के माध्यम से	1	2	3	
		Through other digital messaging (email, other phone app, etc.) इंटरनेट पर विज्ञापन देखने के बाद टेलीफोन कॉल के माध्यम से	1	2	3	
21	Since the start of the COVID-19 pandemic, how have the sexual services that your clients pay for changed compared to prior to COVID-19.	**Type of services** **सेवा का प्रकार**	**Increased** **बढ़ा हैं**	**Decreased** **घटा हैं**	**Not Applicable**	

	कोविड -19 महामारी की शुरुआत के बाद से, आपके ग्राहकों द्वारा भुगतान की जाने वाली सेक्स सेवाओं में कोविड -19 से पहले की तुलना में कैसे बदलाव आया है।				**लागु नहीं होता**	
		In-person sex acts व्यक्तिगत सेक्स एक्ट्स/गतिविधिया	1	2	3	
		Digital photos & video डिजिटल फोटो और वीडियो	1	2	3	
		Live-streaming video लाइव स्ट्रीमिंग वीडियो	1	2	3	
		Other अन्य	1	2	3	
21	**[If 1 or 2 in response to DIGITAL PHOTOS & VIDEO orLIVE-STREAMING VIDEO]** **[यदि डिजिटल फोटो और वीडियो या लाइव-स्ट्रीमिंग वीडियो के जवाब में 1 या 2 आए]** In your opinion, where are a majority of the digital clients coming from? आपकी राय में, अधिकांश डिजिटल क्लाइंट कहां से आ रहे हैं?	They are in Maharashtra वे महाराष्ट्र में हैं			1	
		They are in India वे भारत में हैं			2	
		They are international वे अंतरराष्ट्रीय/विदेश में हैं			3	

S. NO क्रम संख्या	QUESTIONS प्रश्न	CODING CATEGORIES कोडिंग कैटेगिरी	CODE कोड	SKIP TO यहां पर जाएं
	Demographics Questions डेमोग्राफिक प्रश्न			
216.	In which district do you live in? आप किस जिले में रहते हैं? SINGLE CODING **सिर्फ एक कोड आ सकता हैं**	Ahmednagar अहमदनगर	1	
		Akola अकोला	2	
		Amravati अमरावती	3	
		Aurangabad औरंगाबाद	4	
		Beed बीड	5	
		Bhandara भंडार	6	
		Buldana बुलडाना	7	
		Chandrapur चंद्रपुर	8	
		Dhule धुले	9	
		Gadchiroli गडचिरोली	10	
		Gondia गोंदिया	11	
		Hingoli हिंगोली	12	
		Jalgaon जलगांव	13	
		Jalna जलना	14	
		Kolhapur कोल्हापुर	15	
		Latur लातूर	16	
		Mumbai City मुंबई शहर	17	
		Mumbai Suburban मुंबई उपनगर	18	
		Nagpur नागपुर	19	
		Nanded नांदेड़	20	
		Nandurbar नंदुरबार	21	

S. NO क्रम संख्या	QUESTIONS प्रश्न	CODING CATEGORIES कोडिंग कैटेगिरी	CODE कोड	SKIP TO यहां पर जाएं
		Nashik नासिक	22	
		Osmanabad उस्मानाबाद	23	
		Palghar पालगढ़	24	
		Parbhani परभनी	25	
		Pune पुणे	26	
		Raigad रायगढ़	27	
		Ratnagiri रत्नागिरि	28	
		Sangli सांगली	29	
		Satara सतारा	30	
		Sindhudurg सिंधुदुर्ग	31	
		Solapur सोलापुर	32	
		Thane थाने	33	
		Wardha वर्धा	34	
		Washim वाशिम	35	
		Yavatmal यवतमाल	36	
217.	What is your gender? आप पुरुष है या महिला? SINGLE CODING **सिर्फ एक कोड आ सकता हैं**	Male **पुरुष**	1	
		Female **महिला**	2	
		Transgender **ट्रांसजेंडर**	3	
218.	What is the highest level of education you have completed? आपने कहाँ तक पढ़ाई पूरी की है? SINGLE CODING **सिर्फ एक कोड आ सकता हैं**	Below primary प्राइमरी से कम	1	
		Primary **प्राइमरी**	2	
		Middle **मध्यम**	3	
		Matric/Secondary	4	

S. NO क्रम संख्या	QUESTIONS प्रश्न	CODING CATEGORIES कोडिंग कैटेगिरी	CODE कोड	SKIP TO यहां पर जाएं
		मैट्रिक/सैकेंडरी		
		Higher Secondary/Undergraduate हायर सेकेंडरी/ग्रेजुएट	5	
		Graduate and above ग्रेजुएट और ऊपर	6	

Recontact Question दोबारा संपर्क करने से संबंधित प्रश्न				
210.	Thank you for completing this survey! In order for us to send you Rs. {insert incentive amount} of mobile airtime for taking this survey, we need your mobile phone number. What is your mobile phone number? इस सर्वे को पूरा करने के लिए धन्यवाद! हमें आपको रुपये भेजने के लिए। इस सर्वे में हिस्सा लेने के लिए {इंसेंटिव अमाउंट लिखे} मोबाइल एयरटाइम, हमें आपका मोबाइल फोन नंबर चाहिए। आपका मोबाइल फोन नंबर क्या है? ***(Programmer Note: Open-ended response for mobile phone number)*** (प्रोग्रामर के लिए नोट: मोबाइल फोन नंबर के लिए ओपन एंडेड प्रतिक्रिया)	✖✖✖✖✖✖✖✖✖✖ Mobile Number मोबाइल नंबर		
211.	Would you like to be notified about future survey opportunities? क्या आप भविष्य के सर्वे के अवसरों के बारे में जानना चाहते हैं?	Yes हाँ	1	
		No नहीं	2	
		Refused to provide mobile number मोबाईल नंबर देने से मना कर दिया	3	

Chain Referral Display
चेन रेफरल डिस्प्ले

Thank you again for completing this survey! With your help, we hope to reach additional adults who are engaged in the commercial sex industry to learn more about the commercial sex industry in Maharashtra. If you recruit other adults who are engaged in the commercial sex industry in Maharashtra to complete this survey, you will receive an additional Rs.300 in mobile airtime for each adult engaged in the commercial sex industry that you recruit to take the survey. You can recruit a max of three new participants to the survey. These participants will not be provided with your name or contact information.

इस सर्वे को पूरा करने के लिए फिर से धन्यवाद! आपकी मदद से, हम महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री के बारे में अधिक जानने के लिए कमर्शियल सेक्स इंडस्ट्री में लगे अतिरिक्त लोगो तक पहुंचने की उम्मीद करते हैं। यदि आप इस सर्वे को पूरा करने के लिए महाराष्ट्र में कमर्शियल सेक्स इंडस्ट्री में लगे अन्य लोगो की भर्ती करते हैं, तो आपको सर्वे में भाग लेने के लिए भर्ती किए जाने वाले कमर्शियल सेक्स इंडस्ट्री में लगे प्रत्येक व्यक्ति के लिए मोबाइल एयरटाइम में अतिरिक्त { रेफरल इंसेंटिव अमाउंट लिखे} प्राप्त होंगे। आप सर्वे में अधिकतम तीन नए प्रतिभागियों की भर्ती कर सकते हैं। इन प्रतिभागियों को आपका नाम या संपर्क जानकारी प्रदान नहीं की जाएगी।

To participate, please tell each person that you recruit to call XXX-XXX-XXX (call center number) and provide one of the three validation codes ({code 1}, {code 2}, {code 3})and take a quick survey via phone.Each code can only be

used once. Each time a survey is completed by one of your recruits, you will receive an airtime payment of Rs.300. If you have any questions or concerns, please contact Mr. Sreevatsaat0120-3102109.

भाग लेने के लिए, कृपया प्रत्येक व्यक्ति को बताएं कि आप XXX-XXX-XXX (कॉल सेंटर नंबर) पर कॉल करने के लिए भर्ती हुए हैं और तीन वेरिफिकेशन कोड ({कोड 1}, {कोड 2}, {कोड 3}) में से एक प्रदान करें और फोन के माध्यम से सर्वे जल्दी भरे। प्रत्येक कोड का उपयोग केवल एक बार किया जा सकता है। हर बार जब आपके किसी रंगरूट द्वारा सर्वे पूरा किया जाता है, तो आपको एक एयरटाइम Rs.300 भुगतान प्राप्त होगा। यदि आपके कोई प्रश्न या चिंता हैं, तो कृपया श्री श्रीवत्सत0120-3102109 से संपर्क करें।