



# Breaking the Cycle: Family Adversity, Child Abuse and Intervention Touchpoint

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# Domestic Violence (DV)

“**Domestic violence** refers to violent, threatening, abusive or controlling behaviours within the context of family or intimate relationships that cause hurt or fear for one’s safety and well-being. This takes various forms including physical abuse, emotional and psychological abuse, sexual abuse, and neglect.”



This presentation focuses on

- Child abuse (DV in childhood)
- Spousal violence/abuse (DV in adulthood)

Sources:

- Ministry of Social and Family Development (2024). Domestic Violence Trends Report 2024. <https://www.msf.gov.sg/research-data/research-reports-data/help-those-in-need/article/domestic-violence-trends-report-2024>
- <https://familyassist.msf.gov.sg/content/making-decisions/seeking-safety/understanding-violence-abuse/family-violence/>

# Existing literature on DV in childhood and adulthood

- Association between DV in childhood (i.e., child abuse) and adulthood (i.e., spousal violence)
  - Co-occurrence of parental spousal violence and child abuse in a family (e.g., McGuigan et al., 2001)
  - Parental spousal violence as a family risk factor for subsequent child abuse (e.g., Rummy, et al., 2000; Taylor et al., 2009).
  - History of child abuse is linked with increased likelihood of intimate partner violence victimisation and perpetration in adulthood (Gómez, 2011; Widom et al., 2014)
- Intergenerational continuity in child abuse
  - Meta analysis showed that in families of parents who experienced maltreatment in their own childhood, the odds of abusing their child(ren) are about three times as the odds in families of parents without a history of experiencing child maltreatment (Assink et al., 2018).
- Other family adversities associated with child abuse include parental history of offending, parent's mental health concerns and parent's socioeconomic status (e.g., Berlin et al., 2011; Mulder et al., 2018).

# Local research examined archetypes for individuals with exposure to DV in childhood and adulthood

## DV in childhood

Four types of family profiles for maltreated children were identified:

- I. **Large household:** multigenerational households and majority lived with extended family members
- II. **Harsh parenting:** high levels of parenting problems and the caregiver justifying abuse/neglect
- III. **High criminality:** high levels of caregiver having substance abuse and criminal history
- IV. **Low disadvantage:** low risk on all the familial factors

## DV in adulthood

Four types of individual profiles were identified among those who filed for Personal Protection Order (PPO):

- I. **With no children,** and low probability of other risk factors
- II. **With one or two children,** and low probability of other risk factors
- III. **Attained lower-level education,** stayed in **rental flat,** and had contact with **child protection** and **criminal justice systems.**
- IV. **Married and had children before 21 years,** had more children, attained lower-level education, stayed in rental flat, and had contact with **child protection and criminal justice systems**

### Notes:

- Sources: The Taskforce on Family Violence (2021). Report of the Taskforce on Family Violence: Tackling and breaking cycles of violence. Chng, G. S., Li, D., Chu, C. M., Ong, T., & Lim, F. (2018). Family profiles of maltreated children in Singapore: A latent class analysis. *Child abuse & neglect*, 79, 465-475.
- Applying for PPO was used as the proxy for exposure to domestic violence in adulthood (i.e., spousal violence). PPO is granted where the Court is satisfied that family violence has been committed or is likely to be committed and that it is necessary for the protection of the family member. PPO applicants refer to individuals filing PPO and they might not necessarily be domestic violence victims.
- Latent class analysis was conducted based on 440 cases who entered the Child Protective Service in Singapore from March 2014 to December 2015, and approx. 830 individuals from the 1980 and 1985 birth cohorts who applied for a PPO by June 2017.

## What has not been fully examined in local context?

- The continuity of DV across lifespan and across generations
- The association between risk of DV and other adversities
  - Touchpoints to break the negative cycle

## Why is it important to fill in the research gap?

- Identify opportunities for upstream preventive effort
- Foster evidence-based decision making by informing policy development and operational strategies

# The presentation covers three investigations

## Investigation 1: Continuity of DV across lifespan

[For parents]: How do history of **child abuse** and other life adversities affect their own risk of **spousal violence victimisation** in adulthood?

## Investigation 2: Continuity of DV across generations

[For children]: How do **parental spousal violence** and other family adversities affect their risk of experiencing **child abuse**?

## Investigation 3: Touchpoints

[For families]: What are the possible **intervention touchpoints** that can reach the at-risk families to break the negative cycle?

# Data from the Intergenerational Transmission of Criminality and Other Social Disadvantages Plus (INTRACS+) research programme



- Objectives
  - Initiated to shed light on how parental exposure to life adversities and disadvantages affect the child's life trajectories in Singapore's context
  - To better guide prevention and early intervention efforts to break the negative cycle
- Led by National Council of Social Service (NCSS) in collaboration with Ministry of Social and Family Development Rehabilitation and Protection Group (MSF-RPG)
- Population-based administrative data across multiple sources
- Multiple birth cohorts
  - Investigation 1: ever-married individuals born in 1980 and 1985
  - Investigations 2 & 3: individuals born between 1990 and 2004

# **Investigation 1:**

## **Continuity of DV across lifespan**

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# Life adversities included in this investigation

## Marriage and parenthood

- Early marriage before 21 years
- Early parenthood before 21 years

## Prior history of DV

- Experiencing child abuse: Contact with child protection service (CPS)
- Being a respondent to PPO

## Socioeconomic status

- Lower education attainment
- Staying in public rental flat at birth
- Staying in public rental flat at 30 years
- Receiving financial assistance

## Criminal history

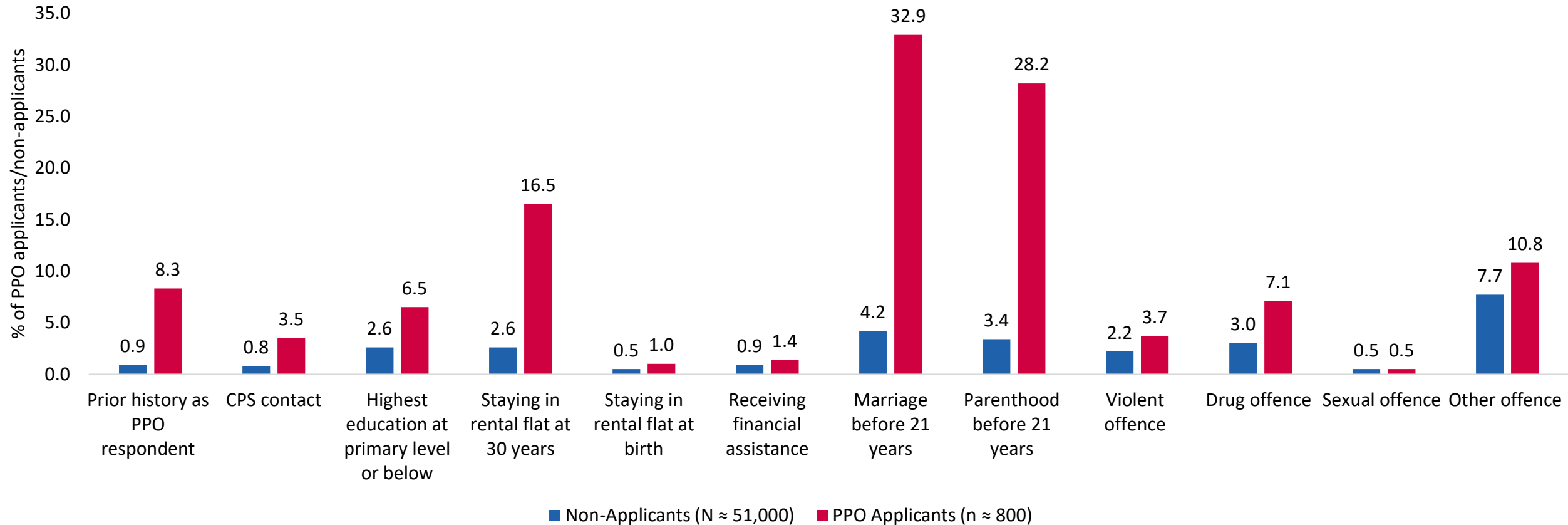
- Violent offence
- Drug offence
- Sexual offence
- Other types of offence

### Notes:

- PPO= Personal protection order. PPO is granted where the Court is satisfied that family violence has been committed or is likely to be committed and that it is necessary for the protection of the family member. PPO applicants refer to individuals filing PPO and they might not necessarily be domestic violence victims. Individuals against whom an application is made might not necessarily be issued with a PPO.
- Demographics, marital status, mental health and family size were controlled for in the study.
- For dynamic factors, different cut-off dates were applied to PPO applicants and non-applicants. For PPO applicants, these variables only captured the events happened before the first contact with the PPO system as applicant. For non-applicants, it captured all the events that happened as of the time of data collection (i.e., 30 June 2017).
- For static factors, education attainment was captured at age 30 years, housing status was measured at birth and age 30 years.

# Higher proportion of PPO applicants reported presence of life adversities

Proportion of individuals with presence of life adversities

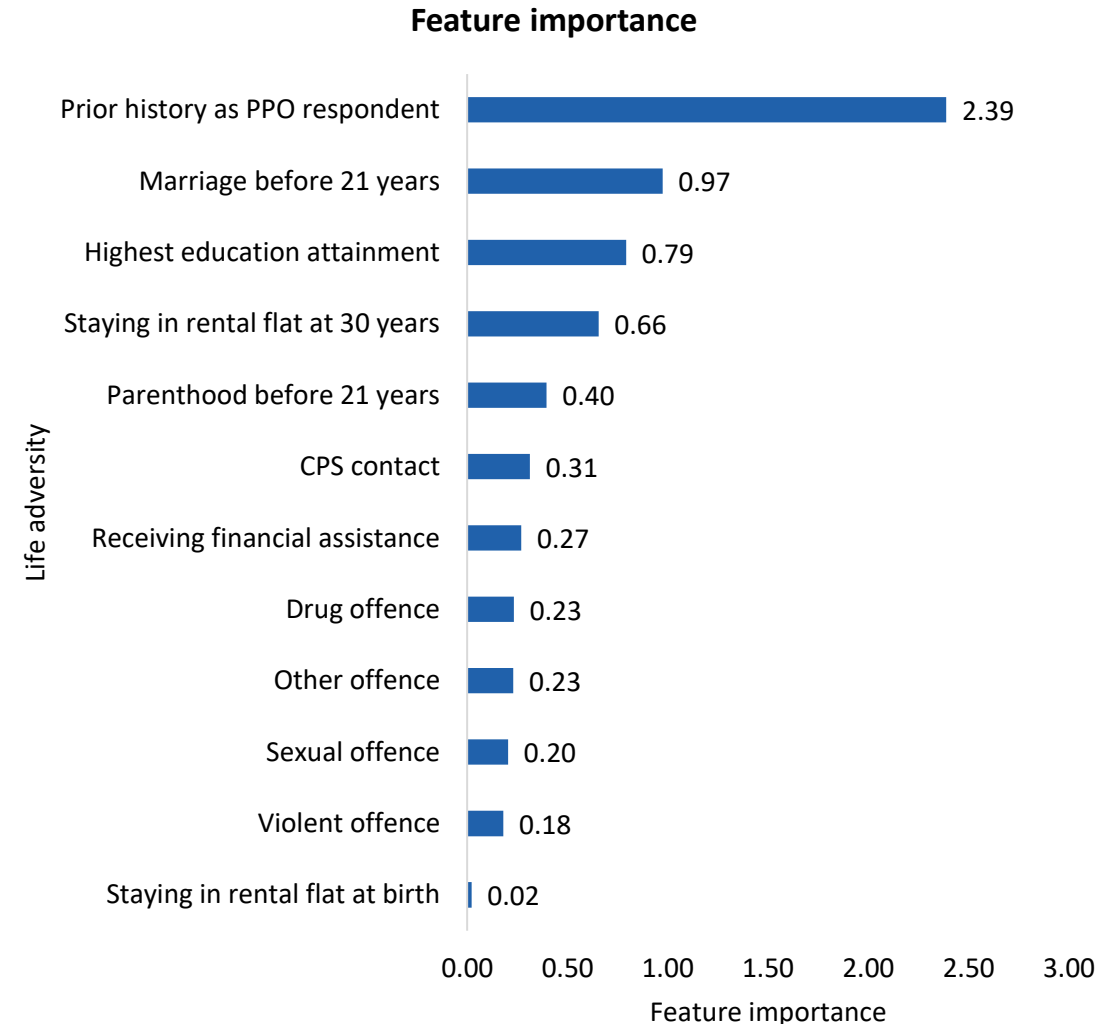


Notes:

- PPO refers to Personal protection order. PPO is granted where the Court is satisfied that family violence has been committed or is likely to be committed and that it is necessary for the protection of the family member. PPO applicants refer to individuals filing PPO and they might not necessarily be spousal violence victims. Individuals against whom an application is made might not necessarily be issued with a PPO.
- CPS = Child Protective Service. Experiencing child abuse was measured by contact with CPS.
- The analysis used administrative data of ever-married individuals born in 1980 and 1985 (N = approx. 51,800). Numbers rounded to nearest 100.

# Life adversities associated with risk of spousal violence victimisation

- Prior history of DV
  - Experiencing child abuse (CPS contact)
  - Being a respondent to PPO
- Socioeconomic status
  - Lower education attainment
  - Staying in a public rental flat at 30 years
- Other adversities
  - Marriage before 21 years
  - Parenthood before 21 years



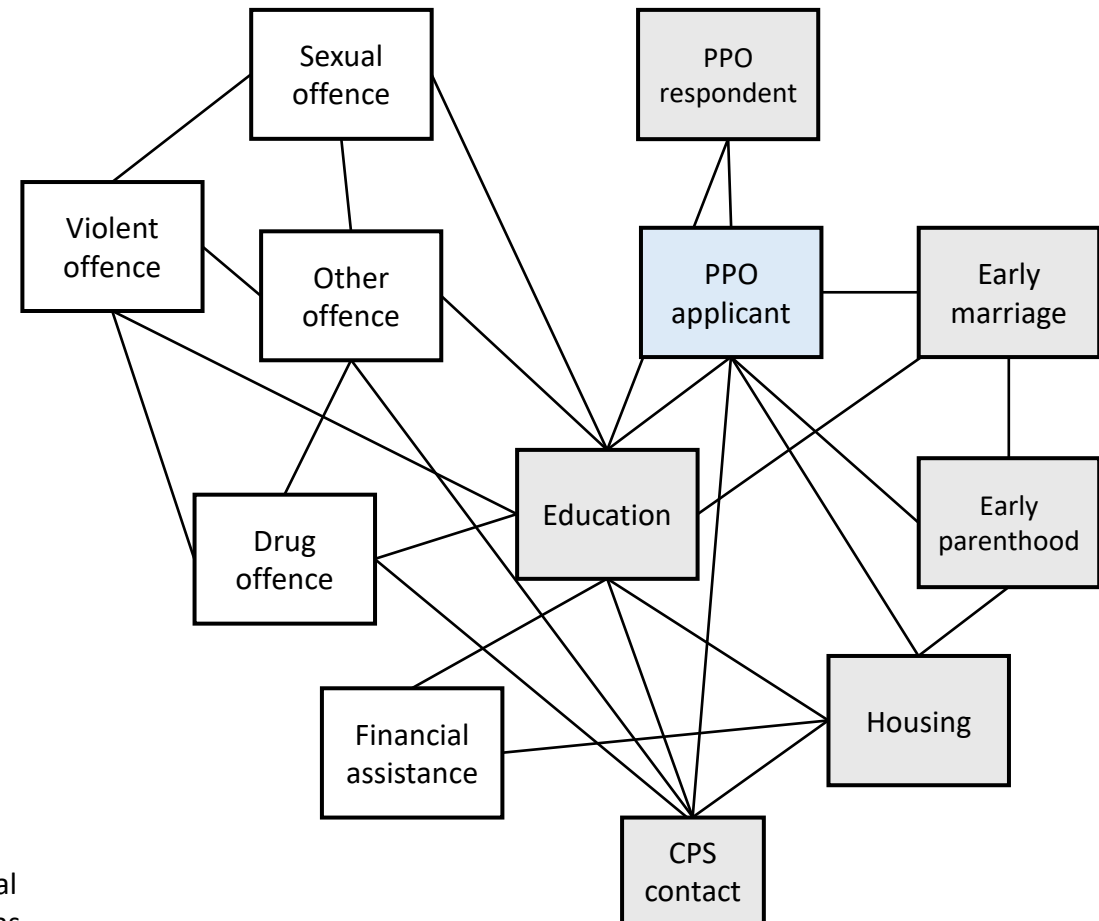
Notes:

- The analysis used administrative data of ever-married individuals born in 1980 and 1985 (N = approx. 51,800). Numbers rounded to nearest 100.
- Machine learning approach was adopted, and four algorithms were used. Logistic regression was selected as the best performing model. Feature importance was calculated by taking the absolute values of the coefficients.
- The recall of the final model was 83.1%. Recall rate indicates the rate of actual PPO applicants that are correctly identified by the model.

# Interrelationship between various life adversities and spousal violence victimisation

Risk factors *directly* associated with risk of spousal violence victimisation

- Experience of DV in childhood (CPS contact)
- Prior history as PPO respondent
- Early marriage
- Early parenthood
- Lower educational attainment
- Staying in public rental flat (housing)



Notes:

Network approach was adopted. Each variable was represented as 'node', and statistical association between two variables, after controlling for other nodes in the network, was represented as an 'edge'.

**Prior history of DV** was directly associated with higher risk of spousal violence victimisation in adulthood

**Socioeconomic status**, measured by education attainment and housing status, were associated with higher risk of spousal violence victimisation in adulthood.

Other life adversities associated with risk of spousal violence victimisation in adulthood included **marriage and parenthood age**.

Consistent with risk factors identified in existing literature and support the theories

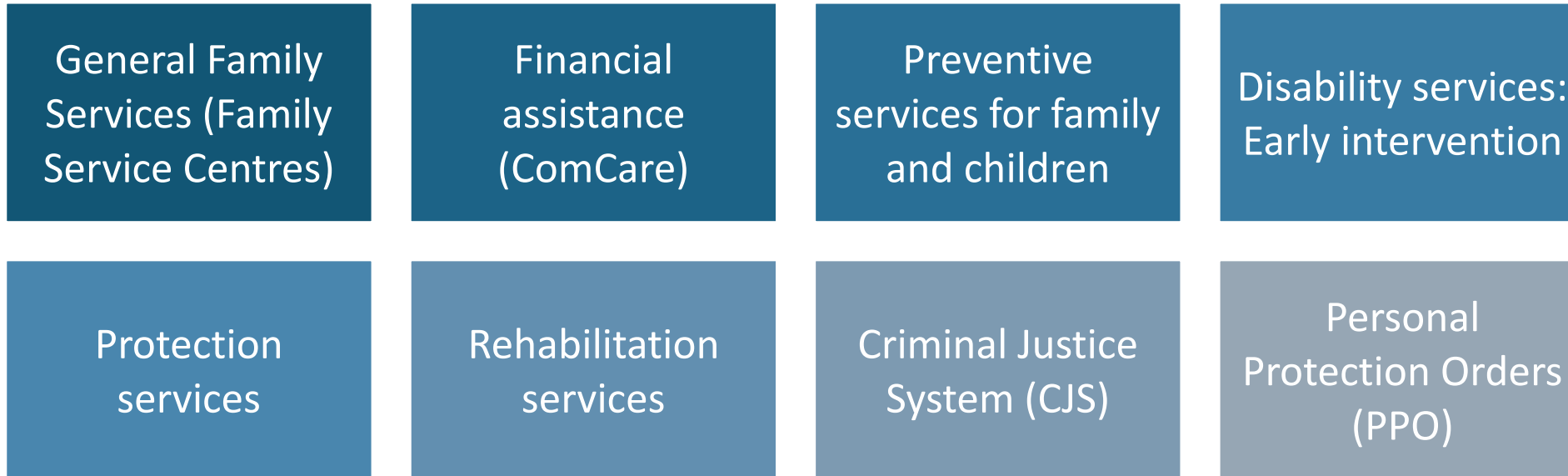
- Ecological framework (Bronfenbrenner, 1989; Heise, 1998)
- Social learning theory (Bandura & Walters, 1977)
- Attachment and trauma theories (Orlans & Levy, 2014)

**Investigation 2:**  
**Continuity of DV across generations**

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# Coverage of services in Investigations 2 and 3

Included upstream social services to examine early risk factors and identify opportunities for preventive efforts



Note: In investigations 2 and 3, domestic violence in childhood was proxied by receiving Protection services, i.e., contact with MSF Child Protective Service (CPS) and Child Protection Specialist Centres (CPSCs). Domestic violence in adulthood was proxied by applying for or being a respondent to PPO, and/or receiving Protection services, including Mandatory Counselling Programme (MCP). MCP providers include appointed community agencies such as Protection Specialist Centres (PSCs), Integrated Services for Individual and Family Protection Specialist Centre (ISIFPSC) and Family Service Centres (FSCs).

# Conceptual framework to examine impact of family adversity on child at different developmental stages

## Before childbirth

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health concerns

## Late childhood (when child was at 7-12 years)

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health conditions
- Child receiving social services

## Early childhood (when child was at 0-6 years)

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health concerns
- Child receiving social services

## Adolescence (when child was at 13-17 years)

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health concerns
- Child receiving social services

### Notes:

- CJS = criminal justice system; PPO= personal protection order
- Child's characteristics, socioemotional and behavioural issues and family profiles (e.g., household size, house type, parent education) were controlled for.
- Sibling was defined as sharing either parent and staying in the same household.



# An example: Family adversities that may predict risk of experiencing child abuse in adolescence (13-17 years)

## Before childbirth

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health concerns

## Late childhood (when child was at 7-12 years)

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health concerns
- Child receiving social services

## Early childhood (when child was at 0-6 years)

- Parent and sibling receiving social services
- Parent with CJS or PPO contact
- Parental divorce
- Parent's mental health concerns
- Child receiving social services

## Outcome:

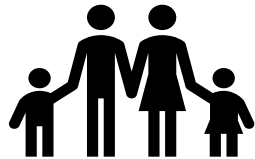
Whether child had contact with protection services (CPS or CPSCs) in adolescence (13-17 years)

### Notes:

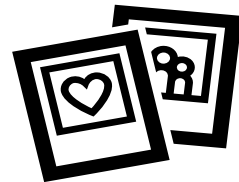
- CJS = criminal justice system; PPO= personal protection order; CPS=Child Protective Service; CPSCs=Child Protection Specialist Centres
- Child's characteristics, socioemotional and behavioural issues and family profiles (e.g., household size, house type, parent education) were controlled for.
- Sibling was defined as sharing either parent and staying in the same household.

# Top family adversities that contributed to risk of experiencing child abuse in early childhood

With other factors being controlled for, as compared to a family without the adversity, relative risk of experiencing child abuse in early childhood was **higher** for



A family with parental contact with **protection services** before childbirth



A family with parental contact with **PPO** before childbirth



A family with parental **criminal justice** involvement before childbirth



A family staying in **1- or 2-room** public housing flat

## Notes:

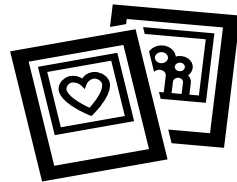
- Early childhood refers to 0-6 years, late childhood refers to 7-12 years, and adolescence refer to 13-17 years.
- The analysis used administrative data of individuals born between 1999 and 2003 (N = approx. 198,800) and their parents and siblings. Numbers rounded to nearest 100.
- Machine learning approach was adopted, and four algorithms were used. Extreme gradient boosting (XGB) was selected as the best performing model.
- Top family adversities refer to family factors with relative feature importance greater than 0.05. Relative feature importance refers to the degree to which the feature contribute to the prediction, with higher value indicating a stronger influence.
- Relative risk ratio was calculated based on partial dependence of the feature, with other factors being controlled for.
- Parental contact with protection services refers to parent experiencing spousal abuse as an adult or child abuse as a child. It excludes situations where the parent previously caused harm to another child.

# Top family adversities that contributed to risk of experiencing child abuse in late childhood

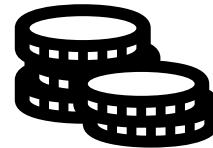
With other factors being controlled for, as compared to a family without the adversity, relative risk of experiencing child abuse in late childhood was **higher** for



A family with parental **criminal justice** involvement before childbirth



A family with parental contact with **PPO** when child was in early childhood



A family in need of **financial assistance** when child was in early childhood



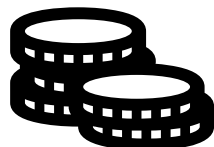
A family staying in **1- or 2-room** public housing flat

## Notes:

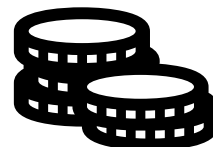
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- Relative risk ratio was calculated based on partial dependence of the feature, with other factors being controlled for.

# Top family adversities that contributed to risk of experiencing child abuse in adolescence

With other factors being controlled for, as compared to a family without the adversity, relative risk of experiencing child abuse in adolescence was **higher** for



A family in need of **financial assistance** when child was in early childhood



A family in need of **financial assistance** when child was in late childhood



A family staying in **1- or 2-room** public housing flat

## Notes:

- Early childhood refers to 0-6 years, late childhood refers to 7-12 years, and adolescence refer to 13-17 years.
- The analysis used administrative data of individuals born between 1999 and 2003 (N = approx. 198,800) and their parents and siblings.
- Machine learning approach was adopted, and four algorithms were used. Extreme gradient boosting (XGB) was selected as the best performing model.
- Top family adversities refer to family factors with relative feature importance greater than 0.05. Relative feature importance refers to the degree to which the feature contribute to the prediction, with higher value indicating a stronger influence.
- Parental contact with PPO before childbirth, when child was in early and late childhood still ranked within the upper half of all features, but with lower feature importances.
- Relative risk ratio was calculated based on partial dependence of the feature, with other factors being controlled for.

# Discussions

Parental **spousal violence** was found to be a pertinent family adversity associated with higher risk of child abuse at early and late childhood.

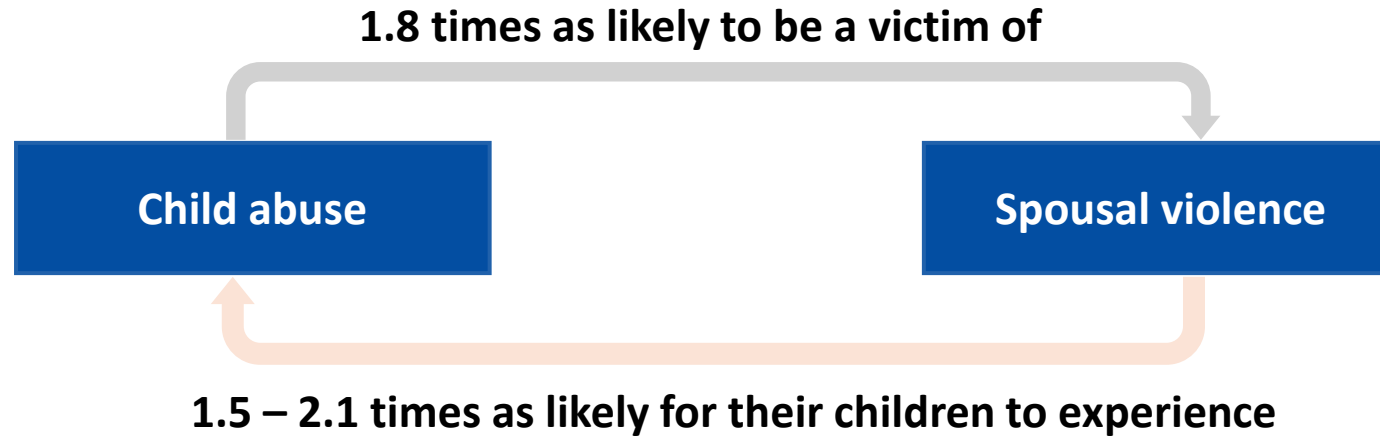
Parental **criminal justice involvement** was also a pertinent family adversity associated with higher risk of child abuse at early and late childhood.

Family with **financial challenges** (i.e., in need of financial assistance and/or staying in 1- or 2-room public housing flat) were associated with higher risk of child abuse across all developmental stages.

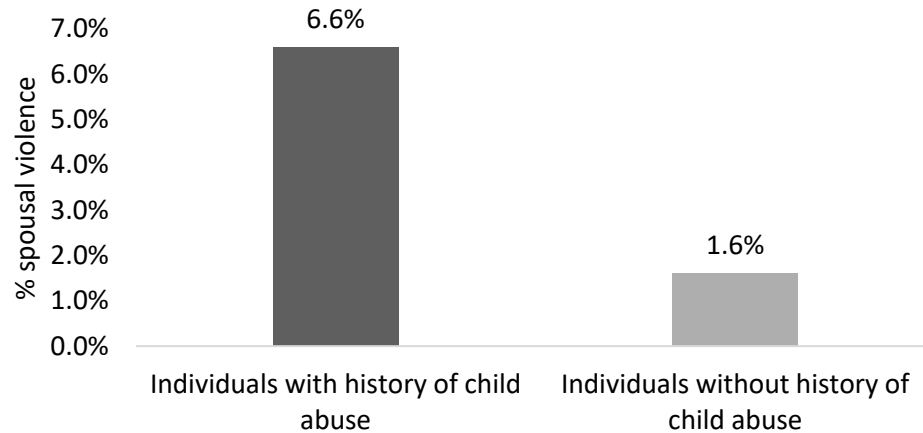
Consistent with risk factors identified in existing literature and support the theories

- Ecological systems theory (Bronfenbrenner, 1989)
- Family systems theory (Bowen, 1978; Papero, 1990)
- Social stress theory (Aneshensel, 1992)

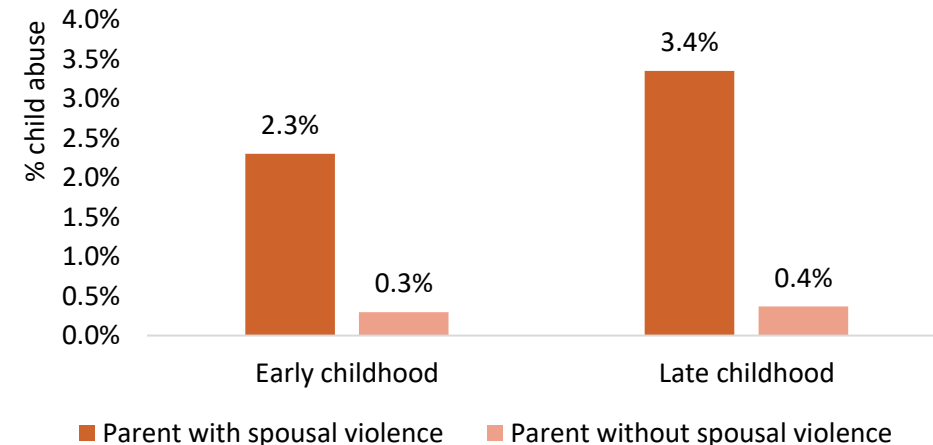
# Intergenerational continuity of domestic violence




Prevalence of spousal violence by history of child abuse



Prevalence of child abuse by parental spousal violence



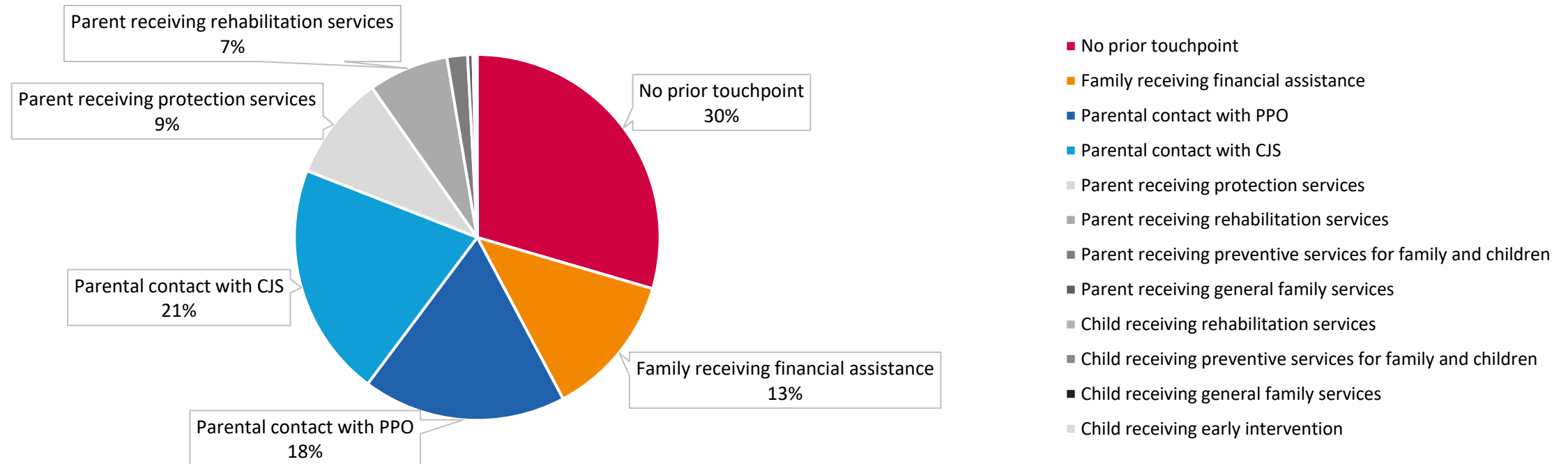
# Investigation 3: Touchpoints

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# Common 1<sup>st</sup> touchpoint before protection services (CPS or CPSCs)

- Among children who received protection services (CPS or CPSCs), approximately 70% of their families (child and parent) were already known to government and social service agencies prior to the protection services.
- Common 1st touchpoints included parental CJS contact, 2) parental PPO contact, and 3) family receiving financial assistance from government agency.

**1st touchpoint for children receiving protection services (CPS or CPSCs)**



**Notes:**

- CJS = criminal justice system; PPO= personal protection order; CPS=Child Protective Service; CPSCs=Child Protection Specialist Centres
- N = approx. 5,900 children who were born between 1990 and 2004 who received protection services (CPS or CPSCs). Numbers rounded to nearest 100.
- Follow-up is up to 16 years. Services received after child's contact with protection services (i.e., CPS and CPSCs) are excluded for this analysis.
- The same service received by the same person in the same year is treated as duplicate. If both child and parent received services on the same date, we chose to include the child's service. If multiple events happened on the same date for child/parent, our priority is downstream services over upstream services.

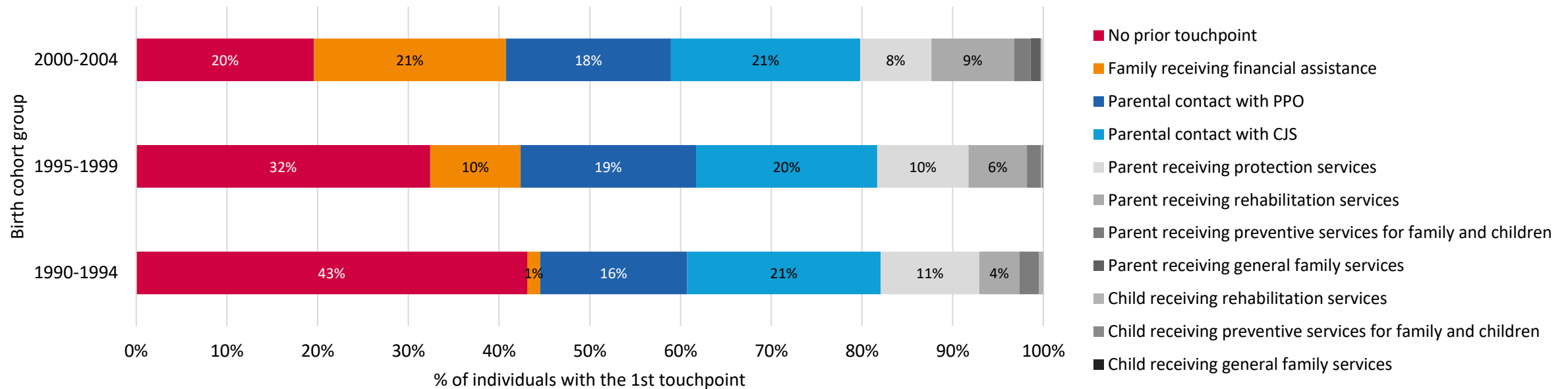


# Increased proportion of families with prior touchpoints across birth cohorts

For more recent cohorts,

- Decreased in % of children who received protection services (CPS or CPSCs) without prior touchpoint.
- Increased in % of children whose 1<sup>st</sup> touchpoint prior to protection services (CPS or CPSCs) was financial assistance.

1st touchpoint by birth cohort group

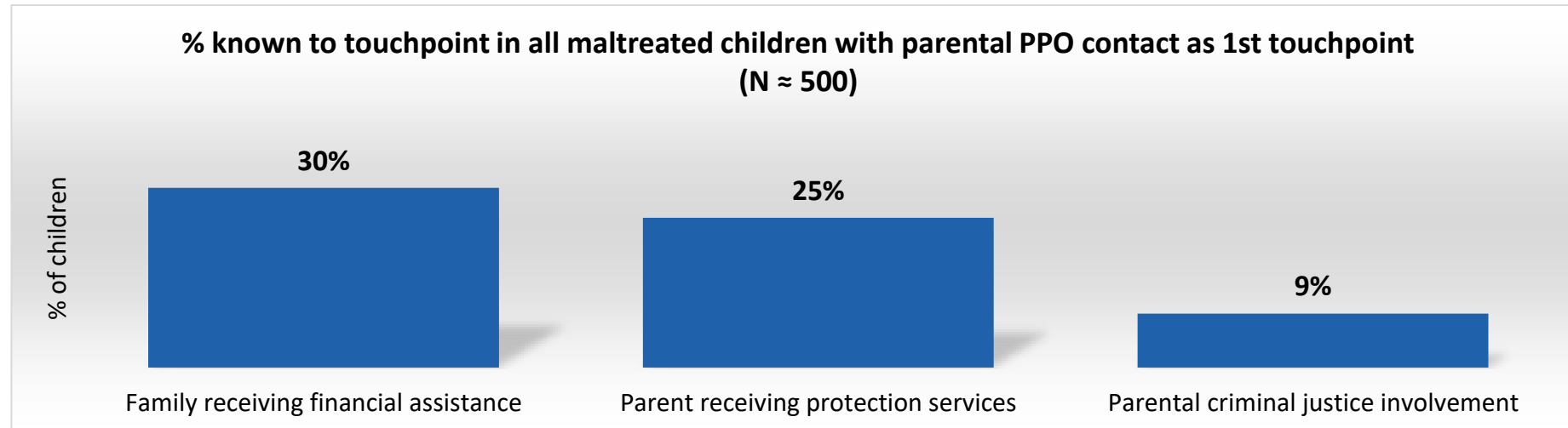


Notes:

- CJS = criminal justice system; PPO= personal protection order; CPS=Child Protective Service; CPSCs=Child Protection Specialist Centres
- N = approx. 2,600 children who were born between 2000 and 2004 who received protection services (CPS and CPSCs). Numbers rounded to nearest 100.
- Follow-up is up to 16 years. Services received after child's contact with protection services (i.e., CPS and CPSCs) are excluded for this analysis.
- The same service received by the same person in the same year is treated as duplicate. If both child and parent received services on the same date, we chose to include the child's service. If multiple events happened on the same date for child/parent, our priority is downstream services over upstream services.

# Possible touchpoints between parental spousal violence and child abuse included financial assistance for family and protection services for parent.

- Spousal violence and child abuse might co-occur
  - Mean time between parental PPO contact and child's contact with protection services (CPS or CPSCs) is about 1 year
- Most common touchpoint in between was financial assistance for the family, followed by protection services for parent, such as mandatory counselling programme (MCP) for DV.



#### Notes:

- PPO= personal protection order; CPS=Child Protective Service; CPSCs=Child Protection Specialist Centres
- Analyses using data from 2000-2004 birth cohorts (N= approx. 500 maltreated children with parental PPO contact as 1st touchpoint). Numbers rounded to nearest 100.
- Touchpoints in between were not mutually exclusive.

# Financial assistance for family and protection services for parent were linked with reduced risk of child abuse

- Focusing on the two common touchpoints in between (i.e., financial assistance and protection services)
- With other factors controlled for, among families where parental PPO contact was the 1<sup>st</sup> touchpoint, odds of child receiving subsequent protection services (CPS or CPSCs) was lower for
  - **Family** receiving **financial assistance** (OR = 0.72,  $p = .004$ )
  - **Parent** receiving **protection services (MCP) for DV** (OR = 0.55,  $p < .001$ )
- Indicating these interventions might have positive impact in reducing risk of child abuse for families with spousal violence

## Notes:

- PPO= personal protection order; CPS=Child Protective Service; CPSCs=Child Protection Specialist Centres
- Logistic regression was conducted using data from 2000-2004 birth cohorts (N= approx. 7000 children with parental PPO contact as 1st touchpoint), controlling for child's demographics, family profiles and whether family received other major services. Numbers rounded to nearest 100.
- Generalized Estimating Equations (GEE) were used to account for the clustering of families.

# Summary of findings from Investigation 3

- Around 70% of children or their families were known to government and social service agencies prior to contact with protection service (CPS or CPSC). There could be potential to tap on these touchpoints to provide early intervention for families in need.
- Major 1<sup>st</sup> touchpoints were PPO and CJS for parent, and financial assistance for family.
- Increased in % with touchpoints prior to child receiving protection services (CPS or CPSCs), and % of family with financial assistance as 1<sup>st</sup> touchpoint for more recent cohorts.
- For families with parental contact with PPO as 1<sup>st</sup> touchpoint, financial assistance and protection service (MCP) for DV had positive impact in reducing the risk of subsequent child abuse.
  - Financial assistance helps to reduce economic stress for families.
  - MCP aims to keep families safe through helping family members to learn more respectful behaviours to resolve conflict and providing family members with the necessary support and skills to ensure everyone's safety.

# Implications

- Findings validated the ongoing efforts in providing continuous support for
  - Children from lower-income families to address issues other than financial challenges (e.g., KidSTART)
  - Children with incarcerated parents (e.g., Kids In Play, Friends of Children and Youth)
  - Families with children that are living in public rental flats (e.g., ComLink+)
- Findings revealed association between spousal violence and child abuse and the possible co-occurrence, highlighting the importance of keeping a lookout and providing continuous support for families with spousal violence (e.g., integrated services, family group therapy).
- For families with parental PPO contact, subsequent financial assistance and protection services (Mandatory Counselling Programme) for the parent were found to have positive impact in breaking the negative intergenerational continuity of domestic violence and reducing the risk of child abuse.







## Future research

- To further investigate profiles of children at 1<sup>st</sup> touchpoints and identify profiles associated with higher likelihood of child abuse
- To identify possible intervention opportunities to mitigate the impact of
  - Parental criminal justice involvement and other family adversities on child abuse
  - Child abuse on spousal violence victimisation and other life adversities in adulthood



**Thank you!**

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# Method: Machine learning (ML) and network approaches were adopted

## Machine learning approach

- Dataset was split into a training set (70%) and a testing set (30%).
- Four supervised ML algorithms were used
  - Logistic regression (LR)
  - Classification and regression trees (CART)
  - Random forest (RF)
  - Extreme gradient boosting (XGB)
- Cost-sensitive learning approach was adopted as dataset is imbalanced
- Five-folded cross-validated grid search to determine the optimal values of hyper-parameters and reduce overfitting

## Network approach

- Each variable was represented as ‘node’
- Statistical association between two variables, after controlling for other nodes in the network, was represented as an ‘edge’.
- Pairwise mixed graphical model (MGM)
  - Estimation of undirected edges for both continuous and binary variables
- “Least absolute shrinkage and selection operator” (LASSO) was employed to correct for false positive.

# Services included in Investigations 2 and 3

- Family Service Centres: Community-based social services that provide support for low-income and/or vulnerable individuals and families with social and emotional issues
- Financial assistance (ComCare): Supports lower-income households with basic living expenses
- Preventive services for family and children
  - KidSTART: Specialises in supporting families in early childhood development
  - Enhanced Step-Up (ESU): A support programme for at-risk youths with chronic school absenteeism issues.
  - Family guidance order: Issued to children or young persons who display serious behavioural challenges.
- Early intervention services: Help children with developmental needs gain skills that maximise their capability for independence.
- Protection services
  - Child Protection Specialist Centres: Community-based specialist agencies that provide services and support for child abuse cases with moderate safety and risk concerns.
  - Child Protective Service: Statutory intervention for child abuse cases with high safety and risk concerns.
  - Mandatory Counselling Programme: A court ordered counselling programme to help persons who have experienced or used domestic violence.
- Rehabilitation services
  - Integrated Service Providers: MSF-appointed social service agencies that run a suite of MSF-funded services primarily for youth offenders.
  - Probation and Community Rehabilitation Service: A community-based rehabilitation option which could be ordered by the Court for people who have committed offence(s).
  - Youth Residential Service: Rehabilitation of youth at the Singapore Boys' Home and Singapore Girls' Home.
- Other relevant services include criminal justice system (CJS) and personal protection orders (PPO)

## Sources:

<https://supportgowhere.life.gov.sg/services/SVC-FSCF/family-service-centre-fsc>; <https://kidstart.sg/>; <https://supportgowhere.life.gov.sg/services/SVC-CPSCC/child-protection-specialist-centre-cpsc>; <https://www.msf.gov.sg/what-we-do/comcare>; <https://www.msf.gov.sg/what-we-do#>; <https://www.ecda.gov.sg/parents/other-services/early-intervention-services>.

# Good model performance across developmental stages

Model evaluation metrics	Model predicting risk of experiencing DV in <b>early childhood</b>	Model predicting risk of experiencing DV in <b>late childhood</b>	Model predicting risk of experiencing DV in <b>adolescence</b>
AUC	0.85	0.86	0.87
Sensitivity	74%	73%	75%
	Out of approx. 200 CYPs who received protection services, 74% were correctly identified.	Out of approx. 300 CYPs who received protection services , 73% were correctly identified.	Out of approx. 400 CYPs who received protection services, 75% were correctly identified.
Specificity	83%	87%	84%
	Out of approx. 59,400 CYPs who did not receive protection services, 83% were correctly classified.	Out of approx. 59,300 CYPs who did not receive protection services , 87% were correctly classified.	Out of approx. 59,200 CYPs who did not receive protection services, 84% were correctly classified.

Notes:

- The analysis used administrative data of individuals born between 1999 and 2003 (N = approx. 198,800) and their parents and siblings.
- Similar to investigation 1, ML approach was adopted. Extreme gradient boosting (XGB) was selected as the best performing model for this analysis.
- AUC (Area Under the Curve) is a metric used to evaluate the overall performance of a binary classification model in distinguishes between positive and negative cases regardless of the chosen threshold. As a general rule for practice, AUCs greater than 0.54, 0.63, and 0.71 are regarded as small, moderate, and large effects, respectively (Rice & Harris, 2005).
- Sensitivity is a measure of a model's ability to identify true positives. Specificity is a measure of a model's ability to correctly identify true negatives.
- Numbers rounded to nearest 100.