Evaluating Child abuse risk, Family & Child Protective Services Units in Hong Kong

Geographical Information System

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01

Background

Literature Review, Project Overview

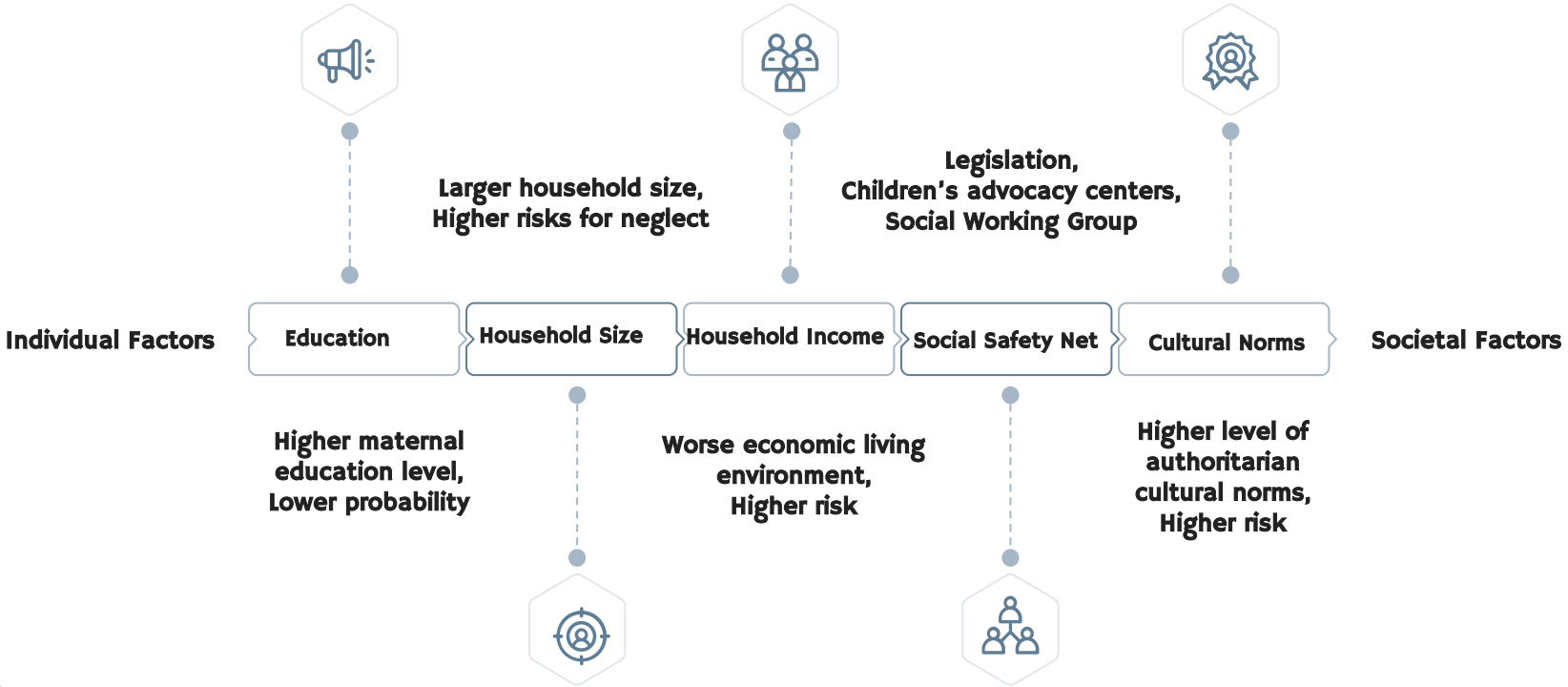
Child Abuse

Child abuse is physical, sexual or psychological maltreatment or negelect of a child or children, especially by a parent or a caregiver.

Immediate adverse physical effects, developmental problems, ill-health, chronic psychological effects, suicide, etc.

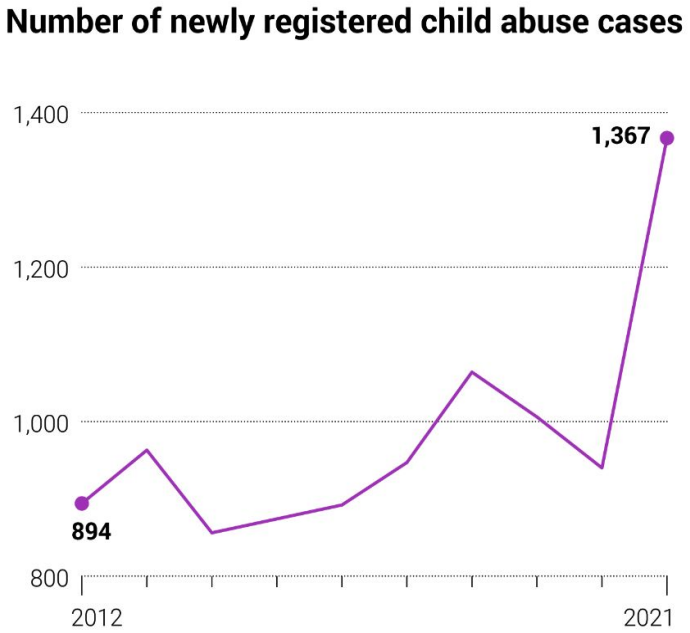
Nearly 300 million children aged 2–4 years regularly suffer physical punishment and/or psychological violence at the hands of parents and caregivers (WHO,2022).

Factors of Child Abuse



(WHO & the International Society for Prevention of Child Abuse and Neglect)

Child Abuse in Hong Kong



50 percent increase

1367 cases of child abuse recorded in 2022

940 cases recorded in 2021

2021

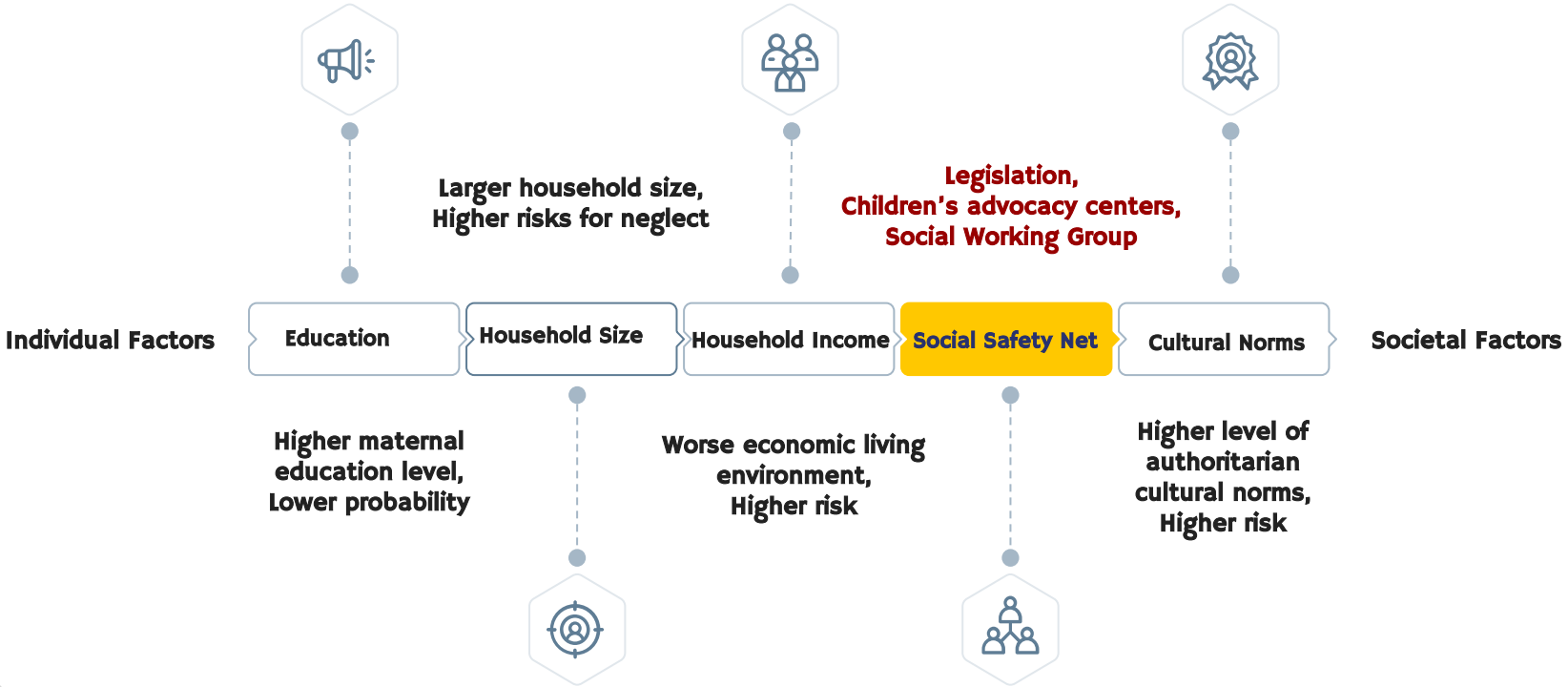
43 percent of cases involved "**physical harm or abuse**"

32 percent concerned "**sexual abuse**"

Crime

(Hong Kong Census & Statistics Department, 2022)

Factors of Child Abuse



(WHO & the International Society for Prevention of Child Abuse and Neglect)

Existing Children Services in HK

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Integrated Family Services

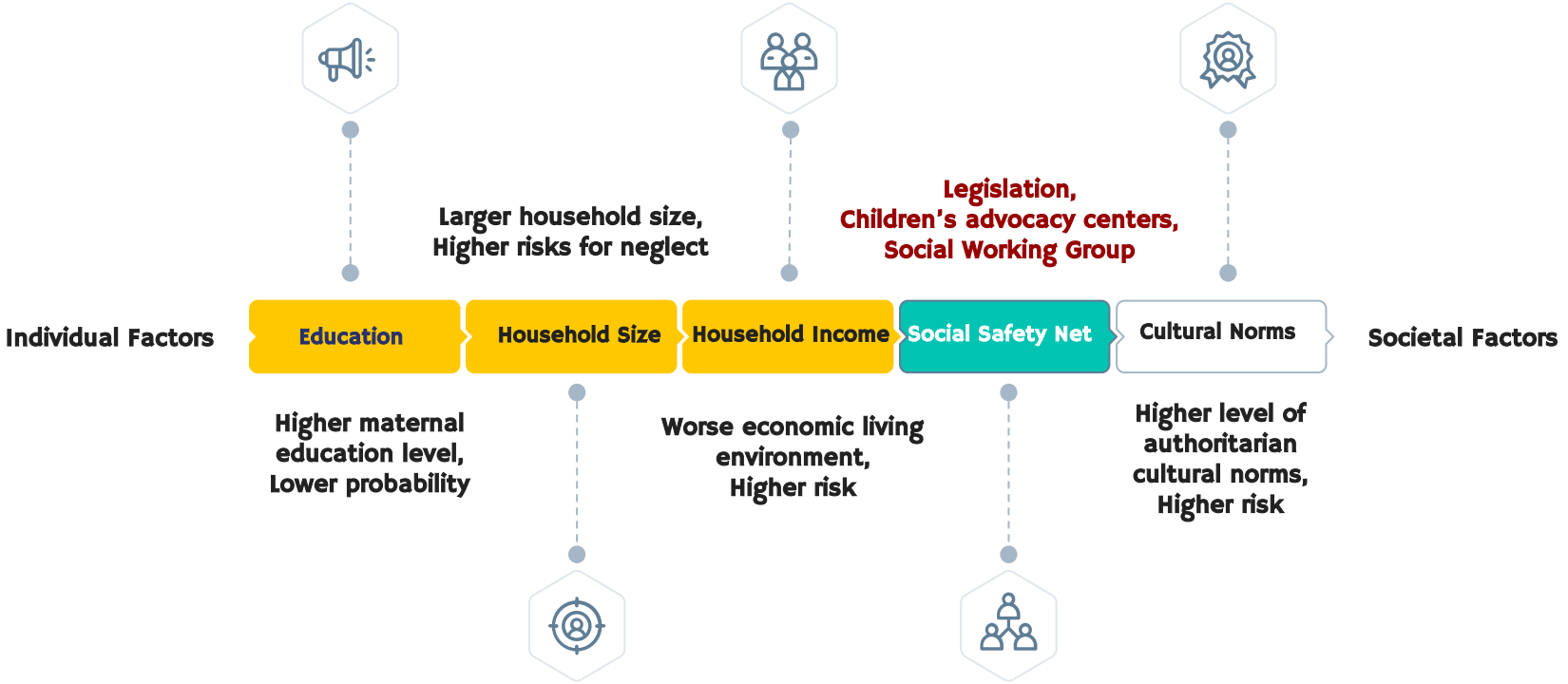
Family resource unit, **Family support** unit and **Family counselling** unit.

11

Family and Children Protective Service

Protect children who are / have been harmed / maltreated
Safeguard the interests of children being affected by custody / guardianship disputes and referred by the Courts

Project overview



Our Aim: Build New Family and Children Protective Centers

02

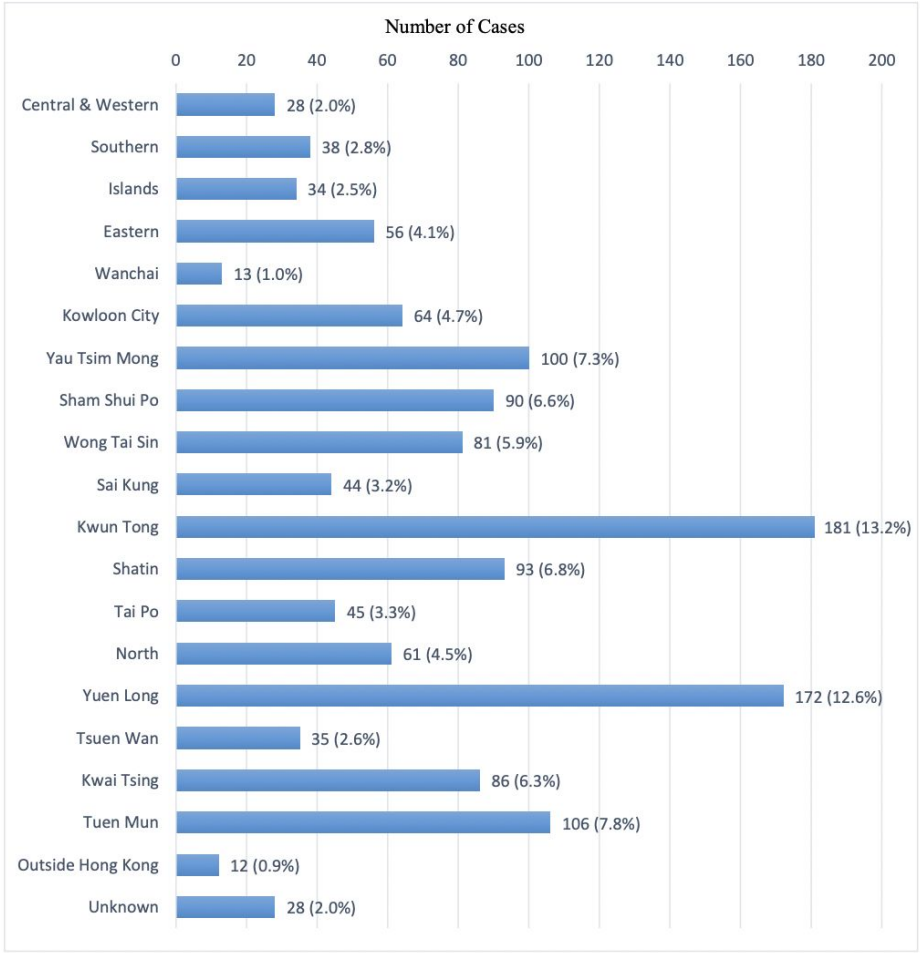
Data

Data source, Descriptive data

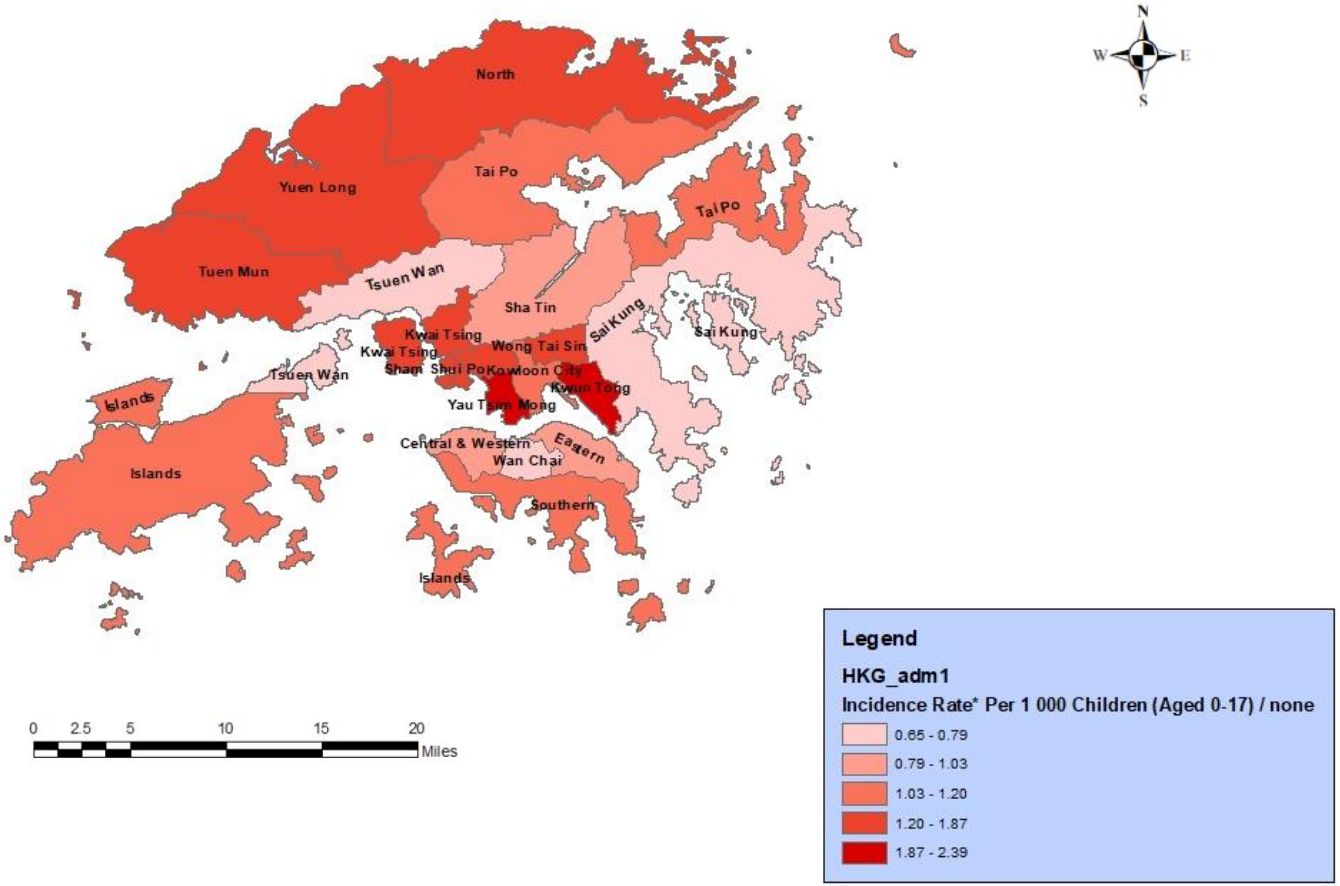
Child Abuse Cases

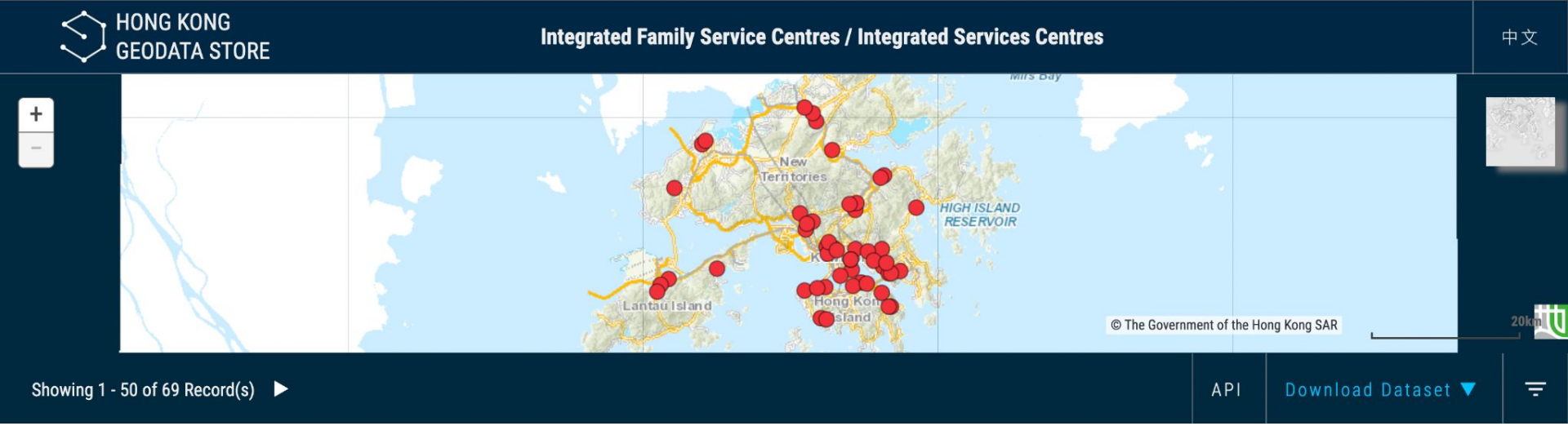
2021 Statistical Report of Child Protection Registry

Graph 2: Distribution of Newly Registered Cases by District for 2021



Child Abuse Incidence Rate (Per 1000 Children)





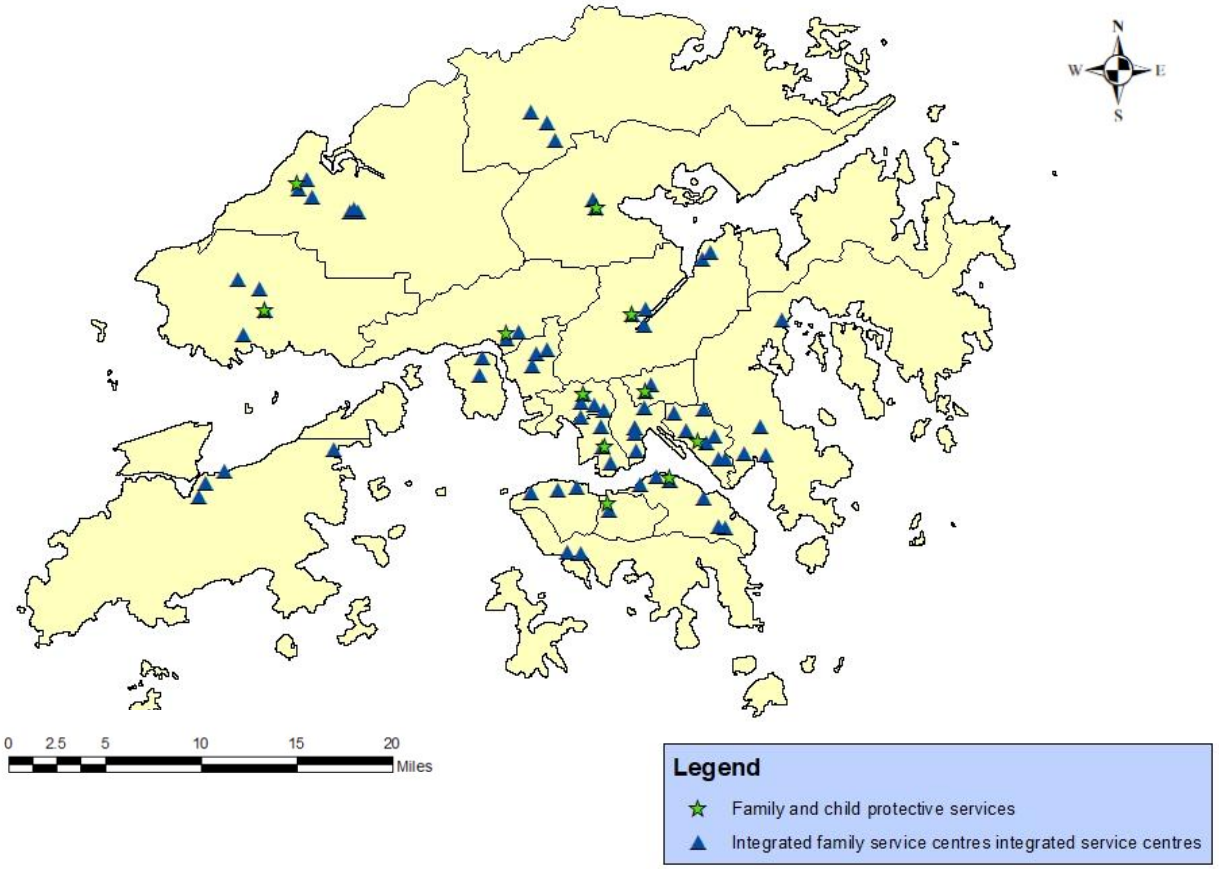
Data from HK GEOData STORE

Export Centers' Latitude
+ Longitude

ArcGIS

Add X and Y coordinate on
Hong Kong base map

Existing Children Services



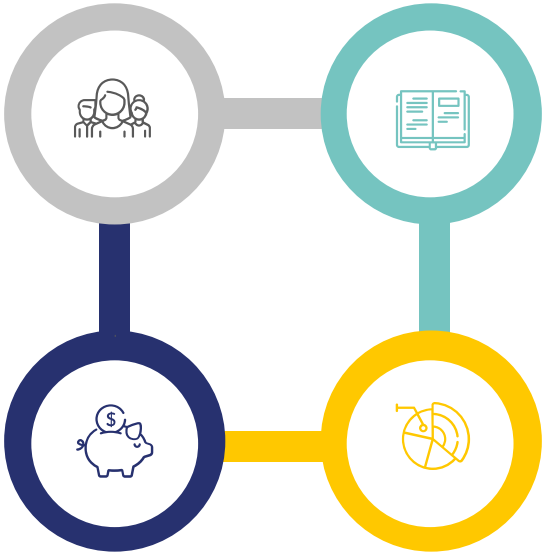
Possible Factors of Child Abuse

Children Density

Proportion of Children (0-14) Population

Income

Monthly Domestic Income



Education

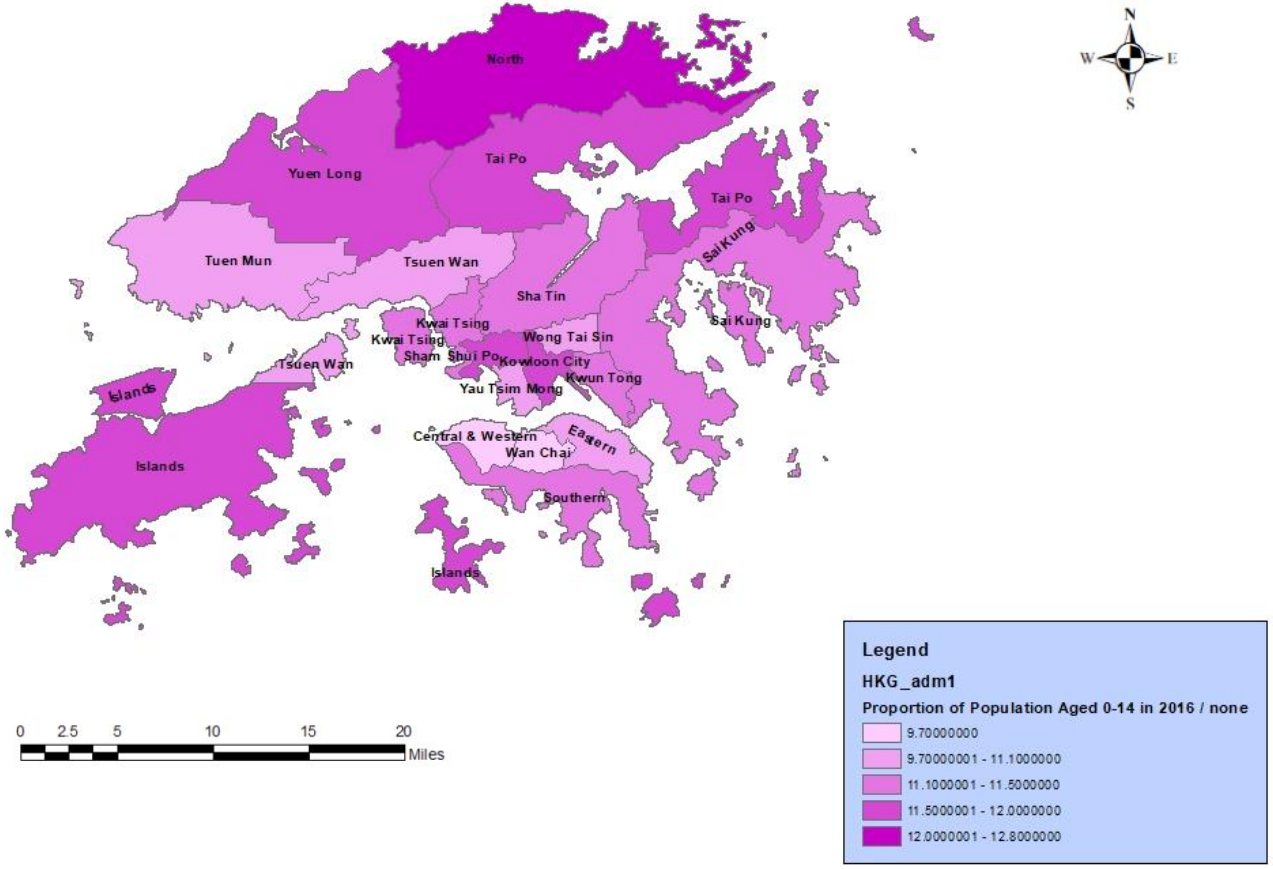
Education score (age > 15) calculated by the proportion of different degree

Poverty Rate

Below 50 percent of the median household income by household size

Data Source: https://www.censtatd.gov.hk/sc/

Proportion of Children (0-14) Population



Education Level

2021 Population and Household Statistics Analysed by District Council District

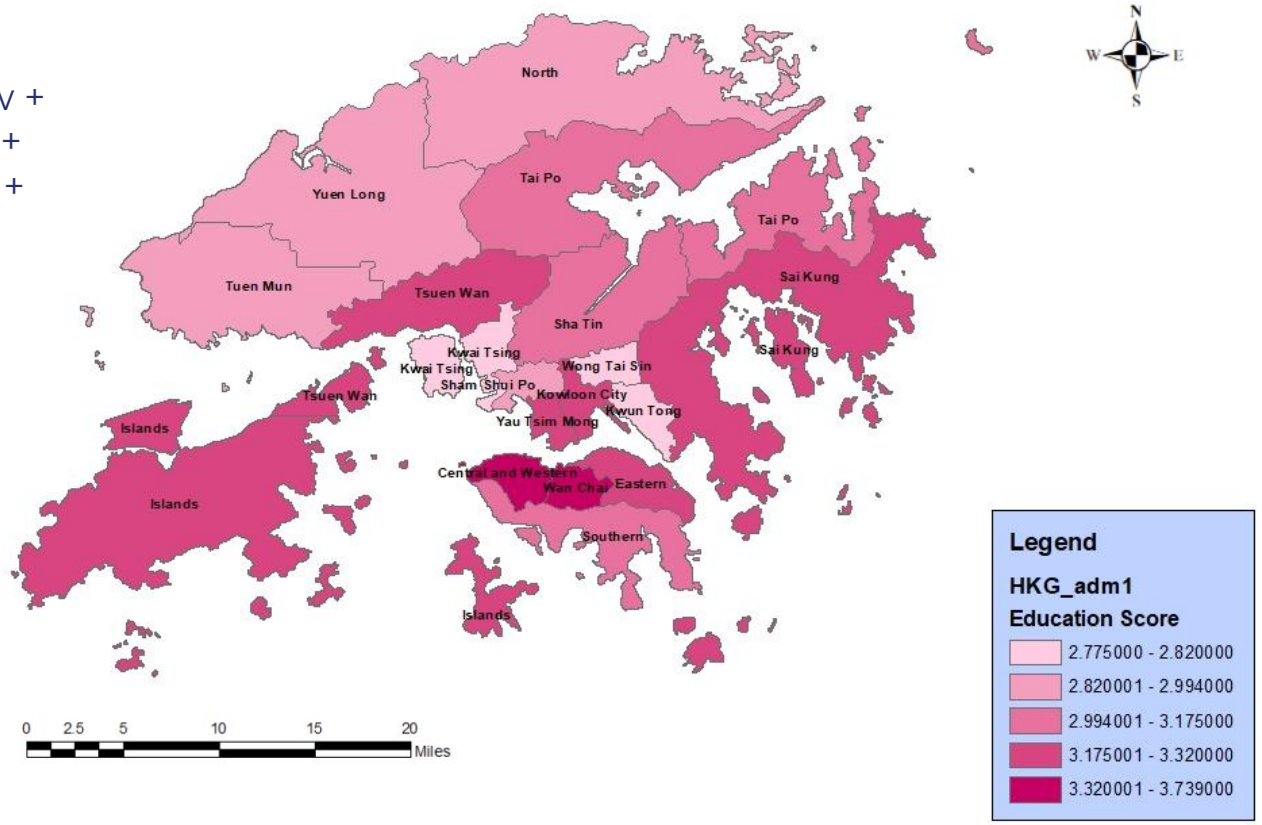
表 6　按區議會分區、性別及教育程度劃分的15歲及以上人口數目

Table 6　Population aged 15 and over by District Council district, sex and educational attainment

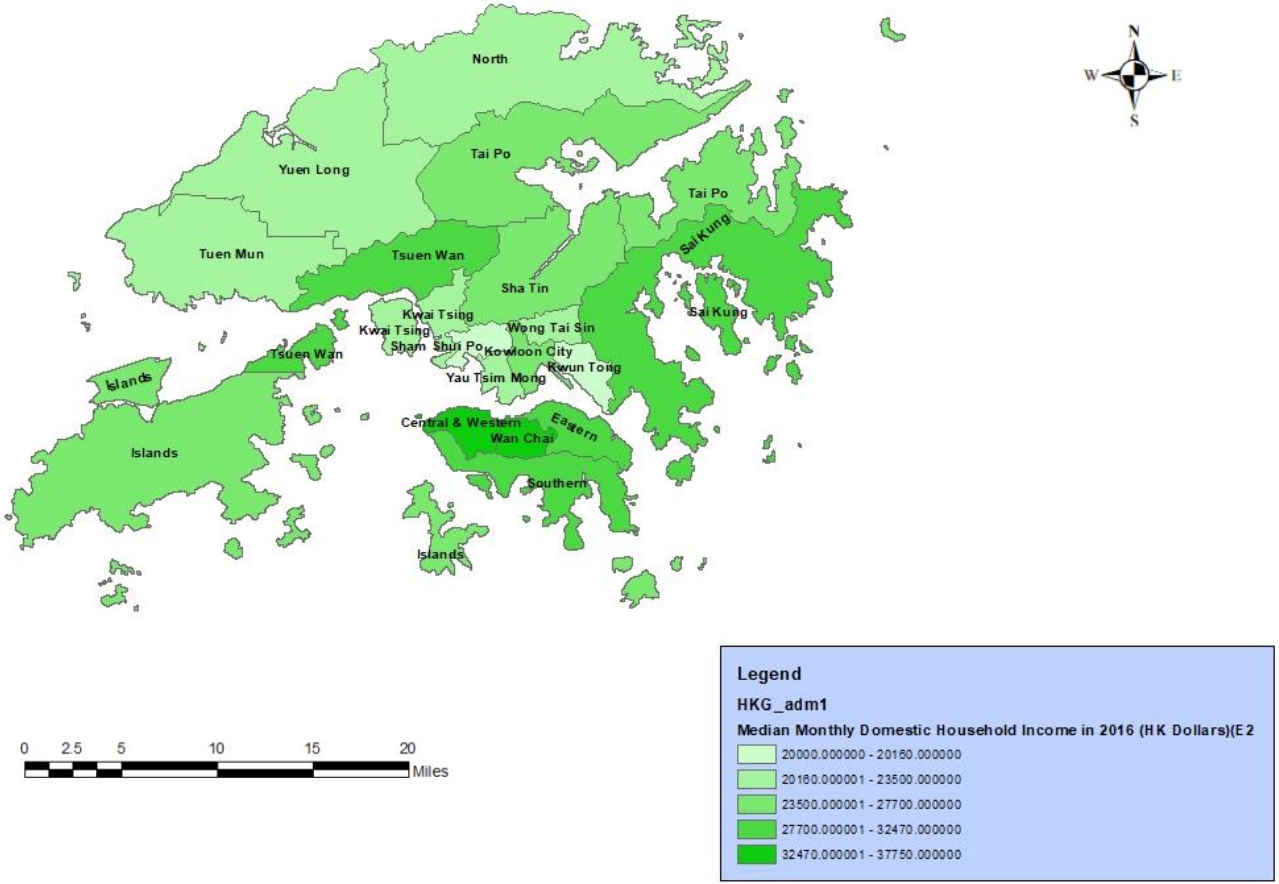
區議會分區 District Council district		男女合計/教育程度 Both sexes/Educational attainment					
		小學及以下 Primary and below	初中 Lower secondary	高中 Upper secondary	專上教育 Post-secondary 非學位課程 Non-degree	專上教育 Post-secondary 學位課程 Degree	總計 Total
中西區 Central & Western	數目 No.	22 700	14 500	62 100	16 700	93 200	**209 200**
	百分比 %	10.9	6.9	29.7	8.0	44.6	**100.0**
灣仔 Wan Chai	數目 No.	13 500	10 600	43 400	14 100	66 400	**148 100**
	百分比 %	9.1	7.2	29.3	9.5	44.9	**100.0**
東區 Eastern	數目 No.	74 100	57 400	160 500	41 400	140 100	**473 600**
	百分比 %	15.7	12.1	33.9	8.7	29.6	**100.0**
南區 Southern	數目 No.	42 900	25 200	75 300	19 300	66 300	**229 100**
	百分比 %	18.7	11.0	32.9	8.4	28.9	**100.0**
油尖旺 Yau Tsim Mong	數目 No.	36 400	37 000	91 300	22 000	84 000	**270 600**
	百分比 %	13.4	13.7	33.7	8.1	31.0	**100.0**
深水埗 Sham Shui Po	數目 No.	75 700	64 600	119 300	29 900	85 500	**375 000**
	百分比 %	20.2	17.2	31.8	8.0	22.8	**100.0**
九龍城 Kowloon City	數目 No.	52 000	42 400	114 100	31 100	114 400	**354 000**
	百分比 %	14.7	12.0	32.2	8.8	32.3	**100.0**
黃大仙 Wong Tai Sin	數目 No.	87 100	64 300	121 900	30 400	63 300	**367 000**
	百分比 %	23.7	17.5	33.2	8.3	17.2	**100.0**
觀塘 Kwun Tong	數目 No.	129 400	104 200	210 600	50 600	102 800	**597 600**
	百分比 %	21.6	17.4	35.2	8.5	17.2	**100.0**
葵青 Kwai Tsing	數目 No.	98 300	79 900	144 900	40 100	75 000	**438 200**
	百分比 %	22.4	18.2	33.1	9.2	17.1	**100.0**
荃灣 Tsuen Wan	數目 No.	41 600	36 100	95 600	24 800	80 500	**278 700**
	百分比 %	14.9	13.0	34.3	8.9	28.9	**100.0**
屯門 Tuen Mun	數目 No.	90 800	75 600	152 800	40 800	84 400	**444 400**
	百分比 %	20.4	17.0	34.4	9.2	19.0	**100.0**
元朗 Yuen Long	數目 No.	97 600	96 900	220 100	51 700	118 400	**584 800**
	百分比 %	16.7	16.6	37.6	8.8	20.3	**100.0**
北區 North	數目 No.	54 400	46 000	98 400	22 000	51 000	**271 800**
	百分比 %	20.0	16.9	36.2	8.1	18.8	**100.0**
大埔 Tai Po	數目 No.	48 200	39 100	94 100	24 600	72 500	**278 500**
	百分比 %	17.3	14.0	33.8	8.8	26.0	**100.0**
沙田 Sha Tin	數目 No.	112 900	89 900	195 100	56 000	155 100	**609 000**
	百分比 %	18.5	14.8	32.0	9.2	25.5	**100.0**
西貢 Sai Kung	數目 No.	65 700	49 900	142 100	38 300	133 900	**429 900**
	百分比 %	15.3	11.6	33.0	8.9	31.2	**100.0**
離島 Islands	數目 No.	23 800	20 600	52 700	15 500	46 700	**159 300**
	百分比 %	15.0	13.0	33.1	9.7	29.3	**100.0**
合計 Overall	**數目 No.**	**1 167 200**	**954 300**	**2 194 400**	**569 300**	**1 633 500**	**6 518 600**
	百分比 %	**17.9**	**14.6**	**33.7**	**8.7**	**25.1**	**100.0**

Education Score (age > 15)

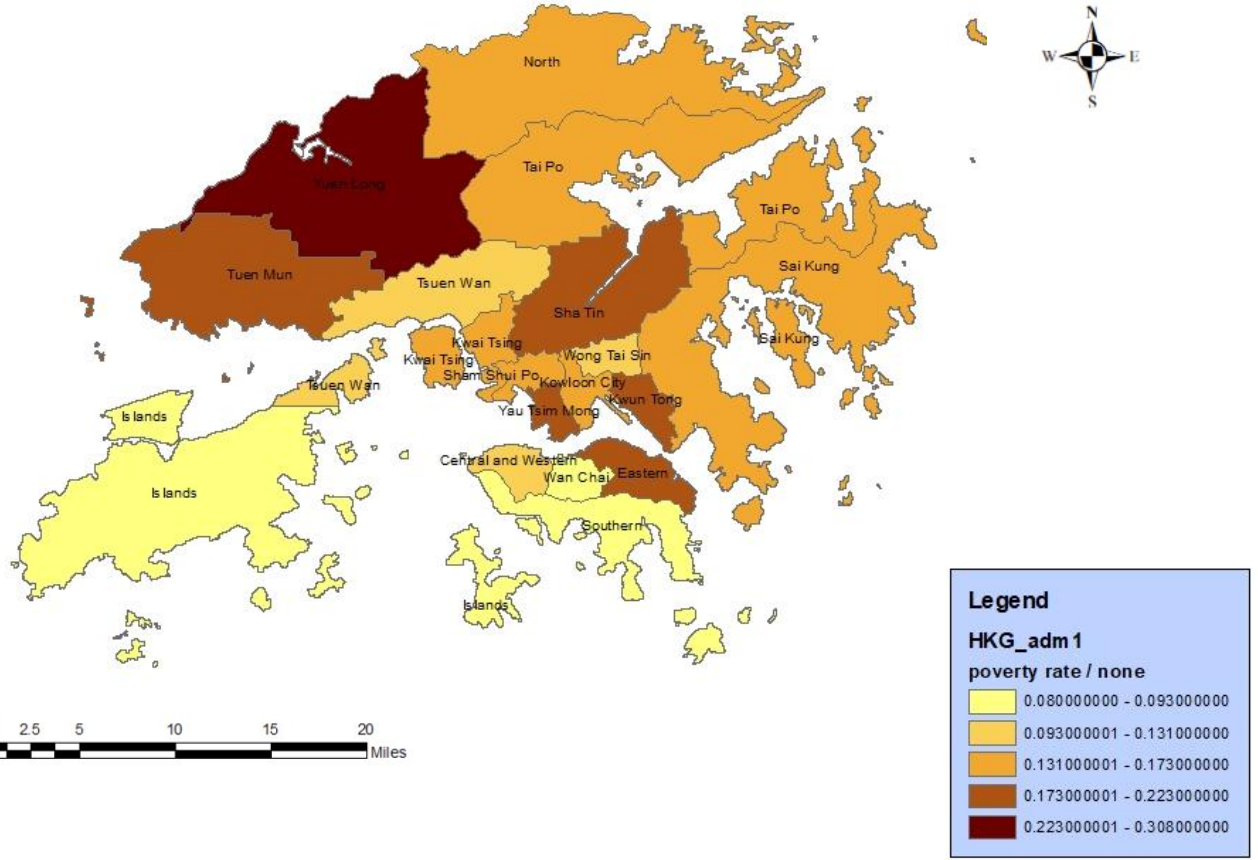
Education Score =
1*Primary and below +
2*Lower Secondary +
3*Upper Secondary +
4*Non-degree +
5*Degree



Median Monthly Domestic Household Income



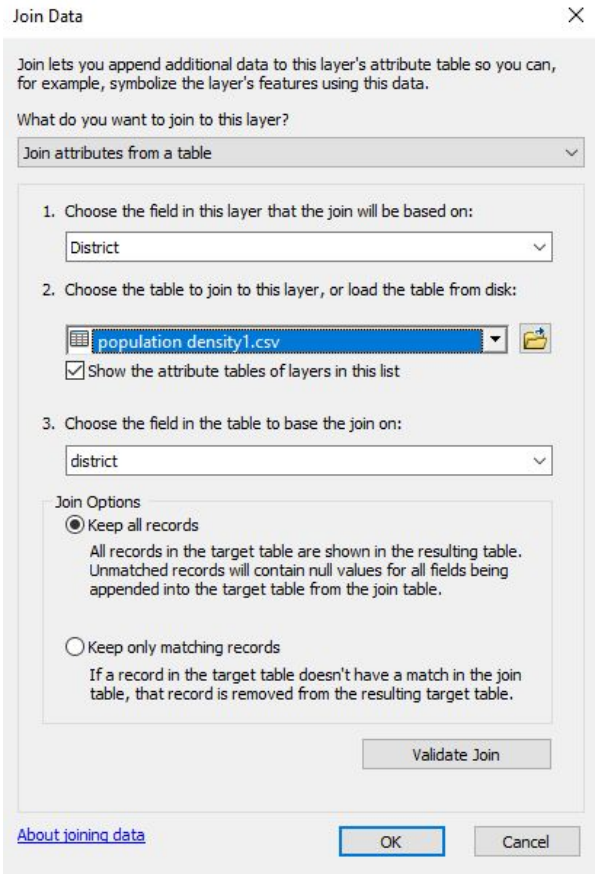
Poverty Rate

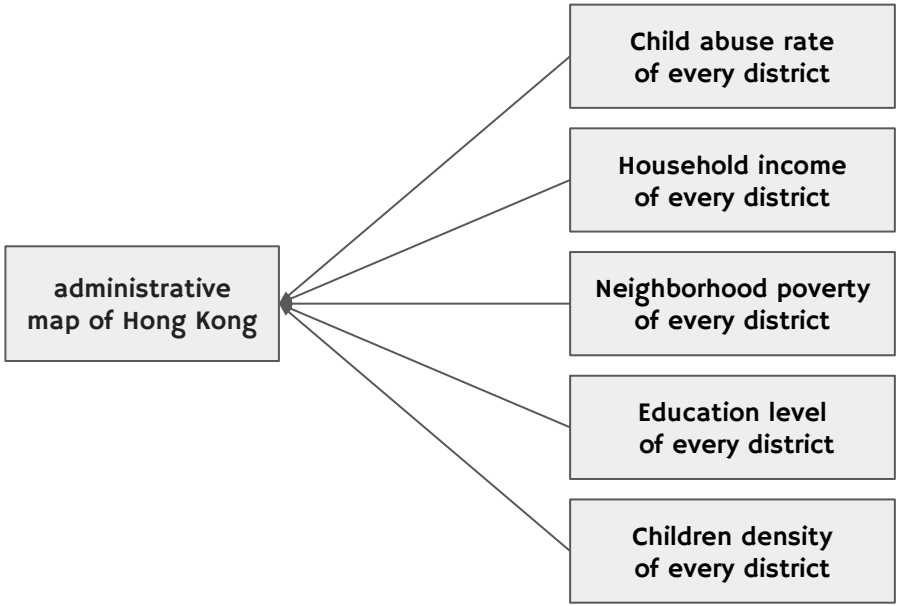


03

Data Processing

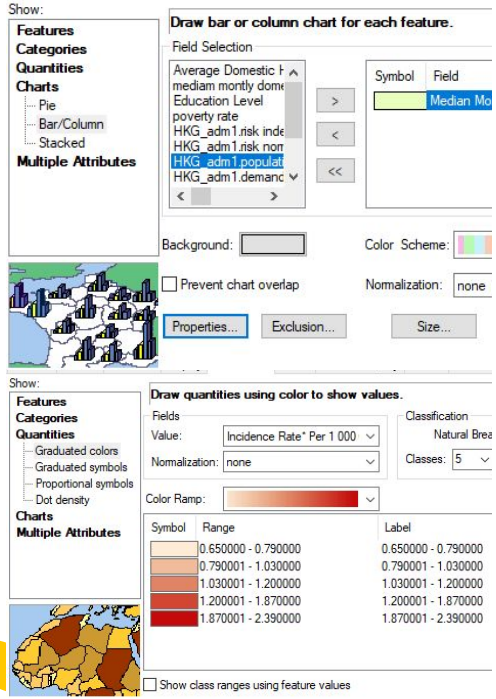
Step 1: join the tables





Join based on the district name

Step 2: visualize the spatial correlation



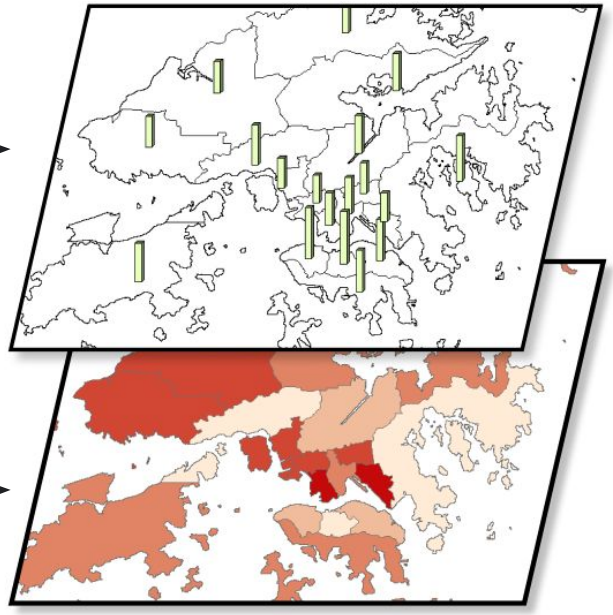
(Independent variable)
Income, education, etc.

Encoded as
bar chart

(Dependent variable)
Child abuse rate

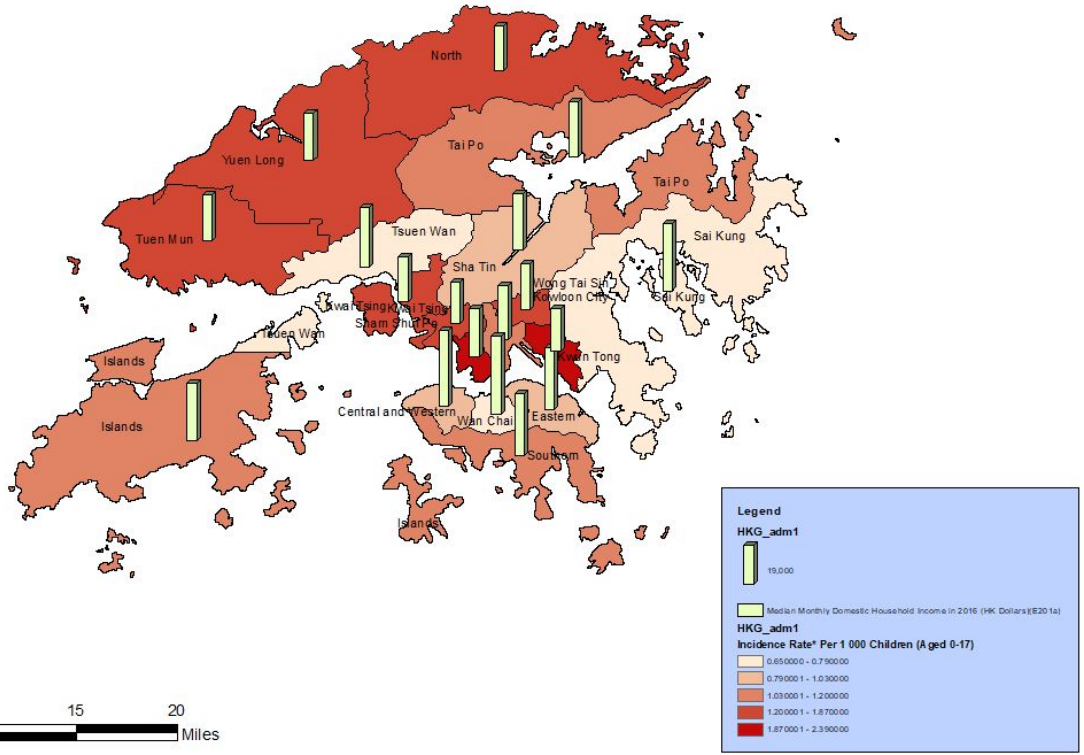
Encoded as
Classification map

5 quantiles



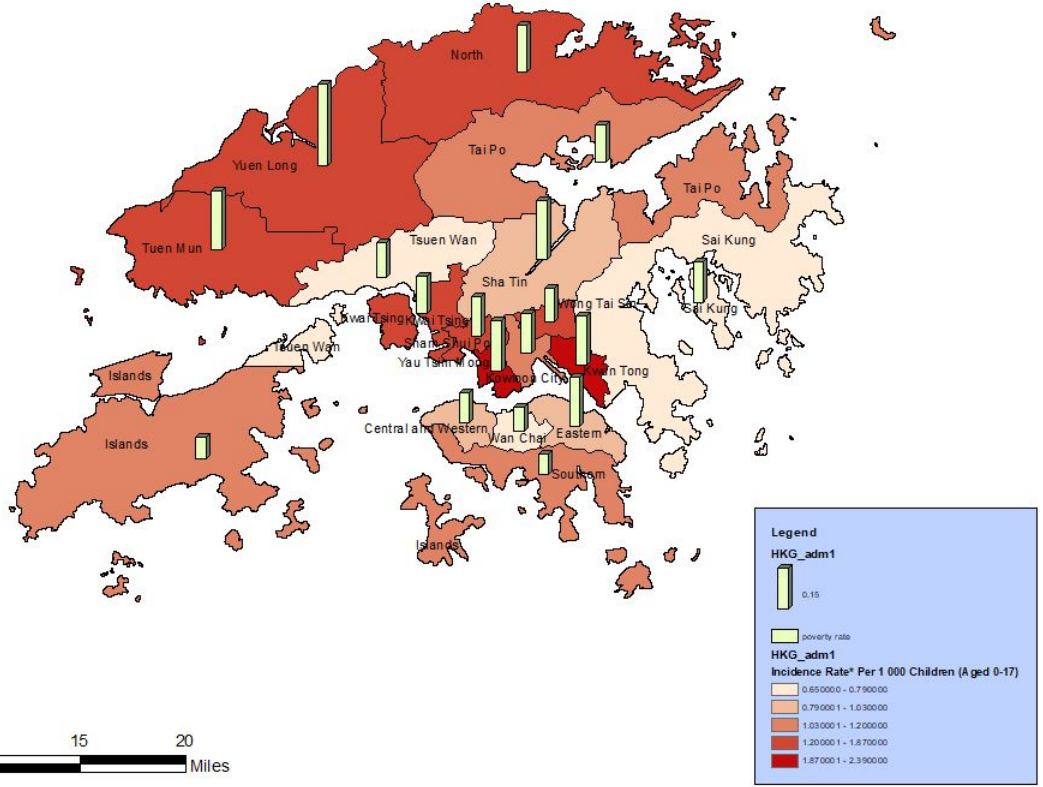
Median household income vs. abuse rate

Lower bars (lower median household income)
& darker background color (higher abuse rate)



Neighborhood poverty rate vs. abuse rate

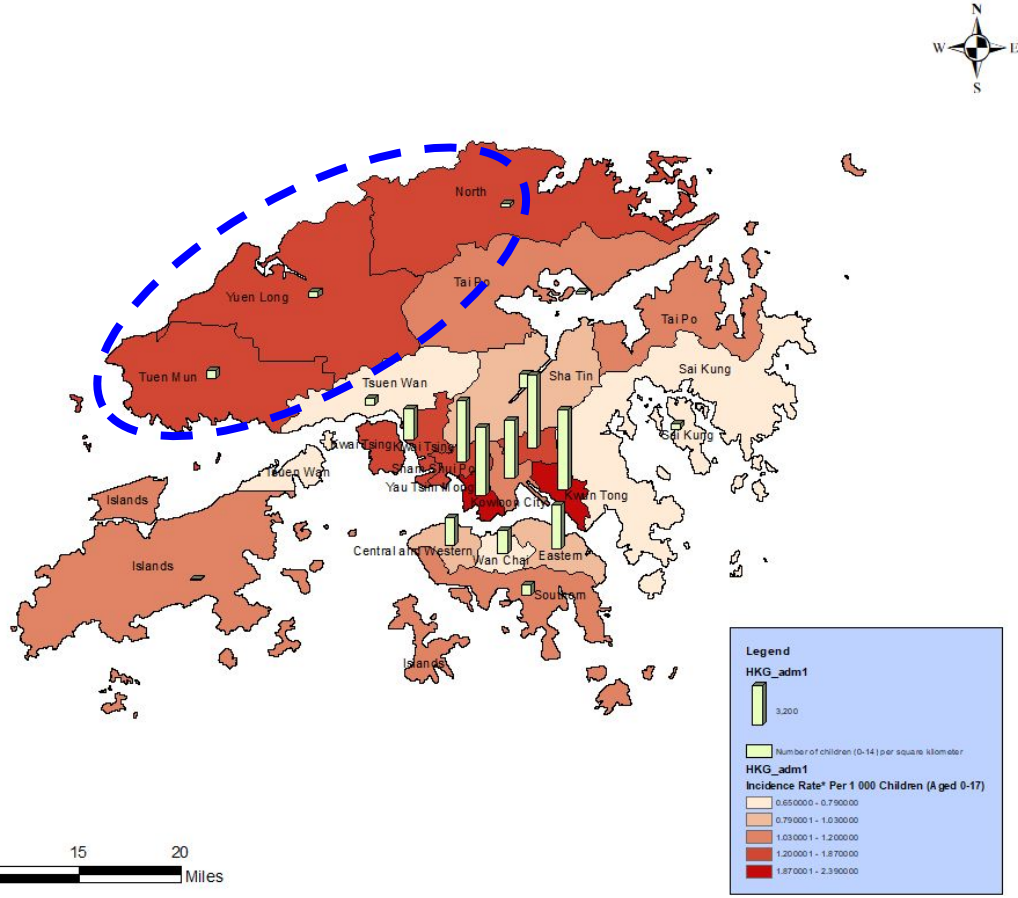
Higher bars (higher neighborhood poverty rate) & darker background color (higher abuse rate)



Children density vs. abuse rate

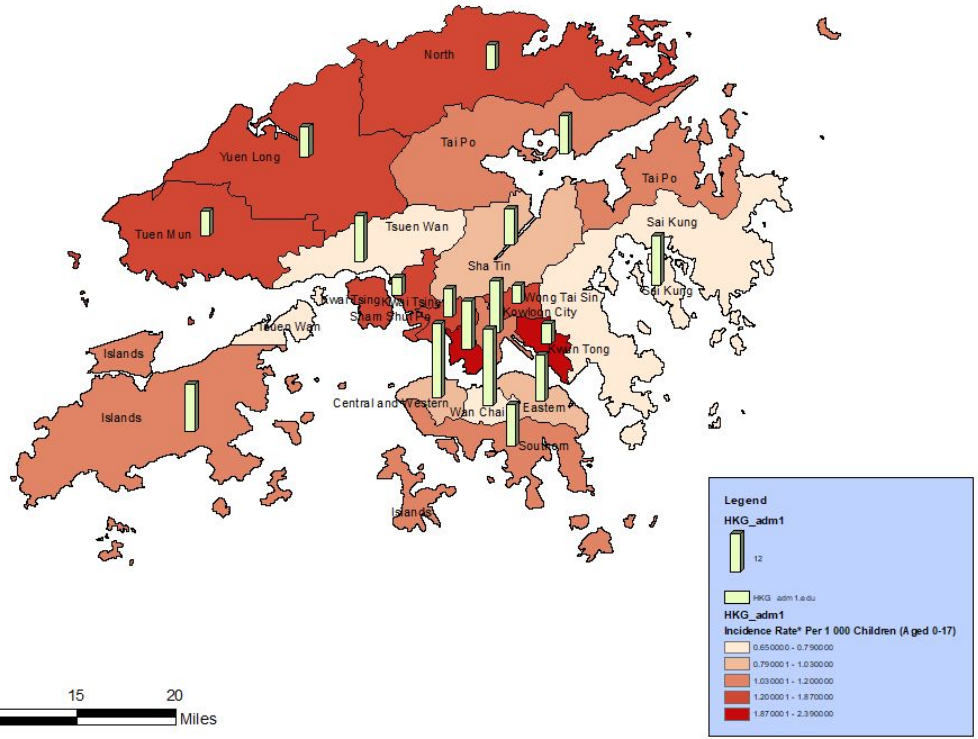
Exception: lower bars (low children density) & darker background color (higher abuse rate) in Tuen Mun, Yuen Long and North
Explanation: these districts have large mountain area with small population size

Solution: exclude children density in following analysis

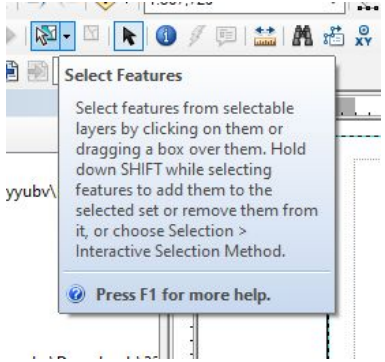


Education level vs. abuse rate

Lower bars (low education rate) & darker background color (higher abuse rate)

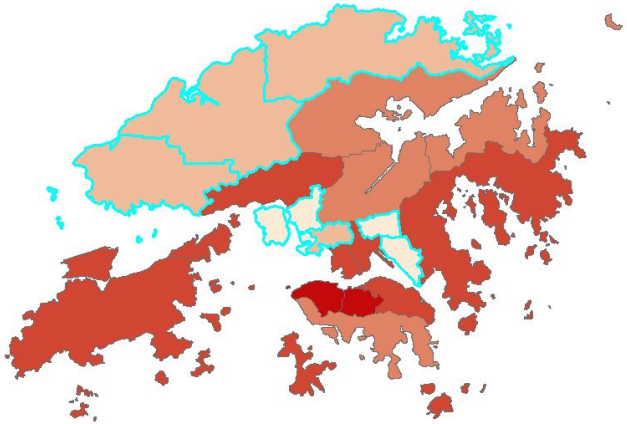


Step 3: select features

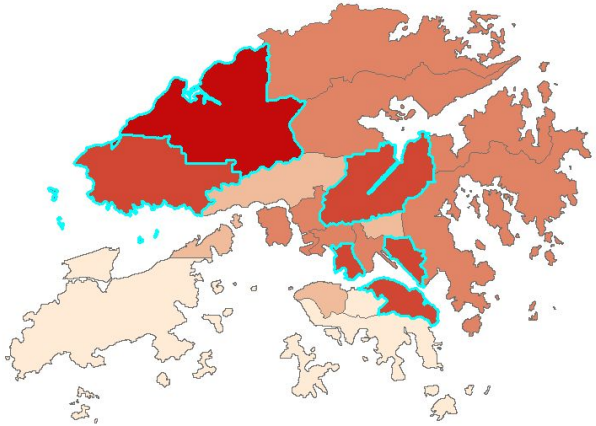


1. Visualize the variable in a classification map with 5 quantiles
2. Manually select top/bottom 2 quantiles

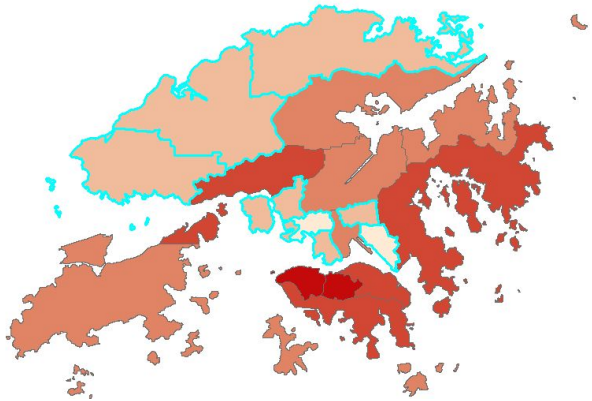
lowest education



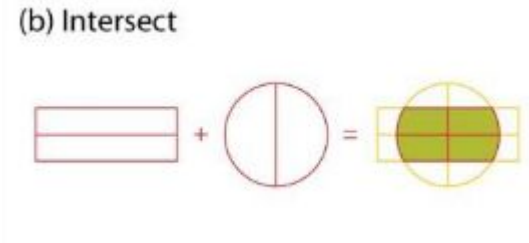
highest poverty rate

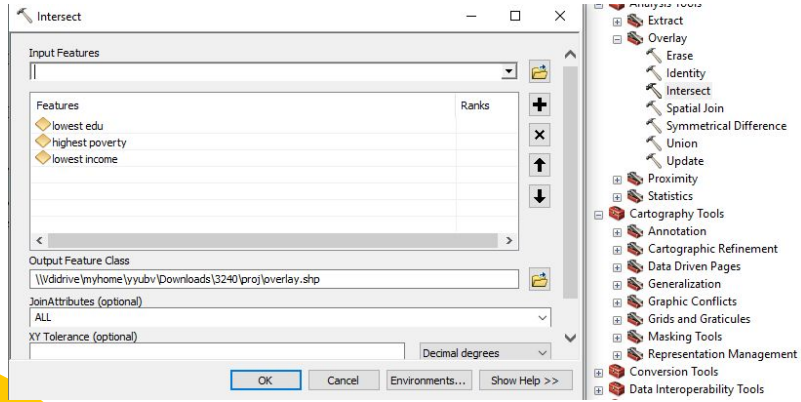


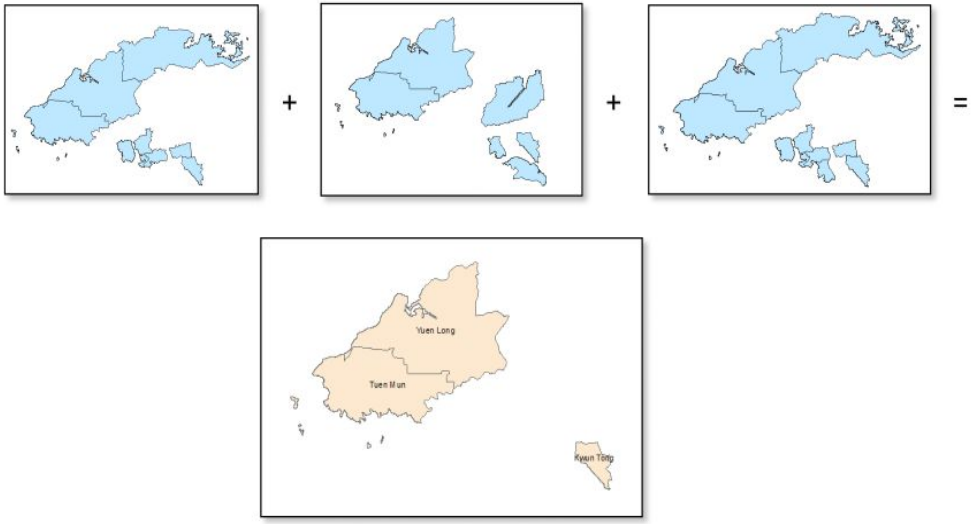
lowest median income



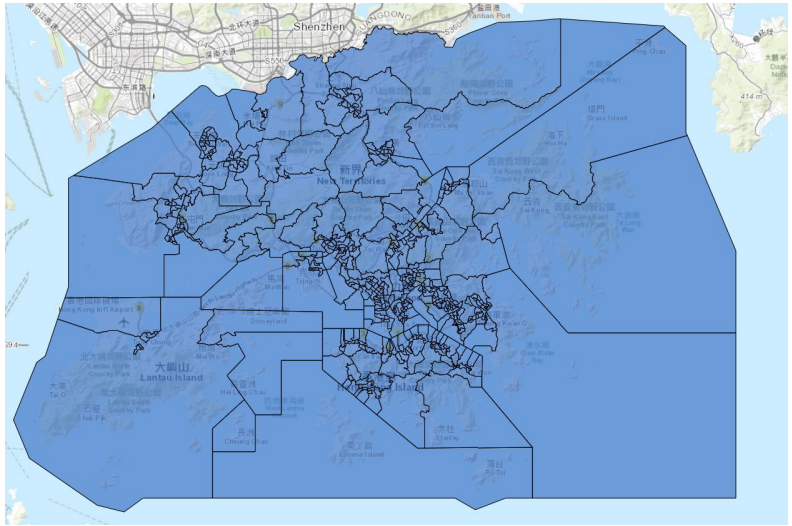
Step 4: overlay analysis



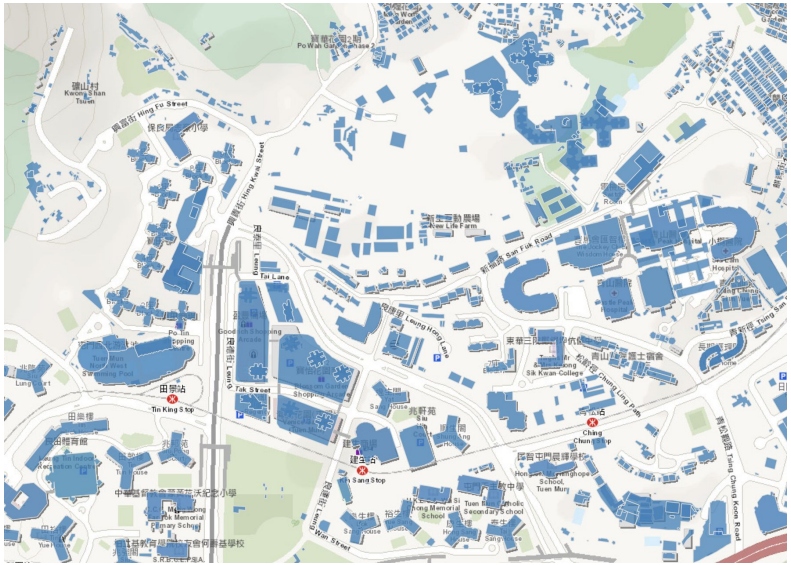




Join additional data For a higher granularity



452 District Council Constituency Areas (“DCCAs”) under 18 administrative districts



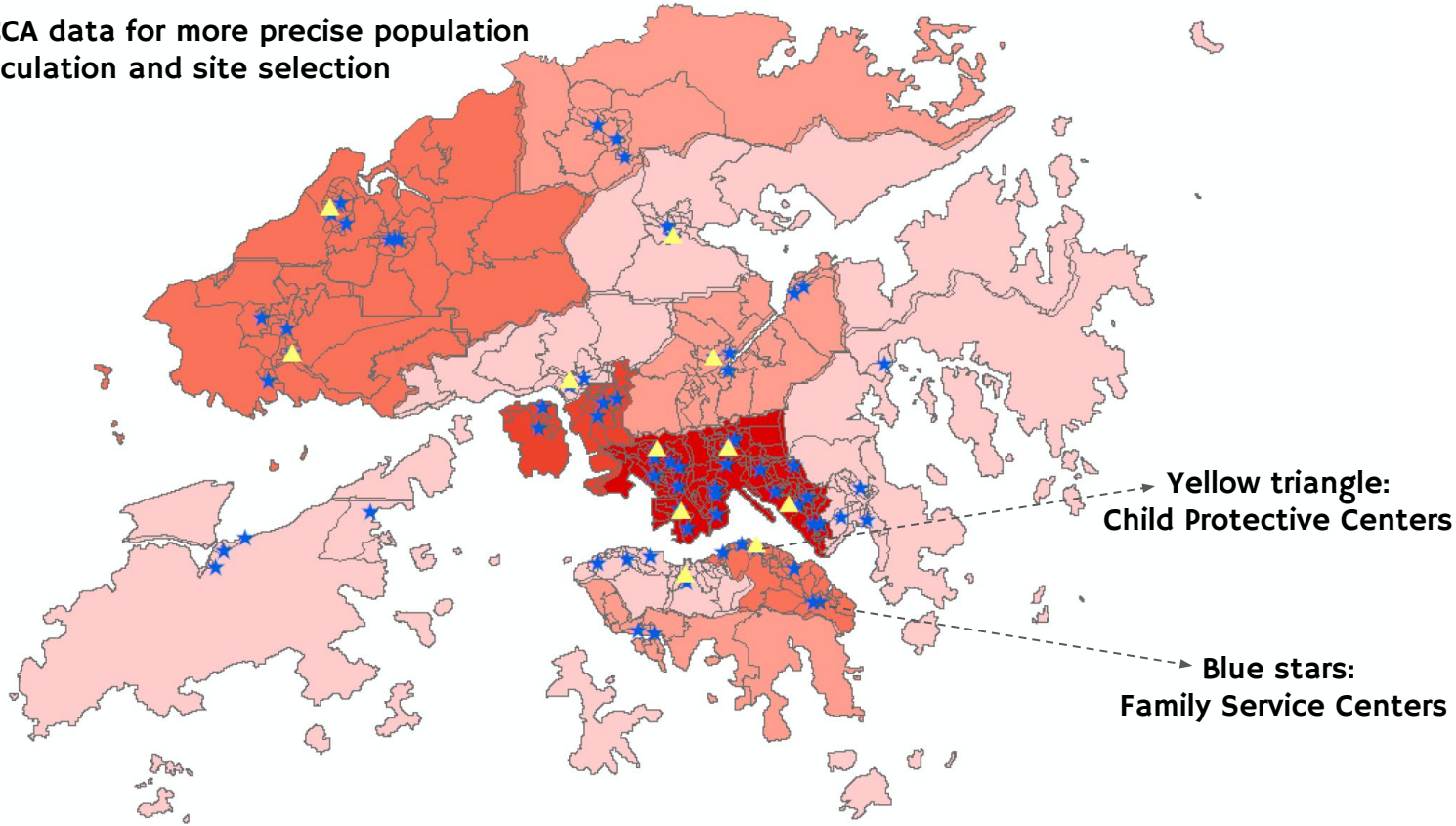
Shapefile of Hong Kong buildings

04

Selecting New Sites

Intersect to have more refined areas

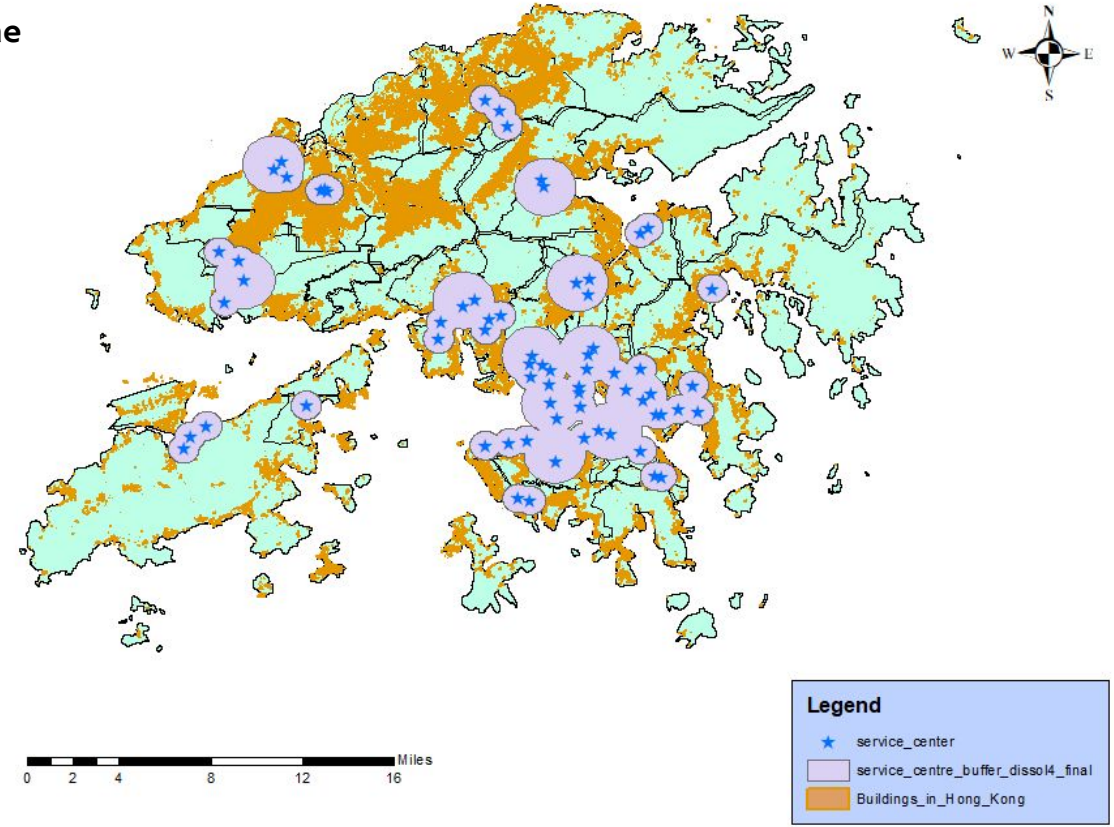
Intersect DCCA data for more precise population calculation and site selection



Site buffer, dissolve and union

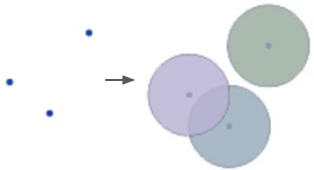
Buffer, Dissolve and Union to see the coverage of the established sites

Add orange dots to represent residential buildings

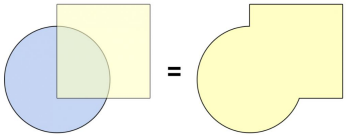


How we Buffer, Dissolve, and Union?

buffer



dissolve



union

Service Center Buffer:
1km radius of impact

Service Center
Dissolve

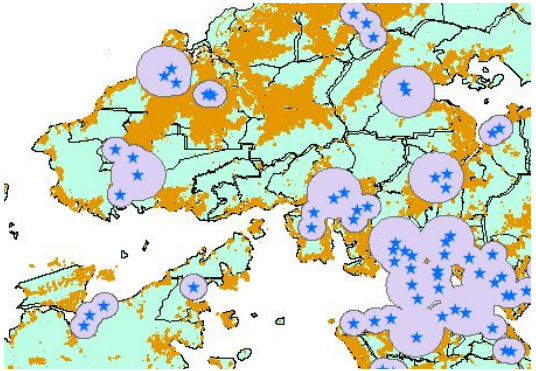
保護家庭及兒童服務課
FAMILY AND CHILD PROTECTIVE SERVICES UNIT

Protect Center Buffer:
2km radius of impact

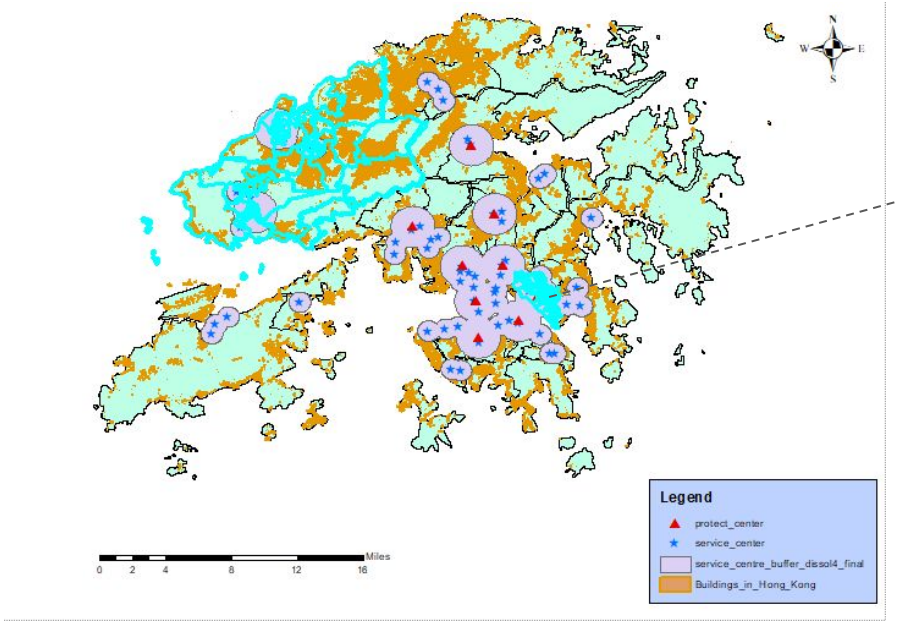
Protect Center
Dissolve

Union:
total impact

Dissolve:
remove boundaries



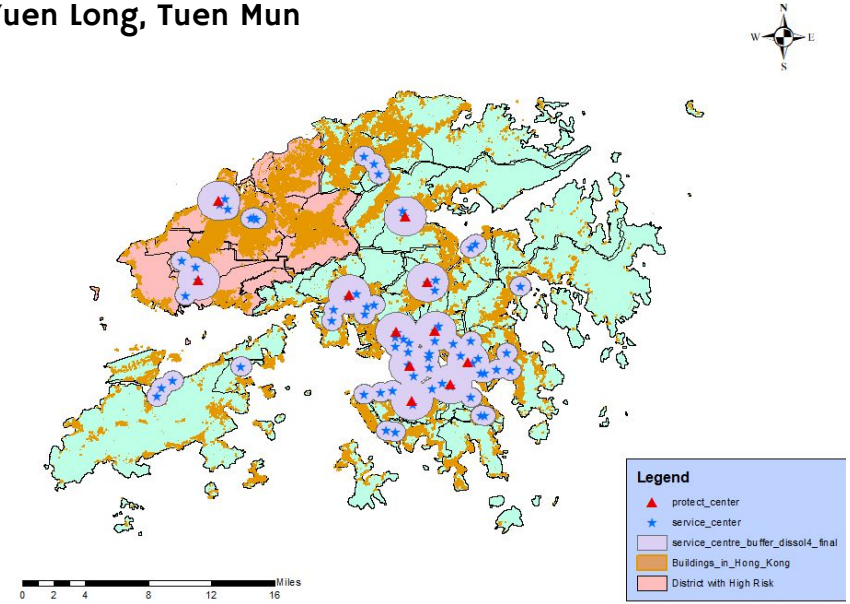
Selecting high risk area



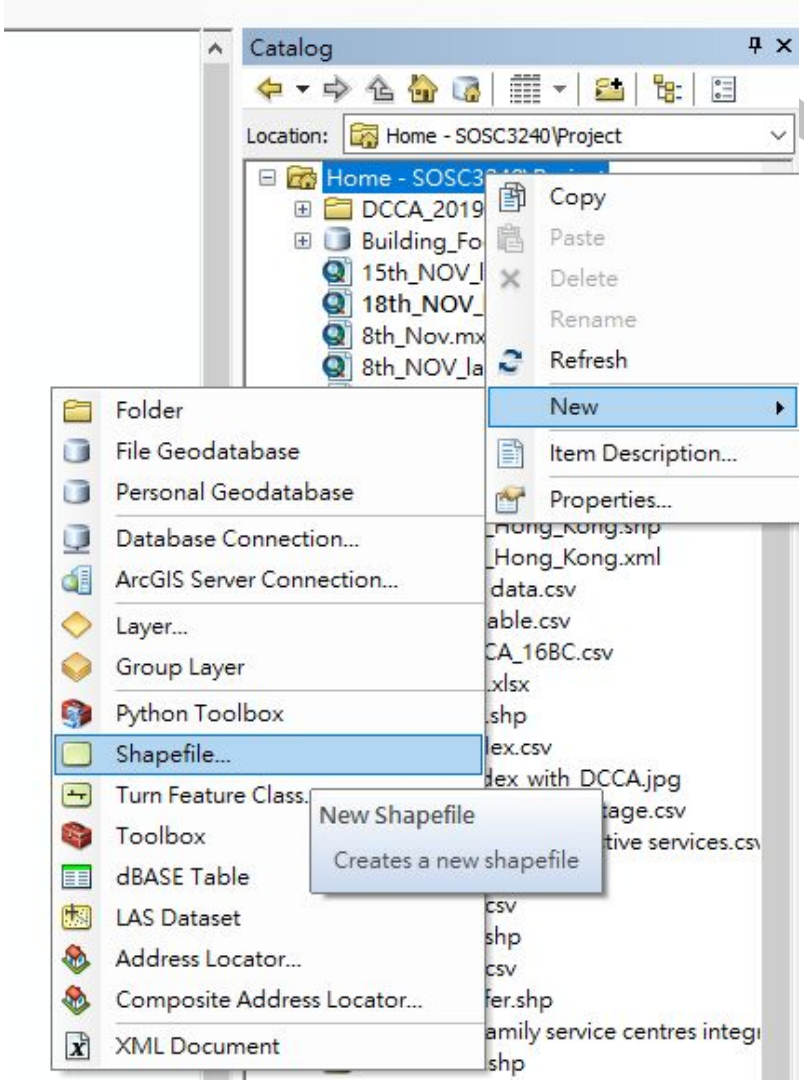
Identified Risky Districts:
Yuen Long, Tuen Mun, Kwun Tong

Kwun Tong:
Covered with sufficient number of centers

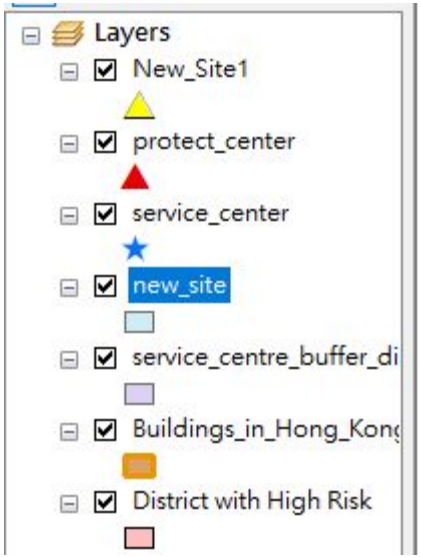
Focus areas:
Yuen Long, Tuen Mun

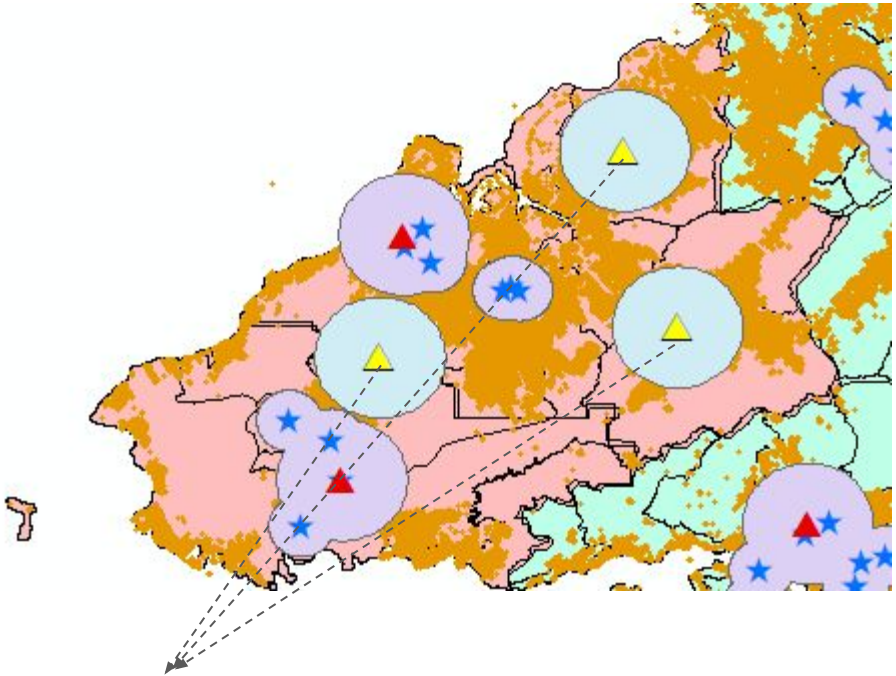


Add new shapefile for new sites



Adding new sites with buffering (2km)

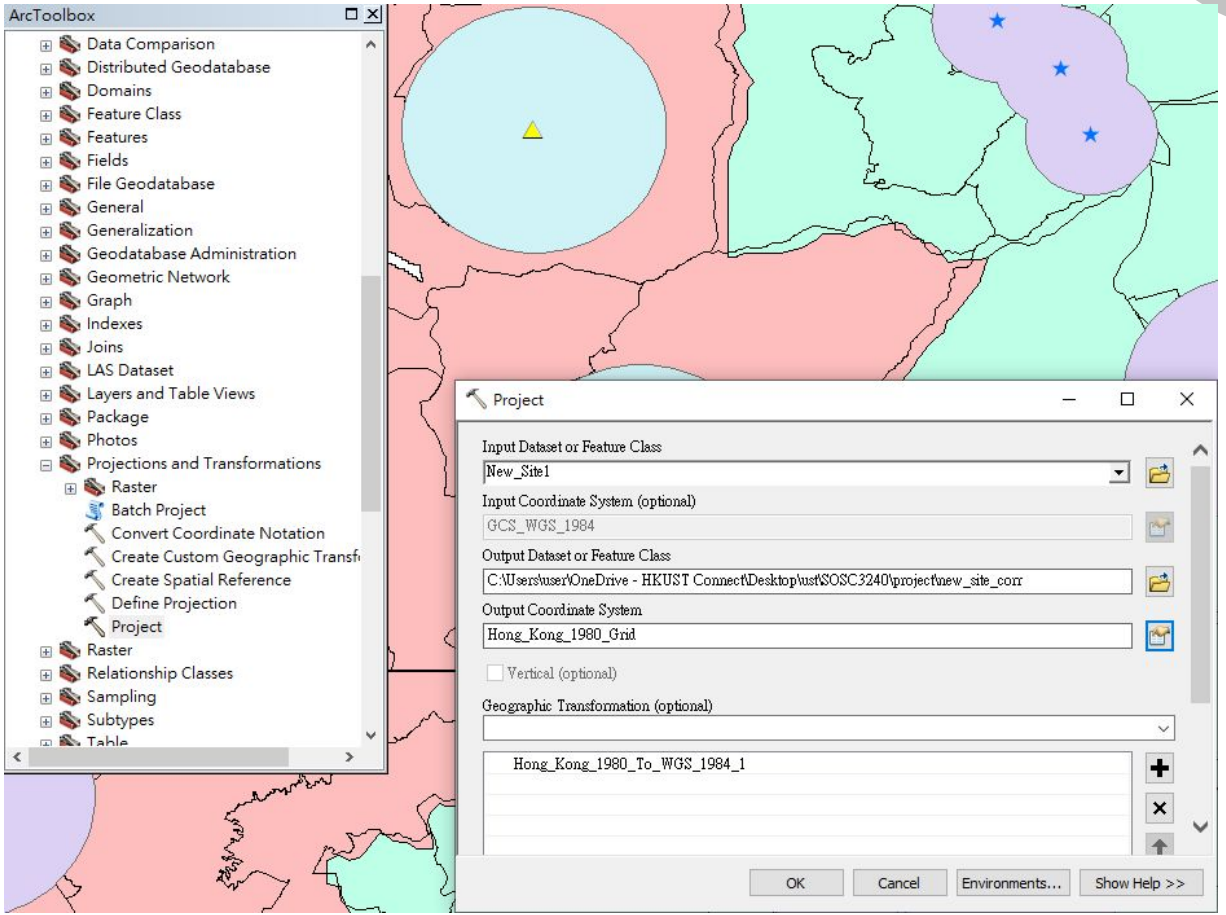




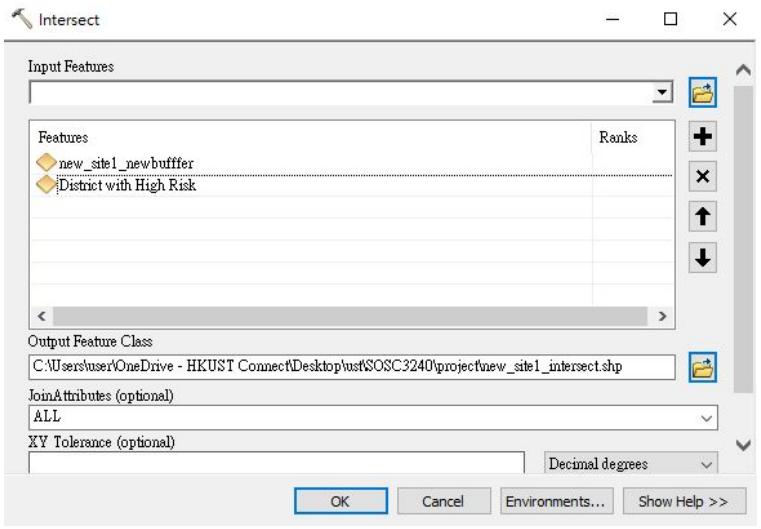
Yellow triangles: three new potential sites with buffering 2km

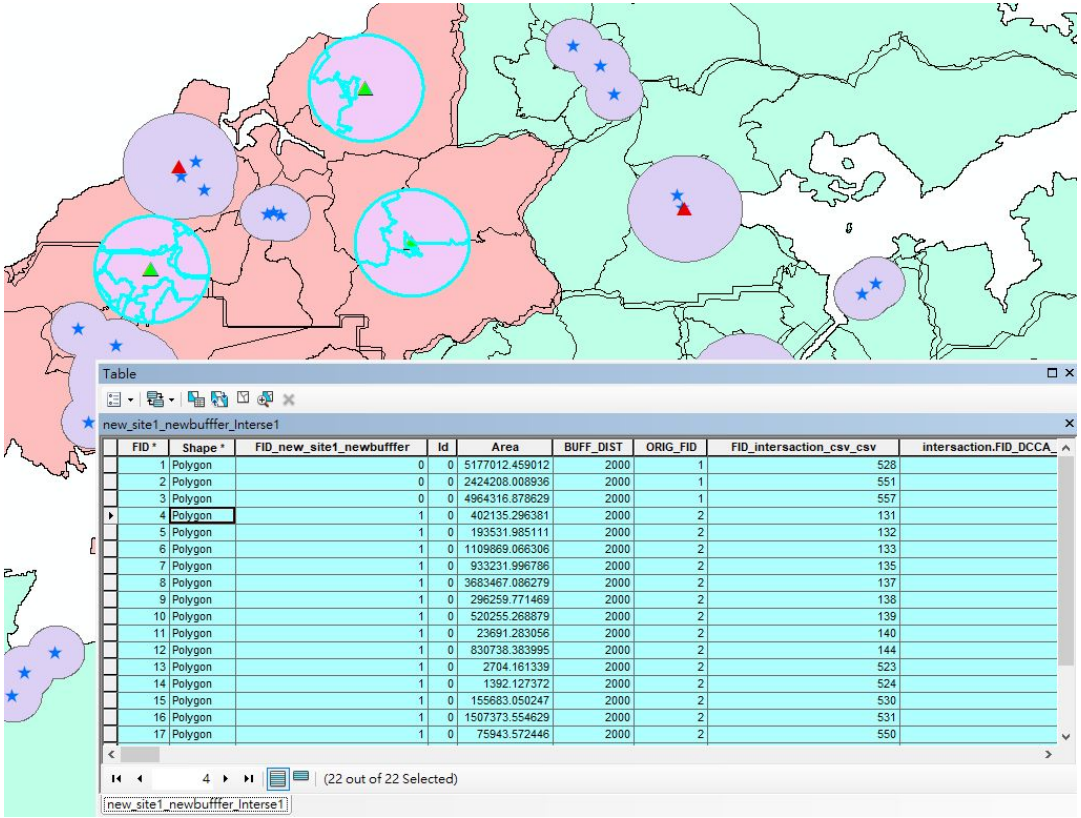
Change of Coordination System (degree to meters)

Change the coordination system from degree (GCS) to meters ->
Calculate the area of the intersections between the buffering area of new sites & the DCCA->
Calculate the population coverage



Intersect buffer with the high risk area

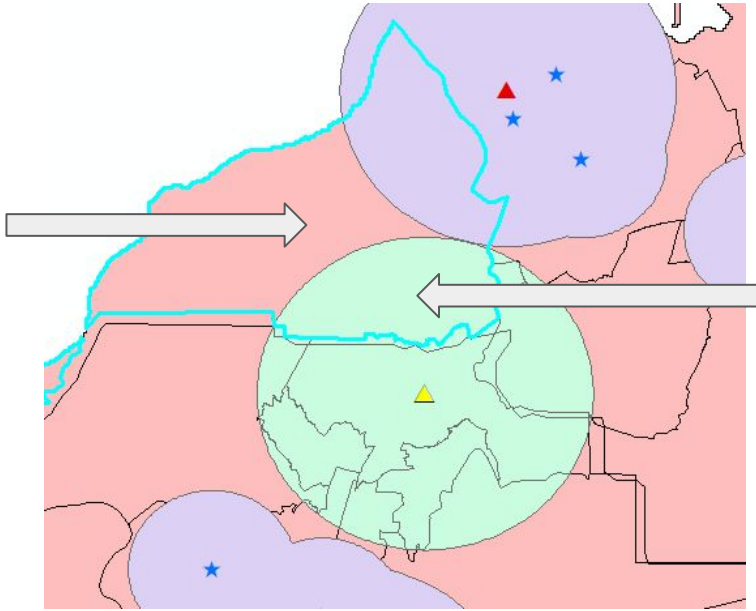




Finding the site which has the largest coverage

Formula : **Site population coverage = ∑ (Total population / Total Area) * Intersect Area**

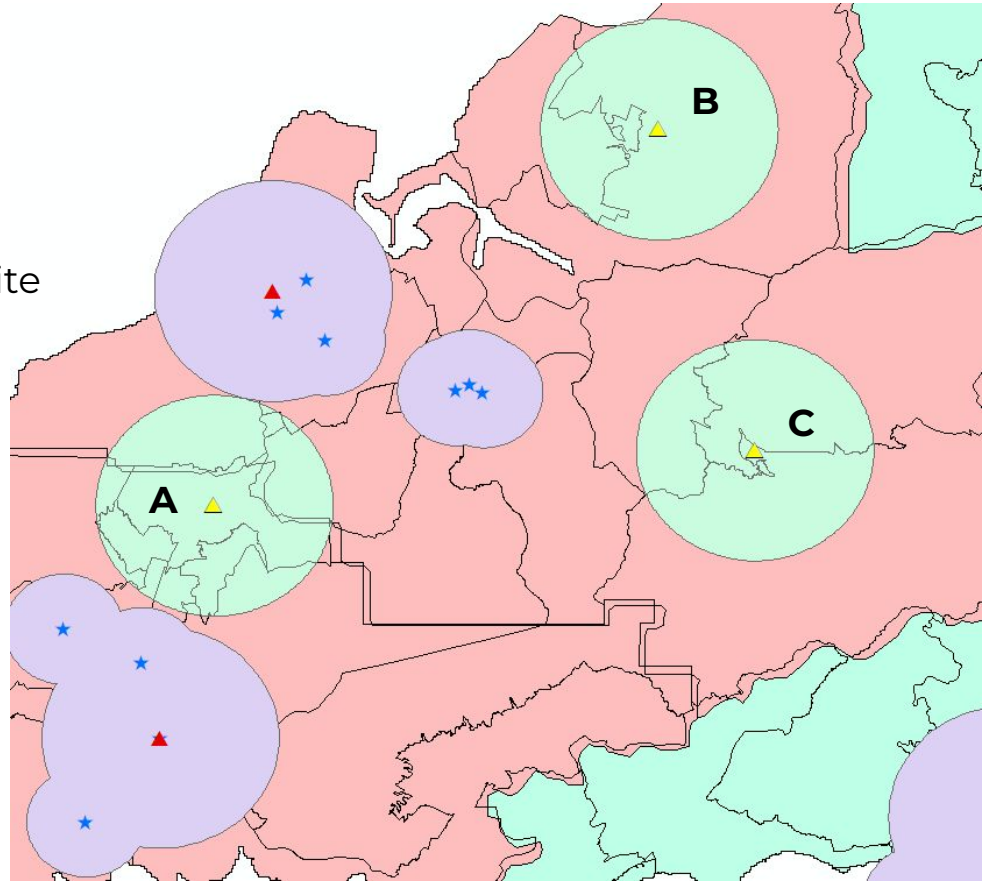
Total Area & Total Population



Intersected Area

Site with largest coverage of population

The population coverage of each site
A: 156,629
B: 14,480
C: 11,300



Site with largest coverage of population

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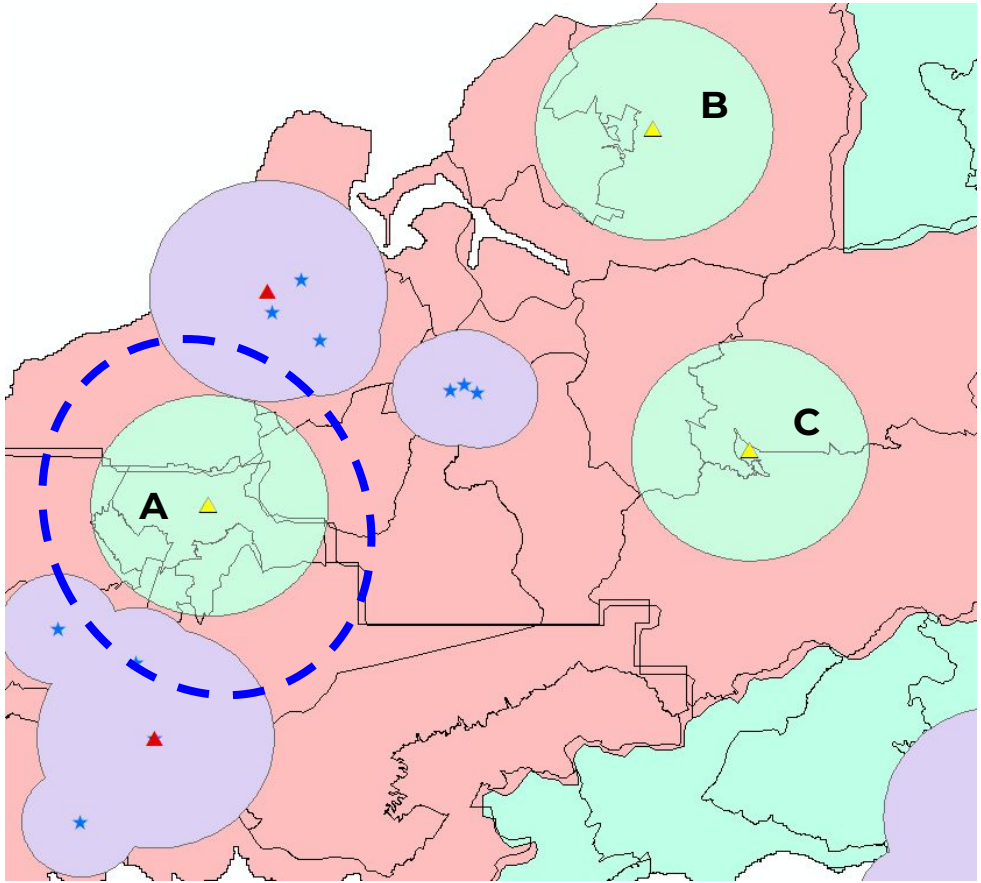

Site with largest coverage of population

Site A:
Residential buildings,
Kindergarten nearby

Ideal to build a new child protective center

Thank You !