

# Singapore Longitudinal Early Development Study (SG LEADS)



## Panel Survey Wave 1

### Study Guide

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September 2020

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## Introduction

The Singapore Longitudinal EARly Development Study or SG LEADS is a study funded by the Ministry of Education's Social Science Research Thematic Grant (MOE2016 – SSRTG – 044) in 2017 to investigate early childhood development in Singapore. The study highlights the importance of promoting human development to increase productivity and maintaining the well-being of a population as a means of achieving a vibrant economy and secure society. It is conducted by the NUS Centre for Family and Population Research (CFPR) and led by Professor Wei -Jun Jean Yeung, Founding Director of the NUS Centre for Family and Population Research, Provost's Chair Professor at the NUS Department of Sociology, and Cluster Leader at the Asia Research Institute.

SG LEADS examines factors that affect children's early development in the domains of health, cognitive, and social-psychological functions. It also aims to understand how multiple contexts such as the family, pre-school, community and the state interact to influence children's development. The study intends to track development of children in Singapore to understand factors that can promote Singaporean children's early childhood development and provide interventions that can help address these factors. The main research questions are: (1) what is the state of Singapore children, (2) how family, childcare and early education institutions, community, and state interact to shape the development of Singapore's children, and (3) how these investments affect intergenerational mobility and social stratification in Singapore. Our research addresses policy concerns such as how caregiving arrangements, preschool education, the roles of mother, father and extended family, cross-cultural family background, family resources, time and technology use, living arrangements, and family dynamics/relations affect children's social-emotional, cognitive, and health development, and what roles community and government can play in improving child outcomes.

SG LEADS consists of a core panel survey and five sub-projects. The Panel Survey is comprised of 2 waves of survey, with the first one conducted in 2018/2019 and the second in 2020. Meanwhile, the five sub-projects focus respectively on 1) children's language development, 2) children's social skills development, 3) development in the context of cross-cultural families, 4) asset-building among low-income households, and 5) pre-school attendance.

In this User's guide, we will describe the study's design, questionnaire development, field procedures, response rate calculation, and sampling weights. We will also provide technical notes on how the data was weighted and how variables were coded and scored.

The Panel Survey is led by PI Professor Wei-Jun Jean Yeung and co-PIs Assistant Professor Ding Xiaopan and Associate Professor Ryan Hong from the NUS Department of Psychology, and Professor Lim Sun Sun from the Singapore University of Technology and Design.

The NUS Research Team for the first wave is composed of Luxi Chen and Xuejiao Chen as Postdoctoral Fellows, Joyous Tan and Lee Yan Song as Research Assistants, and Lori Jane Masil Pasaraba as the Research Manager.

Data collection fieldwork for the first wave was completed by the SG LEADS staff in collaboration with Nexus Link Pte Ltd.

# Part A

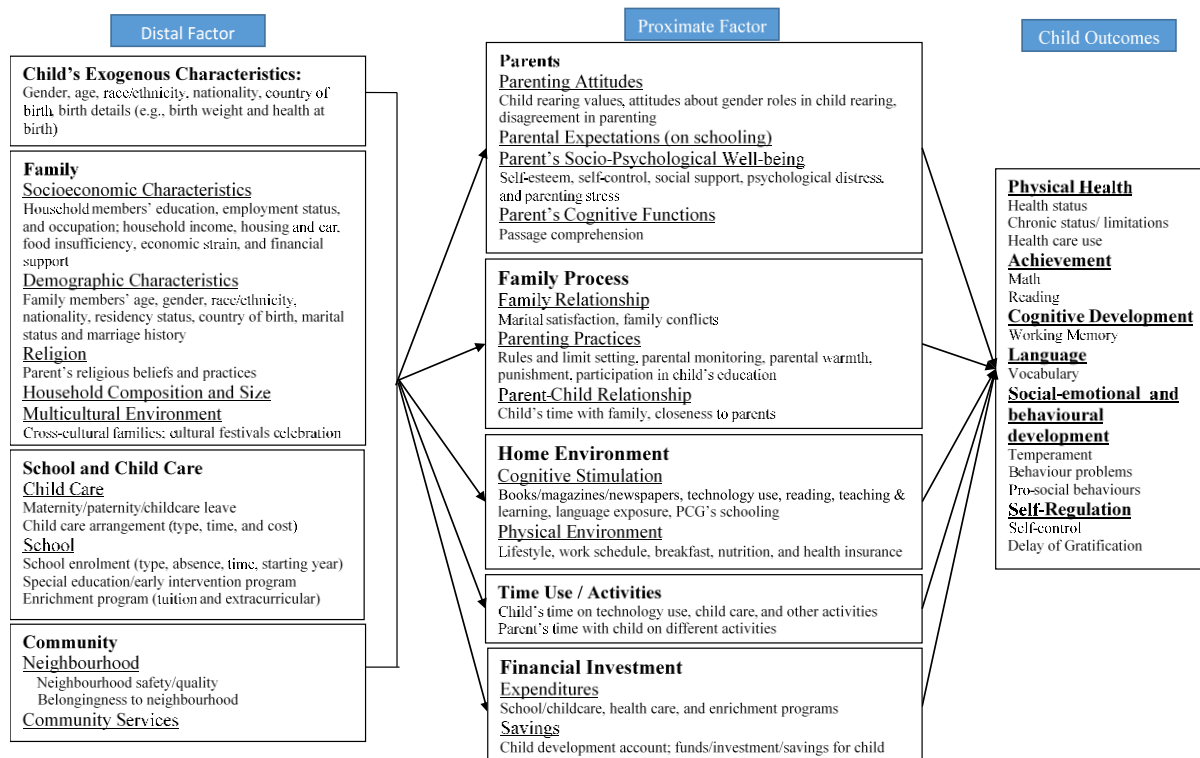
## 1. Study Design

This section discusses the theoretical framework which guided the crafting of the Panel Survey instrument for the first wave of data collection.

### 1.1 Theoretical Framework of the Panel Survey

The contents of the survey are selected based on a theoretical framework about how multiple contexts (home, out-of-home care institution, community and state) shape child development and the importance of examining multiple domains of child development. The survey includes assessments of children’s motor, social-emotional, language and cognitive skills, health, and measures of factors that can potentially shape child development and family resilience. We also focused on the cultural background, early childcare and preschool, time use, technology use, financial and non-monetary investment in children, mother, father and extended family’s roles, family stress, sense of belonging, identity, program participation, and community context. We also asked parents about the kinds of technological devices their children use and typical use patterns, their motivations for acquiring these devices, and the rules and regulations they impose on such use. Further questions were asked focusing on parents’ information sources for formulating such rules and regulations, and any challenges they encounter in mediating their children’s technology use.

Figure 1-1 Theoretical Framework for SG LEADS Panel Survey



## 1.2 Sample design

The first wave of the Panel Survey was conducted from November 2018 to September 2019 using a nationally representative sample of resident households with at least one child below 7 years of age. The sampling frame consists of 6,575 addresses. At the end of the Wave 1 survey, the core sample consisted of 5,019 children under the age of 7 and their primary caregivers.<sup>1</sup>

The decision to survey 5,000 children was determined by several factors: (1) ensuring a sufficient number of cases for each specific age group as child-development analyses often need to be age-specific (2) the heterogeneity of Singapore population in terms of socioeconomic statuses and race composition, (3) attrition rates over time in panel data, and (4) statistical power.

### 1.2.1 Stage 1: Multi-Stage Probability Sampling Strategy

In selecting the sample, we adopted a multi-stage probability sampling - clustered and stratified sampling strategy - with an oversample of population residing in 1-3-room HDB units as proxy for low-income households. The sampling unit here is the dwelling unit.

The frame comprising of addresses with at least 1 Singapore resident aged under 7 years was divided into 3 broad housing types, i.e. HDB 1-3 room flats, HDB 4-room flats, and other remaining housing types (including 5-room HDB, executive HDB, condominium, landed properties, and others).

We drew the dwelling units so that 40% of the sample was from HDB 1-3 room flats, 30% was from HDB 4-room flats, and 30% was from the remaining housing types.

*Table 1-1 Distribution of households in the SG LEADS sampling frame by dwelling type*

	Total number of households with at least one child under 7 in 2017	1-2 room flats and 3 room flats	4 room flats	5-Room and Executive Flats, Condominiums, Landed Properties
% sample	100%	40%	30%	30%
Selection probability provided by the Department of Statistics		0.09357	0.02828	0.02219

### 1.2.2 Stage 2: Include Planning Areas with Resident Children under 7 years Old

At the second stage, within each broad housing type, we included all the 55 planning areas (PAs) within the 5 URA regions in Singapore (Central, East, North, North-East, West) with residents under 7 years of age.

The required number of addresses in each PA was calculated proportionately to the number of households with at least one child under 7 years old (PPS). Within each PA, the addresses were

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<sup>1</sup> Before and during the Wave 2 fieldwork, 14 children were invalidated due to their ineligibility. The final sample is 5,005 children and 3,476 households. Please see Section 6 Post-Fieldwork Notes (Updated on 21 March 2022) for the list of invalid households and children.

randomly selected. These produced dwelling units of different sizes (proxy for SES) in 55 PAs across the 5 regions in Singapore.

Do note that in selecting the sample, we left out 10 PAs that have no residents aged 0-9 years old based on the 2017 statistics<sup>2</sup>. These 10 PAs are special zones that are comprised of natural reservoirs, industrial zones and commercial areas.

### 1.2.3 Stage 3: Random Selection of up to 2 Eligible Children in Each Selected Household

At the third stage, we randomly selected up to 2 eligible children (age under 7 years old) in each selected household resulting to individual children as the sampling unit.

### 1.2.4 Substitution Strategy

Substitution of households was allowed at the end of the data collection period to meet the sample size required. The substitution strategy for the different housing types are as follows:

*Table 1-2 SG LEADS Substitution strategy*

Housing Type	Eligibility for substitution	Substitution Strategy
HDB	Uncontactable at the end of 5 visits	Allow substitution with HH from the same HDB block and with the same housing type
Landed Property		Allow substitution with the same housing type within the same URA planning region (North, Northeast, East, West and Central)
Condominium	Uncontactable at the end of 5 visits, or Uncontactable at the first visit due to restricted access at the gates such that revisits is unlikely to yield positive results.	Allow substitution with the same housing type within the same URA planning region. Due to restricted access of non-residents to condominium complexes, substitution from adjacent planning regions were allowed subject to percentage caps

The substitution strategy attempted to ensure that the substitute households mirror the economic characteristics and geographical location of the households from the original sampling frame. However, for condominium units, the rule on finding substitute households from the “same planning area” was relaxed due to the restricted access of interviewers to these residential complexes hence substitute households from adjacent planning areas were allowed. Moreover, planning areas in Singapore that are adjacent to each other tend to have similar characteristics.

<sup>2</sup> Data from Department of Statistics Table 1: Resident Households by Presence of Member Aged 0-6 Years and Type of Dwelling, 2017 (Customised Data)

## 2 Questionnaire

The questionnaire was developed by the NUS SG LEADS team from August 2017 to June 2018. It was programmed into a CAPI form by Nexus Link and was reviewed extensively by both the NUS SG LEADS Team and Nexus Link before it was launched for fieldwork in November 2018. Testing of the questionnaire in its CAPI form is explained in more detail in *Sec 2.3 System testing*.

### 2.1 Survey Content

The questionnaires were categorized into 6 sections: 1) Consent Form, 2) Household Information Form or Household Screener, 3) Household Booklet, 4) Child Booklet, 5) Child Assessment, and 6) Observation Form.

Table 2-1 summarised the various sections of the SG LEADS questionnaire indicating the objectives of each section and survey topics included.

*Table 2-1 SG LEADS Panel Survey Questionnaire's objectives and topics*

Sections	Main objectives	Respondents	Survey topics
1. Household Screener	Obtain information on the members of the household.	<ul style="list-style-type: none"> <li>• PCG</li> </ul>	<ul style="list-style-type: none"> <li>• Enumeration of household members</li> <li>• Household member's relationship to the PCG and the child</li> <li>• Household member's sociodemographic information</li> </ul>
2. Consent Form	Obtain the PCGs consent for the interview	<ul style="list-style-type: none"> <li>• PCG</li> <li>• Interviewer</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable</li> </ul>
3. Household Booklet	Obtain information of the target child's household, family environment, and neighbourhood	<ul style="list-style-type: none"> <li>• PCG</li> </ul>	<ul style="list-style-type: none"> <li>• Neighbourhood and utilisation of community services</li> <li>• Religious affiliation, beliefs, and practices</li> <li>• The PCG's Psychological wellbeing, social support, and Lifestyle</li> <li>• The PCG's child-rearing values and rules</li> <li>• Food Security</li> <li>• General home environment</li> <li>• Family income, financial strains, housing type and car ownership</li> </ul>
4. Child Booklet	Obtain information of the child's health and behaviour, family environment, school	<ul style="list-style-type: none"> <li>• PCG</li> </ul>	<ul style="list-style-type: none"> <li>• Child health</li> <li>• Home environment of the target child</li> <li>• The child's language</li> </ul>



	enrolment, time use, PCG's parenting practices and parental investments on the child.		<ul style="list-style-type: none"> <li>• Child behaviour</li> <li>• School enrolment, school environment, and the PCG's educational expectations</li> <li>• Parenting practices</li> <li>• Parental expenditures and savings for the child</li> <li>• Child care arrangement</li> <li>• Information on absent parent</li> <li>• Time use</li> </ul>
5. Child Assessment	Measure the child's height and weight, and assess the child's academic achievement, working memory, and self-control	<ul style="list-style-type: none"> <li>• PCG</li> <li>• Child (3 years and above)</li> </ul>	<ul style="list-style-type: none"> <li>• Woodcock Johnson IV Test of Achievement: The child's academic skills learned (reading and mathematics)</li> <li>• Digit Span Tasks: The child's working memory</li> <li>• Delay of Gratification: The child's future-oriented self-control</li> <li>• The child's and the PCG's height and weight</li> </ul>

## 2.2 Questionnaire Administration

The questionnaires were administered to the respondents through face-to-face interviews at their homes. For each interview, a pair of interviewers went to the respondent's house. One interviewer interviewed the PCG (referred to as PCG interviewer) and the other interviewed the child (referred to as the Child interviewer).

For the Panel Survey, it was imperative that the interview was done with the PCG. Interviewers were trained to correctly identify who the respondent child's PCG was based on the following criteria:

- The PCG is a person living in the household who is mainly responsible for providing care for the target child(ren). In most instances, the PCG is usually the:
  - The mother (biological, adoptive, step, foster), or
  - The father (biological, adoptive, step, foster), especially when the mother is not living with the child.
  - In some cases where both of the parents are absent, the PCG could also be the legal guardian of the child (e.g., an aunt/uncle, a grandparent or other relatives who reside with the child and has been assigned legal custody of the child).
  - In cases where the person providing the most care for the child is not living in the same house, such as a grandparent who comes during the day to look after the child but goes back home at night once the child's parent/s are home, the PCG will have to be one of the parents or the legal guardian who resides with the child.
- By definition, the PCG must live with the target child(ren), thus co-residency with the child(ren) is a requisite for the PCG role. People who are paid to do caregiving roles such as domestic workers will not be considered as the PCG. In households with 2 eligible children whose PCGs are different (e.g., PCG for child 1 is the mother while PCG for child 2 is the grandparent), both

PCGs will have to be interviewed. For multi-families living in the same house, only 1 family will be interviewed (PCG and eligible children).

The PCG Interviewer ensured that the Household Information Form, the Household Questionnaire and the Child Questionnaire were completed. Most of the Questionnaires were administered with the PCG Interviewer reading the questions and options aloud to the Respondent. For those questions, the tablet is positioned in a way that the PCG can see the screen clearly while the Interviewer was reading the questions. Such approach facilitates Respondents to understand the questions as they can read and hear the questions at the same time.

For self-administered questions, the PCG Interviewer handed the tablet to the PCG and let the PCG work on the questions on his/her own unless there were clarifications. The PCG Interviewer was prompted in the questionnaire if the question was self-administered.

Meanwhile, the Child Interviewer administered the Child Assessment component to the child. For children 3 years old and above, the Child Assessment component included an academic achievement test (WJ IV ACH) in math and reading, a Delay of Gratification test called Now or Later, a Digit Span task to measure working memory (called the number game), as well as height and weight measurements. For children below 3 years old, the child assessment component only included a height and weight measure.

In administering the Child Assessment component, the Child Interviewers were instructed to ask the PCG for an area in the house conducive for the Child Assessments. Having a room separate from the PCG interview is ideal. In cases where there was no separate room, the Interviewers should sit as far as practicable from each other to avoid distractions caused by hearing what is happening in the other interview. For children who are shy and did not want to be separated from the PCG, the PCG can stay nearer the Child before or during the assessment (without intervening the child assessment). In this case, the assessment should be done whenever the PCG feels that the child is ready for assessment.

Take note that before conducting the WJ IV ACH, Number Game (Digit Span Task), and Now or Later Game (Delay of Gratification Test), the Interviewer should emphasize to both parents and children that the aim of the games was not meant to test and analyse an individual child's performance, and rather, to learn about the overall situation of children's development in Singapore. The games were also designed in a way that children of a certain age would find certain items difficult and would not be able to answer them. Therefore, it is perfectly acceptable for kids to not go very far in the assessments.

Nevertheless, the Child Interviewer should stress that the PCG must not interfere with the Child(ren)'s answers or the ways by which the questions are being asked. Interferences will be considered as wrong answers and result in an inaccurate assessment for the Child.

However, for measuring height and weight of the Child(ren), it would be best if the PCG was present to prevent any misunderstandings. Interviewers were trained not to touch the Child(ren) in any way that would be deemed inappropriate. If necessary, especially with children under 3, Interviewers should get the PCG to help with the measuring process.

The details of which questionnaires are administered to which respondent is shown in Table 2-2 below.

*Table 2-2: Administration of SG LEADS Wave 1 Survey Questionnaires*

<b>Questionnaire Booklet</b>	<b>Respondent</b>	<b>Mode of administration</b>
<b>Household Information Form</b>	Primary Caregiver	CAPI Interviewer-administered

<i>(One booklet per eligible household)</i>		
<b>Household Booklet</b> <i>(One booklet per eligible household)</i>	Primary Caregiver	CAPI Mix of interviewer- and self-administered
<b>Child Booklet</b> <i>(One booklet per eligible child)</i>	Primary Caregiver	CAPI Mix of interviewer- and self-administered
<b>Child Assessment</b> <i>(One assessment per eligible child)</i>	Primary Caregiver	CAPI Interviewer-administered
	Children under 3	CAPI Interviewer-administered with caregiver's assistance (Height & Weight measure)
	Children aged 3 years and above	Pen and paper for the WJ IV Test of Achievement Test CAPI for the remaining components of the Child Assessment
<b>Observation Form</b> <i>(One form per eligible child)</i>	Interviewer	CAPI Self-administered

By default, the questionnaires were administered to the PCG through CAPI and in English. For respondents who do not speak English, pen-and-paper versions of the questionnaires are available in Mandarin, Malay and Tamil. Respondents had the option to do the interviews in either of these languages.

The Child Assessment questionnaire was administered solely in English. In cases where the child does not speak English but understands the language, the interviewer continued administering the questionnaire to the child. However, if the child does not understand English at all, the interviewer has to stop administering the Child Assessment booklet and avoid translating the questions to the child.

### 2.2.1 Special Note on the Use of the WJ Test of Achievement Form C

The WJ IV Test of Achievement is a standardized battery of tests published by Riverside Publishing (previously Houghton Mifflin Harcourt), to measure the level of reading, writing, mathematics, and academic knowledge among 2 to 80+ years of age. For SG LEADS, the WJ IV ACH Form C was administered to kids aged 3 and above. In particular, SG LEADS administered the following sub-tests:

- Test 1: Letter-Word Identification
- Test 2: Applied Problems
- Test 4: Passage Comprehension
- Test 5: Calculation

To ensure the suitability of the test to Singaporean children, selected culturally-sensitive questions of the WJ IV Test of Achievement Form C were adapted to the local context. These are:

- Test 2: Applied Problems - Items 24 & 36
- Test 4: Passage Comprehension - Items 19 & 26. Do note that the adaptation in Item 26 did not require a change in phrasing of the question itself but involved the acceptance of the term “plaster” as one of the correct answers.

In administering the test, the interviewer needs the WJ IV ACH Base Kit Form C, a Response Booklet for each child, and a Test Record for each child. The WJ IV ACH Base Kit Form C is a small easel where one side faces the interviewer and the other side faces the child. The easel facing the interviewers shows the questions that must be read out to the child, as well as instructions for the interviewers on how to administer a particular item in the test. The easel facing the child shows possible answers where the child could choose from. For Test 1, Test 2 and Test 4, it is necessary for the interviewer to sit in an angle where both the instructions page and the answer page of the easel can be seen. Doing so will facilitate the recording of the child’s raw score in the Test Record and avoid unnecessary movements that can distract the child’s attention from the test. For Test 5, the child gets his/her own Response Booklet where calculations are made.

In processing the WJ standardized scores, SG LEADS used an offline scoring platform customised by Houghton Mifflin Harcourt (HMH) for SG LEADS. Each child’s raw scores, together with the child’s name or ID, gender, birth date, date of testing, grade, examiner’s name, and examiner’s observation of the test session are entered into the platform. Additional information such as the child’s use of glasses or hearing aid can also be inputted. A range of standardized scores based on US norms such as age-standardized scores, W-scores and Z-scores can be generated from the scoring platform.<sup>3</sup>

To test the reliability of the WJ scores in the SG LEADS dataset, the effect of interviewers on children’s W-scores and age-standardized scores were analysed through multilevel modelling. Controlling for age, gender, child’s race, biological parent’s education & housing type, the interviewer effect is relatively low (less than 10%) for the tests except for the applied problem test (see table 2-3 below).

*Table 2-3: MLM of WJ Scores (Planning area and interviewer as level indicators)*

	Intra-class Correlation (ICC)	
	model without controls	model with individual-level controls *
<i>Wscores (page 6-12 of the log file)</i>		
B1: letter-word identification	6.4%	8.3%
B2: applied problems	11.2%	15.3%
B3: passage comprehension	7.5%	9.4%
B4: calculation	1.3%	2.5%
<i>Zscores (age standardized) (page 13-19 of the log file)</i>		
B1: letter-word identification	9.8%	7.1%
B2: applied problems	20.4%	15.3%
B3: passage comprehension	11.2%	9.3%
B4: calculation	4.3%	2.2%
* control for age, gender, child's race, biological parents' education, housing type		

The effects of planning area on W-scores and age-standardized scores were low as well (less than 1%).

<sup>3</sup> More details about the WJ scores can be found in McGrew, LaForte and Schrank (2014)

A total of 2,957 children answered all 4 subtests of the WJ IV ACH but 345 were excluded due to invalid age, missing values, and problematic values. To determine the average time spent on the test, a total of 2,612 valid cases was included in the analysis. On average, the children spent 12 minutes for the whole WJ ACH, with the younger kids spending 3 minutes less on the test compared with the older ones. Table 2-4 shows the average time spent on the WJ IV ACH according to the age of respondents.

*Table 2-4: Average Time Spent for the Whole WJ IV ACH Test (in minutes)*

Age (yrs)	e(mean)	e(p1)	e(p5)	e(p25)	e(p50)	e(p75)	e(p99)	e(max)
3	8.15	1.2	2.6	4.5	6.8	10.3	25.1	36.1
4	10.61	1.6	3.3	5.7	9.5	13.7	31.1	48.3
5	13.45	2.4	3.9	7.4	12.5	17.8	34.4	42.2
6	16.32	2.9	4.9	10	15.1	20.45	46.3	67.5
Total	12.17	1.9	3.4	6.1	10.5	16.3	36.7	67.5

Total duration for 4 tests (only includes cases with no missing values in time stamps for all 4 subtests, n=2612)

## 2.2.2 Special Note on Administering the Forward and Backward Digit Span Tasks

The test measures a child’s short-term memory and working memory capacity. Administration of the test involves the interviewer clearly reading a set of numbers to the child at a rate of one digit per second. After reading each number series, the interviewer will pause and allow the child to repeat the numbers (forward or backward) that the interviewer has just read. In the Forward Digit Span Tasks, the child must repeat the numbers in the same sequence that the interviewer has read to them such that “1, 2, 3, 4” must be repeated by the child as “1,2,3,4”. In the Backward Digit Span, the child must say the numbers backward such that “5,6,7,8” must be repeated as “8,7,6,5”. Interviewers need to ensure the child focuses their attention on the test. Once the number series is read, the interviewer is not allowed to repeat it even if the child requests the interviewer to do so.

The task starts from with two trials in a 2-digit number set. If the child repeats one trial correctly, another trial of 2-digit numbers are read. If the child gets the numbers correctly again, child progresses to the next set which includes two trials of 3-digit numbers. The task will continue progressing to the next set until they reach the 8-digit number set. The task will be discontinued if the child gets wrong answers in both trials in a given set.

## 2.3 System Testing

For the first wave of data collection, SG LEADS used the Verint survey system to load the questionnaires into a tablet. Except for the WJ IV Test of Achievement component, the full English questionnaire was programmed into the computer-assisted personal interviewing (CAPI) system. A series of automated programmes such as non-permissible codes, inconsistent codes, and logic checks were devised to detect possible errors when administering the questionnaire.

User acceptance testing of the programmed questionnaire was done by the SG LEADS team in multiple stages. Intensive testing was done in several stages: a) before pilot testing, b) before the actual fieldwork, and c) in the first few weeks after the launch of the fieldwork. Random testing was further conducted all throughout the data collection period to ensure that all skipping rules and data quality checks embedded in the instrument are working.

## 2.4 Pilot Testing

The first pilot test was conducted in September 2018 to test the readiness of the CAPI system, determine the actual survey duration, and assess the readiness of the survey team in the field. Pilot testing was done on a convenience sample of 50 respondents from 33 households.

Results from the pilot test showed that the median time for interviews were 122 minutes for a one-child household and 156 minutes for a two-children household, which were longer than the intended two-hour average duration of the survey. The survey team also experienced issues in the system caused by logic errors, loss of internet connection, prolonged loading time of the questionnaire, complete draining of the tablet's battery, and interviewer's non-familiarity with the system.

Based on these results, the research team adjusted the length of the questionnaire. The time-diary section of the questionnaire was also added. To ensure minimal disruptions in case of system malfunction or battery and internet connection issues, emergency protocols were established so that interviewers would know what to do in case of disruptions.

The second pilot test was conducted in October 2018 with 5 respondents. The system was assessed to be ready for deployment after that.

## 3 Field Procedures

The fieldwork was done over a period of 11 months, from November 2, 2018 to September 30, 2019.

### 3.1 Interviewer Training

Nexus Link tapped a pool of 33 interviewers to collect data for the first wave of data collection for the SG LEADS Panel survey. Majority of the interviewers have had long survey experience but not with young children, so it was mandatory for them to attend an interviewer training session specifically for SG LEADS.

The first batch of 16 interviewers attended a weeklong training in NUS in August 2018. Nexus Link staff conducted the training on general interviewer skills and operating the CAPI hardware/tablet. SG LEADS staff briefed the interviewers about the objectives of the survey, contents of the questionnaires, child interviewing skills, and administering the Child Assessment booklet. Practice interviews simulating various interview scenarios were conducted. Only interviewers who were assessed to be ready for fieldwork were deployed for the launch of the fieldwork in November 2018.

For the whole data collection period, new interviewers were trained by the Nexus Link team and assessed by the SG LEADS team before deployment. Whenever necessary, the SG LEADS team would deploy their own interviewers to supplement Nexus Link's interviewer pool.

### 3.2 Field Manual and Question by Question Objectives

A copy of the SG LEADS Field Manual and Question by Question Objectives (QxQ) are provided to all interviewers as an on-hand reference in the field.

The field manual is a full documentation of the procedures that were discussed during the interviewer training with a compilation of all the necessary fieldwork materials.

The QxQ contains the rationale for each of the items in the SG LEADS questionnaire. It also provides instructions on how questions should be administered.

### 3.3 Household Visits and Interviewing

Before visiting the households, notification letters were sent by Nexus Link to the addresses in the sampling frame. The letters explained the objectives of the study, eligibility for the survey, tasks involved if they decide to participate, duration of the survey, and tokens that will be received at the end of their participation. Potential respondents were informed that interviewers are going to visit their households within the next few weeks. SG LEADS hotlines were included in the letter to provide participants with the option to call the SG LEADS team and schedule an interview date/time beforehand.

With the notifications out, the interviewers visited all the households in the sampling frame to conduct preliminary screening. The addresses were assigned to the interviewers on a "clustered basis" where addresses that are close to the interviewers' place of residence were given priority. Whenever necessary, reassignment of interviewers were done so that interviewers could prioritize interviews in planning areas that need urgent attention.

In visiting the households, the interviewers adopted a 5-visit strategy which means that interviewers must visit the household at least 5 times before it could be considered as a non-responsive case. The visit must be done at different times of the day and at different days of the week. The outcome of each

attempt is captured by a case management system customised for this survey. The visit codes used are shown in Table 3-1.

*Table 3-1 Outcome Codes Used by Interviewers for Each Household Visit Made*

<b>Codes</b>	<b>Outcome of Attempt</b>	<b>Codes</b>	<b>Outcome of Attempt</b>
110	Proceed Survey	500	Invalid address (Demolished/en bloc/ No such address)
200	Refusal	600	Appointment made
300	Visited household (No one at home)	610	NL to re-contact HH/Respondent for an appointment
310	Visited household (Respondent is busy/Not at home)	700	Restricted access (Condominium/Private Apartment)
320	Visited household (Respondent is overseas)	900	Others (Please specify)
400	Ineligible household (No kids aged 0-6 years)	910	Substitution
410	Ineligible household (No Singaporean/ PR)	120	Midway termination

To be considered eligible for the survey, households must 1) have a child below seven years old and 2) who is Singaporean or Permanent Resident. It is imperative that both criteria must be satisfied before a household can interviewed. Primary caregiver must also be available for interview.

Interview completions particularly in the first quarter of the data collection period was slower than planned hence an additional strategy for household visits was employed. In addition to interviewers, a team of “door knockers” were deployed to focus on screening the household’s eligibility for the interview and set interview schedules should PCGs agree to participate right away. In most cases, door knockers had to visit the household more than once before they could set an interview. For such instances, a drop-in letter is left at the door or in the letterbox. The letter informs the household about the visit, explains the objectives and benefits of participating in the survey and seeks the participation of the households. Contact details were also provided so that interested households would be able to contact NL to arrange interview schedules.

To boost response rates, notification letters were dispatched to the addresses 5 times within the data collection period to increase target households’ interest about the study.

At the end of data collection, 53% of visited households participated in the stud while 14.83% refused to participate. The rest of the households were categorized as either non-responsive, ineligible or inaccessible. Details of the final disposition for all addresses are shown in Table 3-2.



Table 3-2 Final Disposition of Cases based on Final Outcome Codes

Outcome Codes	Freq.	Percent	Cum.
110	3,497	53.19	53.19
200	975	14.83	68.02
300	884	13.44	81.46
310	15	0.23	81.69
400	792	12.05	93.73
410	31	0.47	94.21
500	14	0.21	94.42
700	249	3.79	98.21
900	118	1.79	100.00
Total	6,575	100.00	

In calculating the final count of completed interviews, completed cases (Code 110 – Proceed survey) were further categorized into original and substitute cases. All other codes were considered as incomplete cases.

In total, 5,019 children and PCGs from 3,483 households participated in the first wave of the Panel Survey.<sup>4</sup>

### 3.4 Duration of Interviews

Regarding the duration of interviews, one-children households took an average of 81 minutes to complete the survey provided that the child is not doing the Child Assessment Booklet. For households where the child is doing the Child Assessment Booklet, it took an average of 113 minutes to complete the survey.

### 3.5 Keeping Track of Respondents

Contact information of PCGs were collected in the Child Booklet section of the questionnaire. These include primary and secondary phone numbers, email addresses, and mailing addresses of the PCGs. In addition, name and contact information of two of the PCG’s closest relatives or friends who will be contacted if the PCG is unreachable or unresponsive, were also requested. With these data, the Panel Survey team created a database of contact information of all respondents. The Panel Survey team updates the database whenever there are reported changes in contact information. Changes in information are tracked through the following ways:

- Audit calls by interviewers and the Panel Survey team where they verify, among other things, the accuracy of contact information provided during the survey
- During select occasions in Singapore such as Chinese New Year and year-end holidays, email greetings are sent to respondents who provided their email addresses.
- In a few instances, respondents do inform the team about changes in their postal addresses.
- In between waves, reports are shared to all respondents to update them of the SG LEADS’ team’s findings. This is to highlight how the respondent’s participation contribute in the creation of a novel database about young children in Singapore. These efforts are made to

<sup>4</sup> Before and during the Wave 2 fieldwork, some children and households were invalidated due to their ineligibility. The final sample is 5,005 children and 3,476 households. Please see Section 6 Post-Fieldwork Notes (Updated on 21 March 2022) for the list of invalid households and children.

hopefully develop a sense of community among respondents and, at the same time, provide an opportunity for them to inform the team about any change in their contact information.

- Lastly, the Panel Survey team maintains an email address dedicated for the study where respondents can notify the team about changes in their contact details

## 4 Response Rates<sup>5</sup>

The response rate for the first wave of the Panel Survey is 65.57%.

In calculating the response rates, we adapted the definitions and methods used in Lynn, P. et al (2003), the American Association for Public Opinion Research (2016), and the China Family and Panel Study (Sun, 2010). Furthermore, we used addresses as the unit of analysis when calculating for response rates.

Lynn, P. et al (2003) defined response rate as the number of completed interviews divided by the number of eligible cases. Therefore, cases that should be included when calculating response rates are:

- 1) **Complete interview (I)**
- 2) **Partial interview (P)** (whether to include partial interviews varies across definitions)
- 3) **Non-contact (NC)** (eligible)
  - a. Interviewers were not able to contact anybody in the HH but are able to identify the eligibility of the household in some way, e.g., information from the neighbors, presence of kids' shoes outside or baby carriage
  - b. Interviewers were not able to contact the selected respondent (e.g., the child and parents are overseas during the whole period of the survey).
- 4) **Refusal (R)**
- 5) **Other non-interview (O)** (The household was contacted and confirmed to be eligible for the survey but did not participate e.g. non-participation because of illness or language)
- 6) **Unknown eligibility (UE)** (The interviewer was not able to determine the validity of the household. This category includes household that were both contacted and non-contacted). There are three ways to deal with these cases (Phillips et al., 2017):
  - a. Assume all non-respondents are eligible
  - b. Estimate the probability of non-respondent eligibility through the observed eligibility rate.
  - c. Use other records to know that all non-respondents are eligible.
- 7) **Not eligible (NE)** Households which are ineligible, or out of scope (e.g., vacant, vacation home) are excluded when calculating response rates.

American Association for Public Opinion Research (AAPOR) provided six methods of calculating the response rates (RR) (AAPOR, 2016). In these calculations, the cases that should be included are the following:

- 1) **I**: Full interviews
  - 2) **P**: Partial interviews
  - 3) **R**: Refusals
  - 4) **NC**: Non-contact
  - 5) **O**: Others
  - 6) **UE**: Unknown eligibility
  - 7) **e(UE)**: Estimated proportion of cases of unknown eligibility that are eligible
- RR1 and RR2 assume that all non-respondents are eligible  
 $RR1 = I / (I + R + NC + O + UE)$   
 $RR2 = (I + P) / (I + P + R + NC + O + UE)$  (include partial interviews)
  - RR3 and RR4 use estimated eligibility  
 $RR3 = I / (I + R + NC + O + e(UE))$

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<sup>5</sup> This section is extracted from Chen and Yeung, 2020. *SG LEADS Technical Report 1: Calculation of Response Rates for SG LEADS Panel Survey Wave 1*. Singapore: NUS Centre for Family and Population Research.

$$RR4=(I+P)/(I+P+R+NC+O+e(UE)) \text{ (include partial interviews)}$$

- RR5 and RR6 exclude the non-respondents  
 $RR5=I/(I+R+NC+O)$   
 $RR6=(I+P)/(I+P+R+NC+O)$  (include partial interviews)

Following the China Family and Panel Study (CFPS 2010), RR1, RR3, RR5(exclude partial interviews) are provided. As the RR1 and RR5 either underestimate or overestimate the response rates, SG LEADS adopted RR3 for its response rate calculation.

The procedure is detailed in the succeeding sections.

#### 4.1 Define the Conditions of an Eligible Case

Based on the outcome codes enumerated in *Table 3-1 and Table 3-2*, we pull out the number of cases that fall under the following outcome codes:

- the address is valid (invalid address: code 500);
- the house is vacant or under renovation (invalid home: code 900);
- one of the child’s parent is Singaporean or PR (ineligible nationality: code 410);
- the child is under age 7 (ineligible child: code 400).

#### 4.2 Calculate % according to the Four Codes in Step 4.1 Using Count of Each Outcome Code for Sample after Substitution (C1 and C2 in Table 4-1)

- % of valid address:  $e1=1-$  (number of invalid address / sample size-unvisited address)  

$$e1 = 1 - \frac{14}{6575}=99.8\%$$
- % of valid home:  $e2=1-$ (number of invalid home / number of valid address)  

$$e2 = 1 - \frac{118}{(6575-14)}=98.2\%$$
- % of valid household (nationality):  $e3=1-$ (number of non-Singaporean or non-PR / number of valid home with known nationality)  

$$e3 = 1 - \frac{38}{(6575-14-118)-(1154)}=99.3\%$$
- % of valid household (eligible child):  $e4=1-$  (number of HH without eligible child / number of valid household with eligible child)  

$$e4 = 1 - \frac{792}{(6575-14-118-38)-(1154)}=84.9\%$$

*Table 4-1: Final Distribution of Households in the Sampling Frame After Substitution Based on Outcome Code*

Outcome of Visits	Outcome Codes	C1: Sample after substitution	C2: n

complete interview (I)	110 Proceed with survey	3,497	3,497
Refusal (R)	200 Refusal	975	975
Non-contact (NC)	300 Visited Household (No one at home)	889	1148
	310 Visited Household (Respondents is busy / Not at home)	15	
	700 Restricted access (condominium)	244	
Ineligible (IE)	400 Ineligible Household (No kids aged 0-6 years)	792	955
	410 Ineligible Household (No Singaporean Citizen / PR)	31	
	500 Invalid Address (Demolished / En bloc / No such Address)	14	
	900 Others please specify	118	
Total		6575	6575

#### 4.3 Estimate the Number of Eligible Cases among the Cases with Unknown Eligibility (eUE)

$eUE = \text{unvisited Household} * e1 * e2 * e3 * e4 + \text{non-contact household with unknown residential status}^6 * e2 * e3 * e4 + \text{household with unknown nationality} * e3 * e4 + \text{household with valid nationality but unknown information on child} * e4$

- During the field work, interviewers have visited all the addresses in the sample frame, therefore, the eligibility of each address in the sample frame is known.
- cases with unknown eligibility (code 900 + code 300 + code 700) have been visited, but the residential status, nationality of the residents and the age of the child (if any) are unknown, therefore the calculation is:

$$eUE = 1148 * 98.20\% * 99.41\% * 84.95\% = 952$$

Among the cases with unknown eligibility,  $(1148 - 952) = 196$  are **ineligible**. Roughly, **17%** (196/1148) of households are ineligible. Given there are still a large number of non-contact households even after 5 visits, it is reasonable to assume a higher ineligibility rate. If we assume that 25% of the households with unknown eligibility are ineligible, the number is 287.

#### 4.4 Response Rates of SG LEADS

	Assume <u>all</u> cases with unknown eligibility are eligible	Assume <u>proportion of</u> cases with unknown	Assume <u>none</u> of the cases with unknown eligibility are eligible
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<sup>6</sup> Whether anyone lives in the address (e.g., whether vacant home, or whether the place is under renovation).

		eligibility are ineligible (25%)	
Sample after substitution	RR1	RR3	RR5

By treating substitutes as part of the original sample, the distribution of our sample after substitution is as follows (use C1 and C2 in Table 4-1):

Completed interviews: 3497

Number of Ineligible after substitution: 955

Unknown eligible: 1148

$$RR1 = 3499 / (6575 - 955) = 62.22\%$$

$$RR3 = 3499 / (6575 - 955 - 0.25 * 1148) = 65.57\%$$

$$RR5 = 3499 / (6575 - 955 - 1148) = 78.20\%$$

Therefore, if we use RR3, the response rate is 65.57% for sample after substitution.

## 5 Sampling Weights<sup>7</sup>

This section provides instruction on how to calculate sampling weights to address the oversampling of 1-3 room HDB flats in the sample.

### 5.1 Account for All Probabilities of Selection for Eligible Families and Children through the Initial Determination of Eligibility for SG LEADS

Use the inverse of selection probability for each housing type provided by DOS to get the initial household selection weight.

*Table 5-1: Probability of Selection and Weight by Household*

	N (Addresses in the sampling frame with at least one Singapore resident aged 7 years old)	% in sample	DOS selection probability	Raw weight (1/selection probability)	raw weight *n	N <sup>8</sup> (Singapore resident HH <sup>9</sup> with At least one member aged 0-6 years)	% in Population
1- and 3-Room Flats	2,630	40%	0.09357	10.68719	28,107	30,776	14.7%
4-Room Flats	1,973	30%	0.02828	35.36068	69,767	75,457	35.9%
5-Room and Executive Flats, Condominiums, Landed Properties	1,972	30%	0.02219	45.06534	88,869	103,156	49.1%
Total	6,575	100%			186,743	209,997	100%

The SG LEADS sampling frame is based on addresses with at least one Singapore resident under 7 (the child is a Singapore resident). The last column of Table 5-1 is the total number of resident households

<sup>7</sup> This section is extracted from Chen and Yeung, 2020. *SG LEADS Technical Report 1: Calculation of Sampling Weights for SG LEADS Panel Survey Wave 1*. Singapore: NUS Centre for Family and Population Research.

<sup>8</sup> Figures are based on *Table 1: Resident Households by presence of Member Aged 0-6 Years and Type of Dwelling, 2017* from DOS

<sup>9</sup> Based on email clarification with DOS on October 2019, a household refers to a group of 2 or more persons living together in the same house and sharing common food or other arrangements for essential living. It also includes a person living alone or a person living with others but having his own food arrangements. Although persons may be living in the same house, they may not be members of the same household. Singapore resident households refer to households headed by a resident (i.e. headed by a Singapore citizen or permanent resident).

with at least 1 member aged 0-6 years (the child may not be a Singapore resident). In addition, one residential address may contain more than one household, therefore, the total numbers in the 5th and 6th columns are different.

We need to adjust the sample distribution by planning area (PA) as the SG LEADS team allowed condominiums and landed properties being substituted by a unit of the same housing type but in a different PA.

The adjustment factor is calculated by using the number of a specific housing type in a PA in the original sample fame (sample frame after substitution) to be divided by the number of that specific housing type in a PA in the new sample fame (sample frame from DOS). E.g., condominiums in AM in the original sampling frame/ condominiums in the AM in the new sampling frame. The adjustment factor for each PA is shown in *Appendix A: Adjustment Factor for Condominiums and Landed Properties*. A “na” was assigned for cells with no completed households in the SG LEADS dataset.

## 5.2 Adjust the Initial Weight for SG LEADS Non-Response to Produce Interim Household Weight

We adjusted the response rate by housing type in each PA using the inverse of response rate for each subgroup (e.g., inverse of the response rate of the HDB 1-3 room flat at AM). Following the China Family and Panel Survey (2010, baseline survey), the Response Rate 1 (RR1) defined by AAPRO which assumes all cases with unknown eligibility are eligible was adopted. The RR1 is calculated through the equation listed below:

$$RR1 = \frac{I}{I + R + NC + UE}$$

where *I*, *R*, *NC*, *UE* refer to complete interviews, refusal, non-contact and unknown eligibility. See Appendix 2 for the Response Rate (RR1) and Nonresponse Adjustment Factor by Housing Type and PA matrix

Table 5-2: SG LEADS Weighted Sample Description by Dwelling Type with Interim Weight

Housing type	Weighted (n)	Weighted (%)	2017 National statistics (%) <sup>10</sup>
1- and 2- Room Flats	129.7646	3.72	2.90
3-Room Flats	320.6078	9.2	11.75
4-Room Flats	1,298.40	37.27	35.93
5-Room and Executive Flats	914.7745	26.26	27.45
Condominiums	682.8117	19.6	18.16
Landed Properties	137.6423	3.95	3.51
Total	3,484	100	100

The weighted percentage of each dwelling type is close to the distribution of *Resident Households by presence of Member Aged 0-6 Years and Type of Dwelling, 2017*.

<sup>10</sup> Singapore resident households by presence of member aged 0-6 years and type of dwelling, 2017



### 5.3 Post-Stratify to Population Totals to Get Initial Post-Stratification Weight

We post-stratified the interim weight from Step 6.1.2 to population totals calculating using data from the 2015 General Household Survey (2015 GHS). Post-stratification adjustment was conducted at the household level over three characteristics:

- Ethnic group of the household head (Chinese, Malays, Indians, Others)
- Dwelling type (1- and 2- Room Flats, 3-Room Flats, 4-Room Flats, 5-Room and Executive Flats, Condominiums, Other Apartments and Landed Properties)
- Education of the household head (Secondary and Below, Post-Secondary, University)

Fifty-four subgroups were formed by the three-way cross-classification of these categorical variables (Table 5-3). As some of the subgroups are missing, imputation was conducted by using the existing numbers in the table.

*Table 5-3: Resident Households with at Least One Child Aged Below 7 years, by Type of Dwelling, Highest Qualification Attained, and Ethnic Group of Head of Household, 2015*

Ethnic Group	Type of Dwelling	Total	Secondary and Below	Post-Secondary	University <sup>11</sup>
Total	Total	207,040	49,800	60,670	96,320
	1- and 2- Room Flats	7,020	4,890	1,960	170
	3-Room Flats	25,560	10,710	7,120	7,670
	4-Room Flats	75,680	19,830	27,440	28,270
	5-Room and Executive Flats	57,870	10,810	17,380	29,680
	Condominiums, Other Apartments and Landed Properties	40,380	3,390	6,590	30,410
Chinese	Total	138,720	32,270	36,450	69,850
	1- and 2- Room Flats	1,820	1,380	480	240
	3-Room Flats	14,850	6,730	4,090	3,970
	4-Room Flats	51,280	13,890	15,970	21,330
	5-Room and Executive Flats	40,170	7,060	10,980	22,130
	Condominiums, Other Apartments and Landed Properties	30,210	3,090	4,930	22,180
Malays	Total	29,660	12,460	14,410	2,780

<sup>11</sup> Secondary and below refers to no formal schooling\pre-primary, primary and secondary (O'N level). Post- secondary refers to post- secondary (non-tertiary): general & vocational (a' level), polytechnic diploma and professional qualification and other diploma. University refers to bachelor's or equivalent, postgraduate diploma\ certificate (excluding master's and doctorate) and master's and doctorate or equivalent.

	1- and 2- Room Flats	4,280	2,910	1,370	0
	3-Room Flats	4,620	2,710	1,690	220
	4-Room Flats	12,350	4,590	7,170	590
	5-Room and Executive Flats	7,580	2,190	3,900	1,480
	Condominiums, Other Apartments and Landed Properties	830	60	280	490
	<b>Total</b>	<b>27,760</b>	<b>4,130</b>	<b>8,130</b>	<b>15,400</b>
Indians	1- and 2- Room Flats	800	550	280	60
	3-Room Flats	4,570	1,050	1,190	2,320
	4-Room Flats	9,180	1,080	3,770	4,290
	5-Room and Executive Flats	7,470	1,340	2,120	4,010
	Condominiums, Other Apartments and Landed Properties	5,600	110	770	4,720
	<b>Total</b>	<b>10,910</b>	<b>940</b>	<b>1,670</b>	<b>8,290</b>
Others	1- and 2- Room Flats	120	50	70	0
	3-Room Flats	1,530	220	160	1,150
	4-Room Flats	2,870	270	530	2,070
	5-Room and Executive Flats	2,650	280	300	2,060
	Condominiums, Other Apartments and Landed Properties	3,740	120	610	3,010

Notes (DOS):

- 1) Data are rounded to the nearest 10.
- 2) Cells shaded in blue are based on small sample size and are to be used with caution.
- 3) Cells shaded in yellow have been suppressed due to small sample size and should not be used to draw any inferences.

Notes (SG LEADS):

- 1) Cells shaded in yellow have been imputed by using the numbers in a same dwelling type or Education
- 2) Numbers in BLACK in yellow cells were calculated directly using the numbers in the same dwelling type or same educational level within a specific race group
- 3) Numbers in GREEN in yellow cells were calculated directly using the TOTAL of a specific dwelling type and education minus that for each race
- 4) Numbers in RED in yellow cells were calculated directly using both the original or estimated numbers in the same dwelling type or same educational level within a specific race group

If there are fewer than 10 households in a subgroup in the sample, adjacent subgroups are combined cross dwelling type. In addition, cells with population less than 500 (in Table 6) were also collapsed with adjacent cells across dwelling type. After such combination, 38 subgroups were formed.

The SG LEADS weighted population estimate count was calculated with the interim weight from Step 2. Initial post-stratification adjustment factors were computed as the ratio of the 2015 GHS totals to the

SG LEADS weighted population estimate count. These data are presented in *Appendix 3: Initial post-stratification adjustment*

## 5.4 Trim Very Large and Very Small Values of the Initial Post-Stratified Weight

The initial post-stratification adjustment factors were applied to the interim weight to produce an initial post-stratified weight. To reduce the influence of extreme weight values on the variances of sample estimates of population statistics, we decided to trim extreme values at each end of the distribution. The trimming rule applied to the SG LEADS Wave 1 Household Weight assigned the cases with the weight values in the top 5% and in the bottom 5% of the weight distribution to the 5th and 95th percentile values of the weight distribution, respectively.

## 5.5 Post-Stratify the Trimmed Weights to Get Household-Level Weight

After trimming the weights, the sum of initial post-stratified weight does not equal to the population (2015 GHS totals). Therefore, the post-stratification procedure (Step 4) was repeated so that the final trimmed weights again matched the 2015 GHS totals. The SG LEADS weighted estimate was computed by the trimmed initial post-stratified weight. Final adjustment factors were computed as the ratio of the 2015 GHS totals to the SG LEADS weighted population estimate count.

The final post-stratification adjustment factors were applied to the trimmed initial post-stratified weight to produce a household-level weight. The values are listed in Appendix 4.

## 5.6 Construct within-Family Child Selection Factor to Produce Child-Level Weight

Within family selection factor could be calculated by dividing the number of responded children in a family by the number of eligible children in the family. The weight for each responded child from each address is illustrated below.

*Table 5-4: Ways to Construct Child-level Adjustment Factor*

Address	No. of eligible children in a given address in the sampling frame	No. of respondent children in a given address in the sampling frame	Child-level adjustment factor
Address A	5	2	$5/2=2.5$
Address B	3	1	$3/1=3$
Address C	2	2	$2/2=1$

## 5.7 Weighted Description of SG LEADS Dataset

Shown below are the resulting weighted sample distribution of the SG LEADS dataset at the household level and at the child level:

## 5.7.1 Household Level

Table 5-5: SG LEADS Weighted Sample Distribution of Dwelling Type

Dwelling type	n	%	Weighted n	Weighted %	2017 National statistics (%) <sup>a</sup>
HDB 1- to 2-room flats	389	11.17	126.96	3.64	2.90
HDB 3-room flats	962	27.61	432.99	12.43	11.75
HDB 4-room flats	1,097	31.49	1312.52	37.67	35.93
HDB 5-Room and Executive Flats	548	15.73	958.14	27.5	27.45
Condominiums	432	12.4	551.37	15.83	18.16
Landed Properties	56	1.61	102.03	2.93	3.51
Total	3484	100	3484	100	100

<sup>a</sup> DOS, 2018. *Singapore resident household by presence of member aged 0-6 years and type of dwelling, 2017*

Table 5-6: SG LEADS Weighted Sample Distribution of Education of Head of Household

Education of the household head	n	%	Weighted n	Weighted %	GHS2015(%) <sup>a</sup>
Secondary and Below	972	27.9	831.72	23.87	24.03
Post-Secondary	1,142	32.78	1,023.55	29.38	29.30
University	1,370	39.32	1,628.73	46.75	46.52
Total	3,484	100	3,484	100	100

<sup>a</sup> Figures from DOS Table on *Resident household with at least 1 child aged below 7 years, by type of dwelling, highest qualification attained and ethnic group of head of household, 2015*, from DOS

Table 5-7: SG LEADS Weight Sample Distribution of Race of Household

Race of the household head	n	%	Weighted n	Weighted %	GHS2015 (%) <sup>a</sup>
Chinese	2,193	62.94	2,339.05	67.14	66.81
Malay	803	23.05	499.47	14.34	14.2
Indian	370	10.62	467.30	13.41	13.38
Others	118	3.39	178.17	5.11	5.31
Total	3,484	100	3,484	100	100

<sup>a</sup> Figures from DOS Table on Resident household with at least 1 child aged below 7 years, by type of dwelling, highest qualification attained and ethnic group of head of household, 2015

*Table 5-8: Weighted Distribution of Household Size*

Household size	Unweighted n	Unweighted %	Weighted n	Weighted %
2	28	0.8	14.52	0.42
3	738	21.18	721.52	20.71
4	1,333	38.26	1,393.61	40.00
5	775	22.24	767.20	22.02
6	351	10.07	365.39	10.49
7	174	4.99	155.96	4.48
8	52	1.49	38.05	1.09
9	23	0.66	20.26	0.58
10	4	0.11	2.34	0.07
11	3	0.09	2.10	0.06
12	2	0.06	2.76	0.08
13	1	0.03	0.28	0.01
total	3484	100	3484	100

*Table 5-9: Distribution of SG LEADS Respondent Children by Household*

# of children under 7 in the household	# of children interviewed		Total	Weighted n	Weighted %
	1	2			
1	1,926	0	1,926	1,974.31	56.67
2	18	1,274	1,292	1,292.96	37.11
3	4	218	222	189.66	5.44
4	0	36	36	23.52	0.68
5	0	7	7	2.13	0.06
7	0	1	1	1.42	0.04
Total	1,948	1,536	3,484	3,484	100

The total percentage of resident households with more than one member aged 0-6 years in 2017 is 31%. In SG LEADS, 43% of the households have more than one Singapore resident aged under 7.

## 5.7.2 Child Level

*Table 5-10: Age Distribution of SG LEADS Child Respondents*

Age in years	n	%	Weighted n	Weighted %
0	511	10.18	495.53	9.87
1	710	14.14	666.45	13.28
2	817	16.27	835.14	16.64
3	807	16.08	809.81	16.13
4	708	14.1	718.81	14.32
5	727	14.48	732.22	14.59
6	740	14.74	762.04	15.18
Total	5,020	100	5,020	100

*Table 5-11: Gender Distribution of SG LEADS Child Respondents*

Gender	n	%	Weighted n	Weighted %
Male	2,522	50.24	2,559.35	50.98
Female	2,498	49.76	2,460.65	49.02

*Table 5-12: Race Distribution of SG LEADS Child Respondents*

Race	n	%	Weighted n	Weighted %
Chinese	3154	62.83	3,390.77	67.55
Malay	1263	25.16	843.41	16.80
Indian	465	9.26	541.98	10.80
Others	138	2.75	243.83	4.86
Total	5020	100	3,390.77	67.55

## 6 Post-Fieldwork Notes (Updated on 21 March 2022)

As of the end of Wave 1 fieldwork, our sample included 5,019 children from 3,484 households. However, before and during the Wave 2 fieldwork, with more accurate information obtained, some children and households have been invalidated. As of 21 March 2022, the final count of eligible children and households in Wave 1 are **5,005 children** and **3,476 households**.

Please take note that different sections of this study guide and different technical reports were drafted at different stages after the end of Wave 1 fieldwork, so the sample sizes may vary.

Table 6-1 outlines the timeline of invalidated households and children after the end of Wave 1 fieldwork.

*Table 6-1 Timeline of invalid households and children.*

Household or Child?	HHID/CHID	Date	Reason	Email Thread	Count of W1 Children	Count of W1 Households
1 Household with only 1 child	141048	26 June 2020	Duplicate address. We retain only HH141049 which was completed earlier and reports more household members in the screener.	Duplicate addresses	5,019	3,484
1 Household with only 1 child	293436	26 June 2020	Duplicate address. We retain only HH233420 which reports two children although was completed later, while HH293436 reports only one child.	Duplicate addresses	5,018	3,483
1 household with only 1 child	363316	15 Sep 2020	Duplicate case. HH11106 was the original household interviewed on 31 Mar 2019 while 363316 was a substitute household (with the same child) interviewed on 19 Jun 2019		5,017	3,482
1 child	361001CHILD1	8 June 2021	Child's age makes them ineligible. 13 years old but	HHID11042	5,016	3,481

			shown as 8 years old in our listing due to the wrong DOB	and 361001		
1 child	11123CHILD1	24 July 2021	According to PCG, CHILD1 is not her child but confirmed CHILD2 is her child.	HHID11123	5,015	3,481
1 household with only 1 child	11060	28 July 2021	Duplicate of HH 53187. Family used third child to complete interview twice	HHID11060 and HHID53187	5,014	3,480
1 household with 2 children	251016	30 July 2021	Duplicate of HH 33156	HHIDs 251016 & 33156	5,012	3,479
1 household with 2 children	331004	6 Aug 2021	Duplicate of HH 331005	HHID 331004 and HHID 331005	5,010	3,478
1 household with 2 children	331101	12 Aug 2021	None of the children in HH are Singaporean	Screeener Errors as of 13 July	5,008	3,477
1 child	21026CHILD2	1 Sept 2021	Nephew does not reside in the HH	HHID21026	5,007	3,477
1 child	21139CHILD2	1 Dec 2021	CHILD2 was not residing in HH or taken care of by bio mom (W1 PCG).	SG LEADS    Master Listing (Wave 2)	5,006	3,477
1 household with only 1 child	11137	9 March 2022	None of the children (one target child and sibling) are Singaporean. Dad is EP holder and rest of family are DP.	W1 Data Issue - Potentially ineligible household	5,005	3,476



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## Appendices:

### Appendix 1: Adjustment Factor for Condominium and Landed Properties by Planning Area (PA)

PA	Original SF condominiums	New SF condominiums	Adjustment factor for condominiums	Original SF landed properties	New SF landed properties	Adjustment factor for landed properties
AM	13	7	1.86	11	12	0.92
BD	60	41	1.46	36	33	1.09
BK	23	19	1.21	3	4	0.75
BM	16	6	2.67	0	0	-
BP	20	16	1.25	2	3	0.67
BS	17	13	1.31	5	4	1.25
BT	45	26	1.73	24	20	1.20
CK	16	36	0.44	2	2	1.00
CL	21	13	1.62	4	3	1.33
GL	19	16	1.19	7	7	1.00
HG	33	38	0.87	15	17	0.88
JE	3	2	1.50	0	0	-
JW	22	18	1.22	3	5	0.60
KL	23	15	1.53	1	1	1.00
MD	1	1	1.00	0	0	-
MP	23	24	0.96	8	8	1.00
NT	8	6	1.33	0	0	-
NV	24	16	1.50	7	0	na
OR	1	1	1.00	0	0	-
OT	4	5	0.80	0	0	-
PG	41	54	0.76	0	0	-
PR	44	75	0.59	4	8	0.50
QT	10	10	1.00	3	3	1.00
RC	2	3	0.67	0	0	-

RV	11	13	0.85	1	0	na
SB	8	29	0.28	3	5	0.60
SE	47	41	1.15	1	1	1.00
SG	15	9	1.67	23	27	0.85
SR	5	2	2.50	0	0	-
TM	40	54	0.74	0	0	-
TN	20	24	0.83	4	1	4.00
TP	15	18	0.83	4	7	0.57
WD	25	29	0.86	1	2	0.50
YS	21	21	1.00	4	5	0.80
Z5	0	0	-	2	2	1.00
Z6	0	0	-	1	1	1.00
Z8	1	1	1.00	0	0	-
ZA	0	0	-	1	1	1.00
DT	2	0	na	0	0	-
MU	1	0	na	0	0	-
SI	2	0	na	1	0	na
Z1	0	0	-	0	0	-
Z2	0	0	-	0	0	-
Z3	0	0	-	0	0	-
Z4	0	0	-	1	0	na
Z7	0	0	-	0	0	-
Z9	0	0	-	0	0	-
Total	702	702		182	182	

Appendix 2: Response Rate (RR1) and Nonresponse Adjustment Factor by Housing Type and Planning Area (PA)

<b>PA</b>	<b>Dwelling type</b>	<b>RR1</b>	<b>Nonresponse adjustment factor</b>
AM	HDB 1-3 room flats	0.73	1.37
BD	HDB 1-3 room flats	0.61	1.63
BK	HDB 1-3 room flats	0.83	1.21
BM	HDB 1-3 room flats	0.70	1.42
BP	HDB 1-3 room flats	0.76	1.32
BS	HDB 1-3 room flats	0.33	3.00
CK	HDB 1-3 room flats	0.88	1.13
CL	HDB 1-3 room flats	0.62	1.61
GL	HDB 1-3 room flats	0.52	1.93
HG	HDB 1-3 room flats	0.58	1.73
JE	HDB 1-3 room flats	0.64	1.57
JW	HDB 1-3 room flats	0.82	1.22
KL	HDB 1-3 room flats	0.56	1.80
MP	HDB 1-3 room flats	0.56	1.80
NV	HDB 1-3 room flats	0.77	1.30
OT	HDB 1-3 room flats	0.61	1.64
PG	HDB 1-3 room flats	0.71	1.40
PR	HDB 1-3 room flats	0.60	1.67
QT	HDB 1-3 room flats	0.59	1.71
RC	HDB 1-3 room flats	0.27	3.67
SB	HDB 1-3 room flats	0.74	1.35
SE	HDB 1-3 room flats	0.57	1.76
SG	HDB 1-3 room flats	0.63	1.59
TM	HDB 1-3 room flats	0.66	1.52
TP	HDB 1-3 room flats	0.70	1.43
WD	HDB 1-3 room flats	0.70	1.42
YS	HDB 1-3 room flats	0.74	1.36
Z1	HDB 1-3 room flats	0.67	1.50

AM	HDB 4 room flats	0.57	1.75
BD	HDB 4 room flats	0.56	1.78
BK	HDB 4 room flats	0.83	1.20
BM	HDB 4 room flats	0.66	1.51
BP	HDB 4 room flats	0.83	1.21
BS	HDB 4 room flats	0.52	1.92
BT	HDB 4 room flats	0.67	1.50
CK	HDB 4 room flats	0.80	1.24
CL	HDB 4 room flats	0.54	1.84
GL	HDB 4 room flats	0.52	1.94
HG	HDB 4 room flats	0.56	1.80
JE	HDB 4 room flats	0.91	1.10
JW	HDB 4 room flats	0.76	1.32
KL	HDB 4 room flats	0.48	2.07
MP	HDB 4 room flats	0.50	2.00
NV	HDB 4 room flats	0.58	1.71
OT	HDB 4 room flats	0.33	3.00
PG	HDB 4 room flats	0.51	1.96
PR	HDB 4 room flats	0.59	1.68
QT	HDB 4 room flats	0.73	1.38
RC	HDB 4 room flats	0.75	1.33
SB	HDB 4 room flats	0.73	1.38
SE	HDB 4 room flats	0.44	2.30
SG	HDB 4 room flats	0.56	1.79
TM	HDB 4 room flats	0.50	1.98
TP	HDB 4 room flats	0.71	1.42
WD	HDB 4 room flats	0.58	1.72
YS	HDB 4 room flats	0.76	1.32
Z2	HDB 4 room flats		
AM	HDB 5 room flats	0.63	1.58
BD	HDB 5 room flats	0.33	3.00

BK	HDB 5 room flats	0.80	1.25
BM	HDB 5 room flats	0.52	1.92
BP	HDB 5 room flats	0.78	1.28
BS	HDB 5 room flats	0.33	3.00
BT	HDB 5 room flats	0.67	1.50
CK	HDB 5 room flats	0.64	1.57
CL	HDB 5 room flats	0.42	2.40
GL	HDB 5 room flats	0.43	2.33
HG	HDB 5 room flats	0.57	1.76
JE	HDB 5 room flats	0.61	1.64
JW	HDB 5 room flats	0.65	1.53
KL	HDB 5 room flats	0.47	2.14
MP	HDB 5 room flats	0.50	2.00
NV	HDB 5 room flats	1.00	1.00
PG	HDB 5 room flats	0.57	1.75
PR	HDB 5 room flats	0.71	1.41
QT	HDB 5 room flats	0.73	1.38
SB	HDB 5 room flats	0.77	1.30
SE	HDB 5 room flats	0.39	2.57
SG	HDB 5 room flats	0.50	2.00
TM	HDB 5 room flats	0.35	2.86
TP	HDB 5 room flats	0.55	1.82
WD	HDB 5 room flats	0.58	1.73
YS	HDB 5 room flats	0.73	1.37
Z3	HDB 5 room flats	0.00	
Z7	HDB 5 room flats	1.00	1.00
Z9	HDB 5 room flats	0.00	
AM	Condominiums	0.57	1.75
BD	Condominiums	0.40	2.50
BK	Condominiums	0.74	1.36
BM	Condominiums	0.20	5.00

BP	Condominiums	0.88	1.14
BS	Condominiums	0.54	1.86
BT	Condominiums	0.54	1.86
CK	Condominiums	0.86	1.16
CL	Condominiums	0.46	2.17
GL	Condominiums	0.69	1.45
HG	Condominiums	0.84	1.19
JE	Condominiums	1.00	1.00
JW	Condominiums	0.72	1.38
KL	Condominiums	0.47	2.14
MD	Condominiums	0.00	
MP	Condominiums	0.30	3.29
NT	Condominiums	0.67	1.50
NV	Condominiums	0.50	2.00
OR	Condominiums	0.00	
OT	Condominiums	0.67	1.50
PG	Condominiums	0.85	1.18
PR	Condominiums	0.48	2.08
QT	Condominiums	0.60	1.67
RC	Condominiums	0.67	1.50
RV	Condominiums	0.31	3.25
SB	Condominiums	0.97	1.04
SE	Condominiums	0.71	1.41
SG	Condominiums	0.56	1.80
SR	Condominiums	0.00	
TM	Condominiums	0.37	2.70
TN	Condominiums	0.21	4.80
TP	Condominiums	0.39	2.57
WD	Condominiums	0.93	1.07
YS	Condominiums	0.81	1.24
Z8	Condominiums	0.00	

AM	Landed properties	0.25	4.00
BD	Landed properties	0.21	4.71
BK	Landed properties	0.50	2.00
BP	Landed properties	0.67	1.50
BS	Landed properties	0.00	
BT	Landed properties	0.30	3.33
CK	Landed properties	0.00	
CL	Landed properties	0.00	
GL	Landed properties	0.67	1.50
HG	Landed properties	0.12	8.50
JW	Landed properties	0.40	2.50
KL	Landed properties	1.00	1.00
MP	Landed properties	0.25	4.00
PR	Landed properties	0.63	1.60
QT	Landed properties	0.67	1.50
SB	Landed properties	0.60	1.67
SE	Landed properties	0.00	
SG	Landed properties	0.22	4.50
TN	Landed properties	0.00	
TP	Landed properties	0.57	1.75
WD	Landed properties	1.00	1.00
YS	Landed properties	0.20	5.00
Z5	Landed properties	0.00	
Z6	Landed properties	0.00	
ZA	Landed properties	0.00	

Note: A zero response rate indicates that there is no such housing type in that PA in our final dataset. Thus, adjustment factor is not provided for PAs without successful interviews (keep as blank).



### Appendix 3: Initial Post-stratification Adjustment

SN	Race	Education	Dwelling Type	n	SG LEADS weighted estimate	2015 GHS totals	Initial adjustment factor
1	Chinese	Post-Secondary	1- and 2- Room Flats & 3-Room Flats	204	3,249	4,570	1.41
2	Chinese	Post-Secondary	4-Room Flats	218	12,602	15,970	1.27
3	Chinese	Post-Secondary	5-Room and Executive Flats	127	9,505	10,980	1.16
4	Chinese	Post-Secondary	Condominiums, Other Apartments & Landed Properties	76	5,920	4,930	0.83
5	Chinese	Secondary and Below	1- and 2- Room Flats	66	1,058	1,380	1.30
6	Chinese	Secondary and Below	3-Room Flats	205	3,214	6,730	2.09
7	Chinese	Secondary and Below	4-Room Flats	129	7,211	13,890	1.93
8	Chinese	Secondary and Below	5-Room and Executive Flats	49	3,651	7,060	1.93
9	Chinese	Secondary and Below	Condominiums, Other Apartments and Landed Properties	16	1,581	3,090	1.95
10	Chinese	University	1- and 2- Room Flats & 3-Room Flats	153	2,502	4,210	1.68
11	Chinese	University	4-Room Flats	354	20,903	21,330	1.02
12	Chinese	University	5-Room and Executive Flats	229	18,598	22,130	1.19
13	Chinese	University	Condominiums, Other Apartments and Landed Properties	367	28,371	22,180	0.78
14	Indian	Post-Secondary	1- and 2- Room Flats & 3-Room Flats	70	1,091	1,470	1.35
15	Indian	Post-Secondary	4-Room Flats	42	2,247	3,770	1.68
16	Indian	Post-Secondary	5-Room and Executive Flats Condominiums, Other Apartments and Landed Properties	25	1,925	2,890	1.50

17	Indian	Secondary and Below	1- and 2- Room Flats	30	481	550	1.14
18	Indian	Secondary and Below	3-Room Flats	30	480	1,050	2.19
19	Indian	Secondary and Below	4-Room Flats & 5-Room and Executive Flats & Condominiums, Other Apartments and Lande d Properties	17	1,026	2,530	2.47
20	Indian	University	1- and 2- Room Flats & 3-Room Flats	49	779	2,380	3.06
21	Indian	University	4-Room Flats	60	3,542	4,290	1.21
22	Indian	University	5-Room and Executive Flats	33	2,706	4,010	1.48
23	Indian	University	Condominiums, Other Apartments and Lande d Properties	14	1,759	4,720	2.68
24	Malay	Post-Secondary	1- and 2- Room Flats	51	769	1,370	1.78
25	Malay	Post-Secondary	3-Room Flats	110	1,680	1,690	1.01
26	Malay	Post-Secondary	4-Room Flats	141	7,937	7,170	0.90
27	Malay	Post-Secondary	5-Room and Executive Flats & Condominiums, Other Apartments and Lande d Properties	40	3,011	4,180	1.39
28	Malay	Secondary and Below	1- and 2- Room Flats	186	2,945	2,910	0.99
29	Malay	Secondary and Below	3-Room Flats	136	2,107	2,710	1.29
30	Malay	Secondary and Below	4-Room Flats	63	3,372	4,590	1.36
31	Malay	Secondary and Below	5-Room and Executive Flats	17	1,416	2,190	1.55
32	Malay	University	3-Room Flats & 4-Room Flats	37	1,859	810	0.44
33	Malay	University	5-Room and Executive Flats & Condominiums, Other Apartments and Lande d Properties	23	1,710	1,970	1.15

34	Others	Post-Secondary	1- and 2- Room Flats & 3-Room Flats & 4-Room Flats & 5-Room and Executive Flats & Condominiums, Other Apartments and Lande d Properties	39	1,484	1,670	1.13
35	Others	Secondary and Below	1- and 2- Room Flats & 3-Room Flats & 5-Room and Executive Flats	28	491	550	1.12
36	Others	University	1- and 2- Room Flats & 3-Room Flats	13	212	1,160	5.48
37	Others	University	4-Room Flats	22	1,138	2,070	1.82
38	Others	University	5-Room and Executive Flats & Condominiums, Other Apartments and Lande d Properties	15	1,285	5,070	3.95

#### Appendix 4: Post-stratification Adjustment of Trimmed Weights

SN	Race	Education	Dwelling	n	SG LEADS weighted estimate	2015 GHS totals	Final adjustment factor
1	Chinese	Secondary and Below	1- and 2- Room Flats	65	1,368	1,380	1.01
2	Chinese	Post-Secondary	1- and 2- Room Flats & 3-Room Flats	201	4,520	4,570	1.01
3	Chinese	University	1- and 2- Room Flats & 3-Room Flats	150	4,150	4,210	1.01
4	Chinese	Secondary and Below	3-Room Flats	201	6,628	6,730	1.02
5	Chinese	Post-Secondary	4-Room Flats	221	16,228	15,970	0.98
6	Chinese	Secondary and Below	4-Room Flats	132	13,989	13,890	0.99
7	Chinese	University	4-Room Flats	363	21,834	21,330	0.98
8	Chinese	Post-Secondary	5-Room and Executive Flats	128	11,030	10,980	1.00
9	Chinese	Secondary and Below	5-Room and Executive Flats	49	6,242	7,060	1.13
10	Chinese	University	5-Room and Executive Flats	226	21,289	22,130	1.04
11	Chinese	Post-Secondary	Condominiums, Other Apartments and Landed Properties	73	4,662	4,930	1.06
12	Chinese	Secondary and Below	Condominiums, Other Apartments and Landed Properties	16	1,740	3,090	1.78
13	Chinese	University	Condominiums, Other Apartments and Landed Properties	362	21,367	22,180	1.04
14	Indian	Secondary and Below	1- and 2- Room Flats	29	536	550	1.03
15	Indian	Post-Secondary	1- and 2- Room Flats & 3-Room Flats	70	1,474	1,470	1.00
16	Indian	University	1- and 2- Room Flats & 3-Room Flats	49	2,388	2,380	1.00
17	Indian	Secondary and Below	3-Room Flats	30	1,053	1,050	1.00

18	Indian	Post-Secondary	4-Room Flats	43	3,848	3,770	0.98
19	Indian	University	4-Room Flats	60	4,286	4,290	1.00
20	Indian	Secondary and Below	4-Room Flats & 5-Room and Executive Flats & Condominiums, Other Apartments and Landed Properties	17	2,161	2,530	1.17
21	Indian	University	5-Room and Executive Flats	33	3,732	4,010	1.07
22	Indian	Post-Secondary	5-Room and Executive Flats & Condominiums, Other Apartments and Landed Properties	25	2,714	2,890	1.06
23	Indian	University	Condominiums, Other Apartments and Landed Properties	14	1,881	4,720	2.51
24	Malay	Post-Secondary	1- and 2- Room Flats	50	1,348	1,370	1.02
25	Malay	Secondary and Below	1- and 2- Room Flats	184	2,972	2,910	0.98
26	Malay	Post-Secondary	3-Room Flats	111	1,764	1,690	0.96
27	Malay	Secondary and Below	3-Room Flats	134	2,685	2,710	1.01
28	Malay	University	3-Room Flats & 4-Room Flats	36	865	810	0.94
29	Malay	Post-Secondary	4-Room Flats	143	7,274	7,170	0.99
30	Malay	Secondary and Below	4-Room Flats	65	4,733	4,590	0.97
31	Malay	Secondary and Below	5-Room and Executive Flats	17	1,942	2,190	1.13
32	Malay	Post-Secondary	5-Room and Executive Flats & Condominiums, Other Apartments and Landed Properties	37	3,609	4,180	1.16
33	Malay	University	5-Room and Executive Flats & Condominiums, Other Apartments and Landed Properties	24	1,988	1,970	0.99

34	Others	University	1- and 2- Room Flats & 3-Room Flats & 4-Room Flats	34	2,985	3,230	1.08
35	Others	Post-Secondary	1- and 2- Room Flats & 3-Room Flats & 4-Room Flats & 5-Room and Executive Flats & Condominiums, Other Apartments and Landed Properties	41	1,738	1,670	0.96
36	Others	Secondary and Below	1- and 2- Room Flats & 3-Room Flats & 5-Room and Executive Flats	28	552	550	1.00
37	Others	University	5-Room and Executive Flats & Condominiums, Other Apartments and Landed Properties	16	2,137	5,070	2.37