TRENDS IN ONLINE CHILD SEXUAL ABUSE MATERIAL

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CONTENTS

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ACRONYMS

CAID	UK Child Abuse Images Database
COPINE	Combating Paedophile Information Networks in Europe
CPORT	Child Pornography Offender Risk Tool
CSAM	Child Sexual Abuse Material
ESP	Electronic Service Provider
EUROPOL	European Union Agency for Law Enforcement Cooperation
EXIF	Exchangeable image file format
ICAID	Interpol Child Abuse Image Database
ICCAM	I-''See'' (c)-Child-Abuse-Material
ICMEC	International Centre for Missing & Exploited Children
ICSE DB	International Child Sexual Exploitation Database
INHOPE	International Association of Internet Hotlines
INTERPOL	International Criminal Police Organization
IVAS	Investigation Video and Audio System
IWF	Internet Watch Foundation
KIRAT	Kent Internet Risk Assessment Tool
MOU	Memorandum of Understanding
NCMEC	National Center for Missing and Exploited Children
OCSE	Online Child Sexual Exploitation
URL	Uniform Resource Locator

EXECUTIVE SUMMARY

CSAM crimes are varied and subject to change, terminology differs across researchers and practitioners, and inconsistent ways of operationalising and measuring CSAM make comparison across studies difficult. This has had a negative impact on global efforts at data collection across different forms of child sexual abuse and exploitation and is the case with online CSAM.

Our capacity to evaluate the scale of the problem in terms of the quantity of CSAM is compromised by the volume of online content in the open, and also hidden, Internet and the reality that content may be removed but not destroyed.

Criminal justice data from public records, as well as research surveys, would suggest an increase over time in the number of CSAM crimes. Youth-produced images pose a problem for law enforcement in terms of resource demands alongside their ability to determine the age of the child and whether they have been produced as part of coercive activity by adults or peers or represent behaviour that is consistent with adolescent development and risk-taking.

Mapping of existing national and international CSAM databases would suggest that they fall largely into two groups: hash collections and image collections. While there are a number of databases globally,

there is limited connectivity between them. Differences in how data is defined and recorded means that it is impossible to draw firm conclusions as to whether there have been changes in the gender, age and level of violence within recorded CSAM. However there is some converging evidence that the percentage of egregious images has increased over time.

Across three studies, younger victims are associated with greater levels of sexual violence, produced within a family context and more likely to be widely distributed. However, the preponderance of images are of pubescent and pre-pubescent children and the numbers of images of very young children (infants and toddlers) remain relatively low. This is in contrast to the views of experts interviewed in the current study.

The majority of victims and offenders are white Caucasians, and while there has been an increase in other ethnic groups, these numbers remain disproportionately small. This does require further investigation given the increasing availability of Internet connectivity through hand-held devices across hand-held devices and the concerns expressed about, for example, live streaming of abuse.

1. INTRODUCTION

Definitions of what constitutes online-facilitated child sexual abuse and exploitation are both varied and subject to change, and as noted by a recent study,[1] the terms used in research are often different from those used for legally defined crimes, which also differ between, and on occasions within, countries. Differing terminology makes comparison across studies difficult, and this is reflected in the decision by ECPAT International to work with other stakeholders to develop terminology guidelines, as absence of consensus about the terms used has had a negative impact on global efforts at data collection across different forms of child sexual abuse and exploitation.[2] These forms may include: the production, dissemination and possession of child sexual abuse material (CSAM: which are known in many jurisdictions as 'child pornography'); online grooming or active sexual solicitation of children; sexting; sexual extortion of children (also known as 'sextortion'); revenge pornography; exploitation of children through online prostitution, and live streaming of sexual abuse.[3] We can also make a distinction between cyber-enabled and cyber-dependent crime: for example CSAM would fall into the first category, whereas live streaming of sexual abuse would be in the latter as it is only possible because of the technology.[4] It would be true to say that online-facilitated child sexual abuse and exploitation has been seen as both a public health and criminal justice problem.[5] There is a perception that with each new technological advancement, law enforcement, researchers, and advocates

find themselves out-paced as they combat ever-changing and ever-growing problems. Due to the multi-faceted nature of online-facilitated child sexual abuse and exploitation, there are significant gaps in the way these crimes are understood. In her December 2014 report to the Human Rights Council, the Special Rapporteur on the sale and sexual exploitation of children called on States to "conduct research [...] in order to obtain a comprehensive picture of the phenomena [...]" and to "establish a reliable and standard information on the phenomena".[6] The same month, taking place in London, the #WePROTECT Children Online Global Summit that was convened by the government of the United Kingdom clearly highlighted the need for development of indicators and further collection of data.[7] Global indicators and standards in data collection would provide clear language and metrics for law enforcement, researchers, and advocates to communicate more effectively about the phenomena. Currently, there is a growing body of data which show evidence of emerging trends in several key areas of online-facilitated child sexual abuse and exploitation. However, the preponderance of empirical studies has taken place within high income countries and, outside of the research from the Crimes Against Children Research Center,[8] there is a paucity of longitudinal data to help us understand changing patterns of offending and victimisation in this area. To date, bids to quantify the scale of online-facilitated child sexual abuse and exploitation have counted the number

1   Dr. Wager, Nadia et al. (2018), "Rapid Evidence Assessment: Quanitfying the extent of online-facilitated child sexual abuse: Report for the Independent Inquiry into Child Sexual Abuse", January 2018, accessed 27 February 2018, https://www.iicsa.org.uk/document/rapid-evidence-assessment-quantifying-extent-online-facilitated-child-sexual-abuse.
2   Interagency Working Group on Sexual Exploitation of Children (2016), "Terminology Guidelines for the protection of children from sexual exploitation and sexual abuse" (hereinafter Luxembourg Guidelines), adopted in Luxembourg on 28 January 2016, accessed 27 February 2018, http://luxembourgguidelines.org/.
3   Quayle, Ethel (2016), "Researching online exploitation and sexual abuse: Are there links between online and offline vulnerabilities?", Global Kids Online, The London School of Economics and Political Science, London, UK, accessed 16 February 2018, http://eprints.lse.ac.uk/71260/.
4   Kelly,Liz and Karsna, Kairika (2017), "Measuring the scale and changing nature of child sexual abuse and child sexual exploitation. Scoping report", July 2017, London Metropolitan University, accessed 16 February 2018, https://www.csacentre.org.uk/research-publications/scale-and-nature-of-child-sexual-abuse-and-exploitation/scoping-report/.
5   Clarke, Megan, Ribisl, Kurt M., Runyan Desmond and Runyan, Carol (2013), "A public health approach to addressing internet child sexual exploitation" in Understanding and Preventing Online Sexual Exploitation of Children, 244-265, accessed 14 February 2018, https://uncch.pure.elsevier.com/en/publications/a-public-health-approach-to-addressing-internet-child-sexual-expl.
6   UN Human Rights Council (2014), "Report of the Special Rapporteur on the sale of children, child prostitution and child pornography, Ms. Najat Maalla M'jid", UN Doc. A/HRC/28/56, 18 December 2014, accessed 13 February 2018, https://www.ohchr.org/EN/HRBodies/HRC/RegularSessions/Session28/Documents/A_HRC_28_56_Add_1_ENG.doc.
7   Gov. UK (2014), "#WeProtect Children Online Global Summit: Prime Minister's Speech", 11 December 2014, accessed 15 February 2018, https://www.gov.uk/government/speeches/weprotect-children-online-global-summit-prime-ministers-speech.
8   Crimes Against Children Research Center, accessed 18 December 2018, http://www.unh.edu/ccrc/.

of: identified offenders or suspects, as well as young people who have engaged in harmful sexual behaviour; identified victims; reported offences (including public reports as well as crime statistics), and the number of confirmed CSAM (images and videos). By far the greatest number of publications identified in Wagner et al.'s rapid evidence review related to self-report victimisation studies.[9]

THE AMOUNT OF CHILD SEXUAL ABUSE MATERIAL

The focus of this report is CSAM and questions about how much of it exists and whether there are changing patterns in the amount of new material being identified globally. In absolute terms, we can never quantify the amount of material that has been created or is in circulation on the Internet, because new content is constantly being added and only a proportion of older content (some of which predates the Internet but has been scanned and uploaded) will have been identified and taken down. Even with the use of custom-made web crawlers to aid notice and takedown of CSAM,[10] there is no guarantee that it will not be uploaded again. However, common metrics to assess CSAM include reports from hotlines e.g. the absolute number of reported cases analysts have determined to contain illegal content over a period of time, and criminal justice records (e.g. how many individuals have been arrested for possessing CSAM): both methods have their limitations. Anecdotally, it is understood that material is traded across multiple platforms, and that the volume of material outstrips the resources available to law enforcement and hotline analysts to fully investigate or analyse. So, understandably, the number of arrests and reports can never accurately represent the actual amount of CSAM in circulation at any given time.

Additionally, parsing out what method or terminology to use when measuring the amount of identified CSAM is difficult. Material could be examined by the number of children victimised in a series of images or case, the absolute number of images in a collection, or the number of offenders responsible for a series of images (either

perpetrating the behaviour, producing the content, or distributing the material). An added complication is the number of unidentified offenders and victims. There are many offenders and images that will remain undetected by law enforcement or hotline analysts. These offenders are not missed only because law enforcement may have limited capacity to investigate them, but rather because they may use techniques to encrypt or anonymise their activities,[11] or as with the case of new commercial websites, payment is only accepted by digital payment systems such as Bitcoin [12] as an emergent trend to avoid detection by offenders.

Other limitations to gauging the amount of CSAM from these common metrics are the biases in the protocols and laws governing different jurisdictions. For example, some countries limit how proactive law enforcement agents can be in their investigations, requiring them to wait until material is reported to their departments before they can begin an investigation. Other countries have introduced legislation that allows law enforcement and hotline analysts to review areas of the Internet that are considered popular trading platforms (i.e., forums on the dark net). Some evidence has documented that the amount of arrests or reports stemming from the latter method of investigation has made a significant difference in the number of offenders detected.[13]

PUBLIC REPORTS

Using the number of reports made by the public within a given time period to hotlines (a hotline is a national online resource that offers members of the public to report what they perceive as illegal online content) as a metric for the amount of CSAM in circulation, would suggest an incremental growth in these crimes over the total period that data has been collected. However, Donosa (2016) argues for caution when interpreting the number of public reports as evidence of an increase in the amount of CSAM. An increase in reporting may be due to other factors, such as an improvement in rates of detection because of technological tools, or because there has been an increase in human resources

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9   *Ibid*.

10   Keisanen, Laura and Vaaranen-Valkonen, Nina (2016), "1027 Nettivihje – combating online child sexual abuse", accessed 1 February 2018, https://injuryprevention.bmj.com/content/22/Suppl_2/A366.2; Cybertip!ca, "Project Arachnid" accessed 15 February 2018, https://www.cybertip.ca/app/en/projects-arachnid.

11   EUROPOL (2012), "Virtual Global Taskforce Environmental Scan 2012", accessed 15 February 2018, https://www.europol.europa.eu/publications-documents/virtual-global-taskforce-environmental-scan-2012.

12   Smith, Sara (2014), "BRIEFING PAPER- Rogue Affiliates Distributing CSAM using "Disguised Websites", April 2014, Internet Watch Foundation, accessed 15 February 2018, https://www.iwf.org.uk/sites/default/files/inline-files/Analysis_of_rogue_affiliates_commercial_public_0414.pdf.

13   Wolak, J., Finkelhor, D., and Mitchell, K. (2011), "Child pornography possessors: Trends in offender and case characteristics", in Sexual Abuse: A Journal of Research and Treatment, 23(1), 22-42, accessed 15 February 2018, https://www.ncbi.nlm.nih.gov/pubmed/21349830.

available to manage it. It may also be the case that in some countries there is growing awareness of the problem and a willingness to report suspected CSAM. She concludes that because of the nature of the content being dealt with, and the impossibility of most hotlines to collect data directly from the source, it is difficult to draw firm conclusions: "As long as we are unclear how much child sexual abuse material is being produced, distributed and consumed out there, we will not be able to know for sure whether the problem has worsened or not".[14]

There are therefore caveats on how we should interpret public reporting of content, not the least because in 2015, in addition to receiving reports of online CSAM, 85% of hotlines in 2015 also accepted other types of reports, which included for example racism/hate speech (69%), adult pornography (64%), bullying (62%) and self-harm/suicide (44%). However, in this global study of hotlines, approximately one-third of those surveyed indicated that CSAM reports made up the majority of their workload.[15] The National Center for Missing and Exploited Children (NCMEC), serves as the United States of America's clearing house for CSAM through the CyberTipline. This provides an online mechanism for members of the public and electronic service providers (ESPs) to report incidents of suspected child sexual exploitation. This includes CSAM, sexual exploitation of children in travel and tourism, online enticement, trafficking of children for sexual purposes, child sexual molestation, misleading domain names or words, and unsolicited obscene material sent to a child. In the report to the United States House of Representatives Subcommittee in March 2017 it was noted that over recent years, the volume of CyberTipline reports received by NCMEC had increased from over 1.1 million reports in 2014, to more than 4.4 million reports in 2015, to more than 8.2 million reports in 2016. By the time of the report in 2017, NCMEC had already received over 2.3 million CyberTipline reports.[16] It was suggested

that these increases in part may be due to voluntary adoption by electronic service providers (ESPs) of new technology (such as PhotoDNA[17]) to enable the removal of child exploitation content from their platforms. In 2016 it was estimated that 94% of the reports submitted to CyberTipline by US-based ESPs involved someone outside of the United States.

In the 2016 Annual Report from the Internet Watch Foundation (IWF),[18] whose remit is to remove CSAM hosted anywhere in the world, including non-photographic CSAM hosted in the United Kingdom, of the 105,420 reports processed in 2016, 57,162 were received from public sources with the remainder identified through analysts actively searching the open Internet using a combination of analyst searching and bespoke web crawlers. Of these, 57,335 URLs contained CSAM, twenty-eight per cent of these reports were confirmed as containing CSAM.[19] INHOPE (a global network of hotlines from 49 members whose remit is to deal with illegal content online and remove CSAM from the Internet),[20] reported that they received 9,357,240 reports in 2016, with 8,474,713 confirmed as containing CSAM.[21] Cybertip.ca, the hotline hosted by the Canadian Centre for Child Protection processed 40,251 reports in 2016-17, 49% of which were forwarded to law enforcement, child welfare and (or) INHOPE, or a notice was sent to an ESP to report CSAM hosted by a service provider in Canada or the United States.[22]

CRIMINAL JUSTICE RECORDS

The extent of Internet-mediated sexual abuse and exploitation has also been examined through police data. The most substantial data set comes from the US longitudinal National Juvenile Online Victimisation (NJOV) study.[23] This arrest study collected data in 2000, 2006 and 2009. These studies included two phases of data collection:

14   Quote from an interview to Verónica Donoso Executive Director at INHOPE, NetClean Labs, "Can a growing problem be a positive", 29 June 2017, accessed 3 February 2018, https://blog.netclean.com/can-a-growing-problem-be-a-positive/.
15   Stroebel, Melissa and Jeleniewski, Stacy (2015), "Global Research Project: A global landscape of hotlines combatting child sexual abuse material on the Internet and an assessment of shared challenges", NCMEC, accessed 4 February 2018, http://www.missingkids.com/content/dam/ncmec/missingkids/downloads/grp.pdf.
16   Sheehan, John (2017), "Hearing: Combating crimes against children: assessing the legal landscape", House of Representatives, Judiciary Committee, accessed 3 February 2018, https://judiciary.house.gov/hearing/combating-crimes-children-assessing-legal-landscape/.
17   Microsoft, "PhotoDNA", accessed 3 February 2018, https://www.microsoft.com/en-us/photodna.
18   Internet Watch Foundation, accessed 25 January 2018, http://www.iwf.org.uk.
19   Internet Watch Foundation (2016), "IWF Annual Report 2016", accessed 22 January 2018, https://www.iwf.org.uk/sites/default/files/reports/2017-04/iwf_report_2016.pdf.
20   INHOPE, accessed 3 February 2018, www.inhope.org/gns/home.aspx.
21   INHOPE (2016), "Annual Report 2016", accessed 25 January 2018, http://www.inhope.org/Libraries/Annual_reports/Annual_report_2016.sflb.ashx.
22   Canadian Centre for Child Protection (2016-17), "Protect We will/ Social Value Report 2016-2017", accessed 25 January 2018, https://www.protectchildren.ca/pdfs/C3P_SocialValueReport_2016-2017_en.pdf.
23   Walsh, Wendy, Wolak, Janis and Finkelhor, David (2012), "Methodology report – 3rd National Juvenile Online Victimization Study (NJOV3): Prosecution study", September 2012, accessed 12 January 2018, http://unh.edu/ccrc/pdf/CV293_NJOV3%20Prosecution%20Study%20Methodology%20Report_1-18-13.pdf.

a postal survey of state, county and local law enforcement agencies in the US, of arrests made for technology-facilitated sexual crimes against children over a specified period of time, and telephone interviews concerning cases identified in the survey. There was a substantial increase in the number of arrests (from 2,577 in 2000 to 7,010 in 2006 and 8,144 in 2009), although this may not indicate an actual increase (as there was an overlap in the estimated ranges at the 95% confidence interval). Approximately half of the arrests were for possession of CSAM (defined as 'child pornography' in the study). Arrests for crimes where the victim was known to the police (through CSAM production) increased by approximately 30% between 2000 and 20006, and doubled between 2006 and 2009. This reflected a large increase in offenders who were known to their victims and described in the study as family and acquaintance offenders. Arrests that were made through proactive policing (police posing as children online) went down in 2009, although arrests for proactive investigation of CSAM offences increased in 2009 (2,353 compared to 880 in 2006).[24] The majority of people arrested in each wave of the study were male white Caucasians, although by 2009 a higher proportion arrests (16%) were members of minority ethnic groups.

The increase in arrests for the production of child sexual abuse materials appeared to be largely driven by 'youth-produced sexual images' which were taken by children 17 years or under and which met the legal definitions in the US for 'child pornography'. In most of these cases the person arrested was an adult who had solicited images from a minor. This was also reflected in the fact that there were more adolescent victims in 2009 and ones where they were face-to-face acquaintances with the person arrested. Adult-produced images were more likely than the images produced by adolescents to be taken by a family member (51% as opposed to 6%) who was aged 26 or older, with victims younger than 12 years. Adult producers were likely to possess additional CSAM which had been downloaded from the Internet, and to be discovered through law enforcement activity. One quarter of the adults producing images distributed them

on the Internet. In the cases where adolescents had produced the images, 83% were distributed, mainly by adolescents who had taken pictures of themselves and sent them to others (over half by mobile phones).

In 2009 the majority of the victims of CSAM production were aged 13–17, and overall more than half of the producers arrested had committed a contact sexual offence, documented in the images taken.[25]

This data is now quite old, and there is a paucity of comparable offence data outside the US, as many countries do not have the resources to research this area or do not disaggregate their sexual offence data.

In the UK, it was reported that the number of offenders convicted of taking, making or distributing child abuse images increased by 35%, from 921 in 2005/06 to 1,247 in 2012/13, with 2,515 offences reported in 2012/13 for possession.[26] The Rapid Evidence assessment by Wagner[27] also notes that in the UK the number of obscene publication offences which includes recorded offences for creating, possessing or distributing CSAM) has doubled across the UK between 2010/2011 and 2014/15 and that these increases have been attributed to an increase in the creation or distribution of indecent or pseudo-photographs of adults and children using Internet and mobile technology.[28] However, others have argued that these increases may be due to more targeted and coordinated activity by the UK National Crime Agency and other law enforcement agencies.[29] Earlier threat assessment reports by NCA-CEOP Command (2010-2012) noted changing patterns in the types of victimisation within seized images (increases in the egregiousness of the sexual assaults) and the ages of the children becoming younger and involving more females. However, these studies provide limited information as to the methodology involved in these estimates.[30]

Police data from the Netherlands was used to examine the attributes of seized CSAM and the characteristics of arrested offenders. Their data was

24   Wolak, Janis, Finkelhor, David, and Mitchell, Kimberly J. (2012), "Trends in Law Enforcement Responses to Technology-facilitated Child Sexual Exploitation Crimes: The Third National Juvenile Online Victimization Study (NJOV-3)", April 2012, accessed 12 January 2018, http://www.unh.edu/ccrc/pdf/CV268_Trends%20in%20LE%20Response%20Bulletin_4-13-12.pdf.

25   Quayle, Ethel (2016), "Researching online exploitation and sexual abuse: Are there links between online and offline vulnerabilities?".

26   McManus, Michelle Ann and Almond, Louise (2014), "Trends of indecent images of children and child sexual offences between 2005/2006 and 2012/2013 within the United Kingdom", accessed 12 February 2018, https://www.tandfonline.com/doi/abs/10.1080/13552600.2014.893031.

27   Ibid.

28   Office for National Statistic (2016), "Crime in England and Wales: year ending September 2015. Statistical Bulletin: Office for National Statistics", accessed 12 January 2018, https://www.gov.uk/government/statistics/crime-in-england-and-wales-year-ending-sep-2015,

29   Bently et al. (2017), "Our fifth annual report How safe are our children?", NSPCC, p. 42, accessed 12 January 2018, https://www.nspcc.org.uk/globalassets/documents/research-reports/how-safe-children-2017-report.pdf.

30   CEOP (2013), "Threat Assessment of Child Sexual Exploitation and Abuse", accessed 12 January 2018, https://www.norfolklscb.org/wp-content/uploads/2015/03/CEOP_Threat-Assessment_CSE_JUN2013.pdf

drawn from 159 police files involving 172 suspects investigated in 2007.[31] The majority of their suspects (93.6%) had only one victim, and where there were cases of multiple suspects, these did not appear to be part of organised criminal networks. Over 98% of the suspects were male and ranged from 14-83 years of age, but 35% were under 18. Often, these were young people who had taken sexualised pictures and/or videos of themselves and/or each other. However, it has to be acknowledged that these were largely samples of convenience and are likely to represent only a proportion of those involved in CSAM.

PRODUCTION AND DISTRIBUTION OF ABUSIVE IMAGES

A US study of arrests for CSAM production at two time-points (2000/2001 and 2006) indicated an increase in adolescent victims, but no increase in the proportion involving very young victims.[32] Many of the cases involved self-produced sexual images by adolescents and involving adult sex offenders. A third sample indicated that arrests for CSAM production quadrupled between 2000-2009 which was attributed to cases of self-produced sexual images solicited from minors by adult offenders.[33] However, of note is that in 2009 most youth-produced images were distributed, usually by youth who took pictures of themselves and sent them to others. Images were uploaded to the Internet in approximately 1 in 10 cases. Although there has been an increase in the amount of CSAM produced by adolescents in the context of coercive relationships, the NJOV-3 survey indicated that most CSAM was still produced by adult offenders. Adults either created images of minors themselves (37%) or enticed minors to produce images (39%). Adult-produced images were more likely to be perpetrated by a family member, have victims younger than 12-years of age, be perpetrated by offenders aged 26 or older and who also possessed CSAM images

that they had downloaded, and be discovered by law enforcement activity as opposed to disclosures. Of importance in relation to deterrence was that the authors concluded that increases in arrests were related to high levels of law-enforcement activity by agencies trained to respond to technology-facilitated crimes.

The introduction of technological landmarks such as the Internet, digital cameras, and smart phones over the past two decades has radically altered the way offenders sexually exploit children.[34] Currently, researchers have looked at the difference between offenders using 'active, real-time' platforms (i.e. live streaming and webcams) to transmit material versus those who use passive platforms (i.e. Torrents) to distribute CSAM. The complexities around determining the amount of CSAM that exists can be explored through image production through commercial exploitation. An example of live streaming of child sexual abuse for payment is provided by Terre des Hommes Netherlands who conducted research in nineteen English-language public chat rooms where four researchers posed as pre-pubescent Filipino girls. The researchers then waited for people to make contact and request a webcam sex performance. Contacts were reminded that they were interacting with a pre-pubescent child. If they continued to request a sex show, researchers began working to identify them. During the 10-weeks observation 20,172 offenders attempted to engage in live streaming of sexual abuse.[35] A systematic study of US Internet-facilitated sexual exploitation was examined through data from 569 arrests in 2006. [36] Offenders either used the Internet to purchase or sell access to identified children for sexual purposes, including CSAM production (36%), or used the Internet to purchase or sell images they possessed but did not produce. A qualitative study of Swedish youth commercially exploited online indicated that this included the purchase of CSAM, ranging from semi-nude pictures to live-streaming.[37]

31   Leukfeldt, E. R., Jansen, J. and Stol, W. P. (2014), "Child pornography, the internet and juvenile suspects. Journal of Social Welfare and Family Law", 36(1), 3–13, accessed 12 February 2018, https://www.tandfonline.com/doi/abs/10.1080/09649069.2013.851178.

32   Wolak, J., Finkelhor, D., Mitchell, K., & Jones, L. (2011), "Arrests for child pornography production: data at two points from a national sample of U.S. law enforcement agencies", in Child Maltreatment, 16(3), 184-195, accessed 3 January 2018, https://www.ncbi.nlm.nih.gov/pubmed/21788212.

33   Wolak, J., Finkelhor, D., and Mitchell, K. (2012)., "Trends in Arrests for Child Pornography Production: The Third National Juvenile Online Victimization Study (NJOV-3)".

34   Seto, M. C. (2013). "Child Pornography" in Internet sex offenders. Washington, DC: American Psychological Association. 38, 42

35   Terre des Hommes (2013), "Webcam child sex tourism", accessed 23 February 2018, https://www.terredeshommes.nl/sites/tdh/files/uploads/research_report.pdf.

36   Mitchell, K., Jones, L., Finkelhor, D., and Wolak, J. (2011), "Internet-facilitated commercial sexual exploitation of children: Findings from a nationally representative sample of law enforcement agencies in the United States", in Sexual Abuse : A Journal of Research and Treatment, 23, 43-71, accessed 23 January 2018, http://unh.edu/ccrc/pdf/CV201.pdf.

37   Jonsson, Linda S. Svedin, Carl Göran and Hydén, Margareta (2014), "Without the Internet I never would have sold sex: Young women selling sex online", accessed 24 February 2018, https://cyberpsychology.eu/article/view/4297/3345.

CHARACTERISTICS OF OFFENDERS

It has been consistently noted across studies that CSAM offenders represent a heterogeneous group, who display wide variation in their sexual preoccupation with CSAM and their motivation to offend. [38] In relation to this, it has been observed[39] that a fundamental problem with prevention policy in the criminal justice system is that it is largely based on stereotypical, and often mistaken, characterisation of sex offender populations — for example the common view of them as exclusively adult males who have a sexual orientation towards pre-pubescent children (paedophiles) and who are strongly motivated to offend. While the majority of offender-related research has used samples of people convicted of technology-mediated abuse and exploitation, there have been a few studies drawn from general population samples as well as people who were seeking help. For example, an online survey of 8,718 German men, found that 4.1% reported sexual fantasies involving prepubescent children, 3.2% reported sexual offending against prepubescent children, and 0.1% reported a pedophilic sexual preference. Men who reported exclusive use of CSAM were identified as a subgroup who differed from contact sexual offenders against prepubescent children and men who reported both CSAM use and contact sexual offenses against prepubescent children.[40] A further US study recruited 262 females and 173 males through an online survey to examine sexual interest and adverse childhood experiences. Six per cent of men indicated some likelihood of having sex with a child if they could get away with it (as did 2% of women)

and 9% of males and 3% of females indicated some likelihood of viewing CSAM on the Internet.[41] In offender samples, differences have been found between CSAM offenders and contact offenders in relation to higher levels of Internet use,[42] lower levels of anti-social behaviour,[43] differences in empathy[44] and evidence of compulsive or addictive behaviour.[45] However, much of the offender-related research has focused on risk of a CSAM offender either having a prior history of contact offending or whether they will go on to commit a further contact offence.[46] Two significant studies in relation to risk come from Canada, with the development of the Child Pornography Offender Risk Tool (CPORT),[47] and the UK (KIRAT: Kent Internet Risk Assessment Tool).[48]

THE SEXUAL CONTENT OF ABUSIVE IMAGES

One area that has been standardised is the terminology used to grade the sexual activity depicted in CSAM. An example of this would be the COPINE scale developed by Quayle and colleagues that sorts sexual activity into ten categories.[49] This scale was later adapted to a 5-point scale to grade images by the Sentencing Advisory Panel.[50] However, the scale has not been incorporated into many law enforcement and hotline databases and, instead, is used more for prosecution and academic purposes. Researchers have coded samples of images and reported trends within specific databases over a given timeframe, but there has yet to be a global effort to code and report trends in sexual activity.

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38 Quayle, Newman, Cariola, Cooper, Koukopoulos, Wortley, Beier and Squire (2017), "Deterrents to viewing child sexual abuse images of children online: A meta-narrative review".

39 Finkelhor, David (2009), "The Prevention of Childhood Sexual Abuse", accessed 23 February 2018, http://www.unh.edu/ccrc/pdf/CV192.pdf.

40 Dombert, Schmidt, Banse, Briken, Hoyer, Neutze and Osterheider (2016), "How Common is Men's Self-Reported Sexual Interest in Prepubescent Children?", accessed 25 January 2018, https://www.ncbi.nlm.nih.gov/pubmed/26241201.

41 Wurtele, Simons and Moreno (2014), "Sexual interest in children among an online sample of mena and women: prevalence and correlates", accessed 14 February 2018, https://www.ncbi.nlm.nih.gov/pubmed/24215791.

42 Lee, Li, Lamade, Schuler, Prentky and Roesch (2012), "Predicting hands-on child sexual offenses among possessors of internet child pornography", Psychology, Public Policy, and Law, 18(4), 644-672, accessed 14 February 2018, http://dx.doi.org/10.1037/a0027517.

43 Babchishin, Hanson and Vanzuylen (2015), "Online Child Pornography Offenders are Different: A Meta-analysis of the Characteristics of Online and Offline Sex Offenders Against Children", accessed 3 February 2018, https://www.ncbi.nlm.nih.gov/pubmed/24627189.

44 Elliott, Beech, and Mandeville-Norden (2013), "The Psychological Profiles of Internet, Contact, and Mixed Internet/Contact Sex Offenders", accessed February 2018, https://www.ncbi.nlm.nih.gov/pubmed/22434344.

45 Young, Kimberly (2008), "Understanding sexually deviant online behavior from an addiction perspective" in International Journal of Cyber Criminology, Vol 2 Issue 1, accessed 15 February 2018, http://www.cybercrimejournal.com/Youngijccjan2008.htm.

46 Seto, M. C. (2013), "The Connection Between Online and Contact Offending" in Internet sex offenders, Washington, DC: American Psychological Association. 173-176.

47 Seto and Eke (2015), "Predicting recidivism among adult male child pornography offenders. Development of the Child Pornography Offender Risk Tool (CPORT)", accessed 12 January 2018, https://www.ncbi.nlm.nih.gov/pubmed/25844514.

48 Long, Alison, Tejeiro Hendricks Giles and Lamb (2016), "KIRAT: Law enforcement's prioritization tool for investigating indecent image offenders".

49 Quayle, Ethel (2008), "The COPINE project", Irish Probation Journal, vol 5, pp. 65-83, accessed 17 February 2018, https://www.research.ed.ac.uk/portal/files/12893845/The_COPINE_Project.pdf ; Taylor, Holland, Quayle (2001), "Typology of paedophile picture collections", accessed 17 February 2018, http://journals.sagepub.com/doi/abs/10.1177/0032258X0107400202?journalCode=pjxa.

50 Sentencing Advisory Panel (2002), "The panel's advice to the court of appeal on offences involving child pornography", London: Sentencing Advisory Panel.

While anecdotally, law enforcement and hotline analysts have expressed concern over sexual content of the material becoming more aggressive[51] and the proportion of violent material increasing,[52] there is little consistent empirical evidence. Though reporting the sexual activity in CSAM may appear straightforward, a given cases could involve multiple victims, as well as multiple offenders, there are tensions around what exactly is recorded. Some victims may experience different levels of abuse or violence. Likewise, not every image or video may contain the same level of sexual activity. Additionally, when reporting trends, it is not always clear whether only new material during a timeframe will be used to generate estimates on the amount of violence, or all the material seen circulating during the timeframe. For instance, if there is a greater market for violent imagery, law enforcement may find that offenders are recirculating older material that is extremely violent, which would be missed if only new material was used to examine trends.

CHARACTERISTICS OF VICTIMS

While there is extensive research on offenders, very little is known about the children depicted in sexually abusive material, especially in the global landscape. To date, much of the research has involved identified victims within law enforcement databases, which may not be representative of the general population of children who are sexually exploited online, particularly as a limited number of countries are compiling databases of CSAM and where they do exist these tend to be from the global north. We also have very little evidence to help us differentiate between identified and non-identified children who have been abused in the production or exchange of CSAM. Studies of the databases that do exist, suggest there are more female victims than males, significantly more white than non-white victims, and that most children featured in material are prepubescent.[53] CSAM can, however, be produced across different contexts which, as previously discussed, may reflect changes in our relatively recent ability to create digital content. A study of 3,503 Swedish 18-year-old youth, indicated

that 6.5% of those who reported sexual abuse had also experienced the abuse being documented in pictures or videos.[54] In an early study by the same researcher, children identified in seized CSAM were interviewed and their images analysed. All of these were taken during acts of sexual abuse by the perpetrators who, in some cases, had also distributed the CSAM. No images were produced by the children.[55] A further study from Turkey [56] (2015) examined the medical records of 662 sexual abuse victims referred through the courts to a Child and Adolescent clinic. Ninety-three reported at least one of the following: online/offline sexual acts through e-mail, cell phones, text messages, and Internet sites; an image of the victim of a sexual nature or of the sexual abuse itself recorded on a mobile phone/camera, with threats of distribution if s/he did not continue sexual acts; the image shared online/offline; and the victim subjected to online harassment or offline sexual abuse by other offenders that knew about the image.[57] For these children, digital technology was significantly associated with more severe forms of abuse, such as penetrative sex, recurrent sexual abuse and multiple offenders.

This victim-focused research reflects evidence also seen in offender studies of the production and use of CSAM images as part of the offence process.[58] By the end of 2015, the International Child Sexual Exploitation Database (ICSE DB) included data on more than 8,000 identified victims from nearly 50 countries, but still little was known about these children. ChildBase is a database developed by the Child Exploitation and Online Protection centre (CEOP) and consisted of CSAM images gathered from police seizures across the United Kingdom. In a randomised sample of 24,550 unique sexualised images of children from the database (approximately 10%), it was found that the images contained four times more girls than boys and almost 10 times more white than non-white children. The UK Internet Watch Foundation reported that after analysing all child sexual abuse URLs in 2014, 80% of all the children were 10 years or younger.[59] The Interpol Child Sexual Exploitation Image Database (ICSE DB) contains important information about

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51   Netclean (2015), "Eleven Unbelievable Truths: The NetClean Report 2015", accessed 16 February 2018, https://www.netclean.com/wp-content/uploads/sites/2/2017/06/The_NetClean_Report_2015.pdf.

52   Canadian Centre for Child Protection (2016), "Child Sexual Abuse Images on the Internet", January 2016, pg. 16, accessed 3 February 2018, https://www.protectchildren.ca/pdfs/CTIP_CSAResearchReport_2016_en.pdf.

53   Baartz, D (2008), "Australians, the Internet and technology-enabled child sex abuse: A statistical profile". Australian Federal Police; Quayle, E., and Jones, T. (2011), "Sexualized images of children on the Internet", in Sexual abuse: a journal of research and treatment, 23(1), 7-21; Wolak, Finkelhor, and Mitchell. "Child pornography possessors".

54   Svedin CG. (2012), "Victims assistance", Launching Conference on Global Alliance Against Sexual Abuse Online. EU: Brussels.

55   Svedin CG Back C. 2003, "Why didn't they tell us?", Stockholm: Save the Children Sweden.

56   Say, Babadağı, Karabekiroğlu, Yüce & Akbaş, (2015), "Abuse characteristics and psychiatric consequences associated with online sexual abuse", accessed 17 February 2018, https://www.liebertpub.com/doi/abs/10.1089/cyber.2014.0494.

57   Ibid., p.334.

58   Quayle, Ethel and Newman, E. (2015), "The role of sexual images in the online and offline sexual behaviour with minors", accessed 17 February 2018, https://www.ncbi.nlm.nih.gov/pubmed/25894354.

59   IWF (2014), "IWF Operational trends 2014: Overview".

child abuse image crimes. A recent study quantified the characteristics of 687 children in identified illegal images, from the UK claimed cases from the database, and described the differences between cases of self-taken images and those whose images had been taken by others.[60] The analysis showed an increase in identified victims during the study years 2006-2015. Almost two thirds of the children identified were female, the majority were white and 44.3% were self-taken (34.4% taken in a coercive and 9.9% in a non-coercive relationship). The data also indicated that since 2010, the number of self-taken images each year exceeded more than 40% of the total number of images in the database. Although self-taken images could potentially be perceived as less worrisome, two-thirds of all the images within this study were classified as coercive.

However, the yearly reports of organisations such as the Internet Watch Foundation would suggest that there are fluctuations in the characteristics of the children depicted in CSAM. In 2015 the IWF reported that material involving prepubescent children made up a smaller fraction of all reports (69%) than was seen in 2012 (81%), with pubescent victims increasing; however, the amount of material involving children two years old or younger remained constant over the same four-year span (about 3-4%).[61] By 2016 the IWF had seen a further overall drop in the children assessed as being 10 or younger and an increase in reports of children 11-15. This proportionate drop was felt in part to be related to the increase in self-produced content which had been shared online, alongside of the fact that the IWF also actively searches for images (which exceeded public reports in 2016) and therefore were more likely to encounter more images of 11-15-year olds. In their report there were also fewer images falling into categories A (penetrative sexual activity) or B (non-penetrative activity) in either 2014 or 2015. Differences were also seen between data from the Canadian Centre for Child Protection in 2008 which showed that 49.64% of child victims were under the age of eight years old[62] when compared with the ChildBase study which showed relatively low numbers of very young victims (only 0.7% of females and 1.6% of males were infant/toddlers).[63]

A further study examined two different datasets from the NCMEC database of identified children.[64] This included actively traded cases (518 cases involving 933 victims which were seen in 5 or more reports to NCMEC) from 2002-2013 and identified child victims (1,965 cases including one offender and one victim and 633 cases involving multiple offenders/victims from July 2011-June 2014) whether traded or not. The most notable finding from the first dataset was a trend towards more egregious sexual content over time (more abusive sexual content in later years), but with no obvious trends in relation to child victim age or gender. In the second dat set involving a single offender and victim, cases that were actively traded involved pre-pubescent victims, more egregious sexual content, and more likely to involve familial offenders (particularly nuclear family members).

However, in the second dataset of 1.965 cases 61% of cases involving single victims and 42% where there were multiple relationships the children were pubescent. Most cases involved male offenders who were unrelated to the child, but cases that involved female offenders, younger children or more extreme content were likely to involve family members. In a further analysis of the ICSE database of unidentified victims conducted by ECPAT International and Interpol,[65] 64.8% were girls, 31.1% were boys and the remaining 4.1% included children of both genders. Where boys were depicted the content was more egregious. Within this dataset 93.9% of the children were white, and where age could be determined, the largest group were pre-pubescent (56.2%). Similar to the NCMEC analysis there was also a relationship between the age of the victim and the severity of the abuse. Across the three studies (NCMEC, ICSE UK and ECPAT/Interpol) very young children were in the minority (6% and 3% of the second data set from NCMEC; 4.3% in the total ICSE DB unidentified children and approximately 6% of the ICSE UK claimed cases of identified children). In the first dataset from NCMEC of only actively traded cases between 2002-2013, the number of infants victimised varied between years (6.5-12.4%), but the lowest value related to 2013.

60   Quayle, Jonsson, Cooper, Traynor and Svedin (2018), "Children in Identified Sexual Images – Who Are they? Self- and Non-Self-Taken Images in the International Child Sexual Exploitation Image Database 2006–2015", accessed 15 February 2018, https://onlinelibrary.wiley.com/doi/abs/10.1002/car.2507.

61   Internet Watch Foundation (2016), "Annual Report 2015", pg. 10, accessed 15 February 2018, https://www.iwf.org.uk/sites/default/files/inline-files/IWF%202015%20Annual%20Report%20Final%20for%20web_1.pdf.

62   Canadian Centre for Child Protection (2016), "Child Sexual Abuse Images on the Internet", pg. 16

63   Quayle, E., and Jones, T. (2011), "Sexualized images of children on the Internet.

64   Seto, Buckman, Dwyer and Quayle (2018), "Production and active trading of child sexual exploitation images depicting identified children", accessed 15 March 2018, https://www.missingkids.org/content/dam/ncmec/en_us/Production%20and%20Active%20Trading%20of%20CSAM_ExecutiveSummary.pdf.

65   ECPAT and Interpol (2018), "Towards a Global Indicator on Unidentified Victims in Child Sexual Exploitation Material", accessed 28 February 2018, http://www.ecpat.org/wp-content/uploads/2018/02/Technical-Report-TOWARDS-A-GLOBAL-INDICATOR-ON-UNIDENTIFIED-VICTIMS-IN-CHILD-SEXUAL-EXPLOITATION-MATERIAL.pdf.

OBJECTIVE

The objective of this report was to speak with experts in this field to uncover why trends in the data may be occurring. We were particularly interested in experts' opinions on trends in the age of victims of online child sexual exploitation (OCSE) and the severity of the sexual activity being depicted in CSAM. Furthermore, we intended to explore national databases in order to contribute to establishing standards and global metrics of CSAM to promote evidence-based advocacy and programming. We wished to document the interaction between key variables (amount of material, the production and distribution of material, offender characteristics, the sexual content of material, and victim characteristics).

MAPPING EXISTING DATABASES

Collections of data that relate to CSAM fall largely into two groups: hash collections and image collections. The hashing process is a mathematical algorithm that produces a hexadecimal numeric value relating to binary data. A hash value is a small, convenient number used to track or sort an arbitrary block of data. Each image file hash value is represented by a unique string of 32 characters, effectively without visible order, sequence, or connection to the actual file name or content of the image.[66] According to Microsoft, data can be compared to a hash value to determine its integrity. Usually, data is hashed at a certain time and the hash value is protected in some way. At a later time, the data can be hashed again and compared to the protected value. If the hash values match, the data has not been altered. If the values do not match, the data has been corrupted. For this system to work, the protected hash must be encrypted or kept secret from all untrusted parties.[67] However, it is also important to distinguish between image databases and image libraries. The former is fully searchable and contains associated metadata related to cases within data, (such as hash sets) that can be exported and shared with others. An image library is more akin to a flat file/folder structure where material may be grouped together on a case by case basis, but cross-comparison of the data is not really possible, and there are significant limits to what can be exported from it.[68] There are

a number of international, national and regional organisations that have image databases and/or databases, and a number of other organisations maintain permanently, or over a period of time, image libraries. For instance, this may be the case with a number of national hotlines as well as some smaller police agencies around the world, or those who are just starting a victim identification unit. Other organisations maintain their own hash sets, which may facilitate workload management in terms of recognising material that has already been seen so that it can either be discounted from the victim identification process or that it can be precategorised for the court process because it has already been categorised previously (for example through determining the age of the child or the nature of the image content).[69] At present there is limited connectivity between databases.

At an international level, as referred previously, INTERPOL houses and maintains the ICSE Database, and also the ICCAM database on behalf of INHOPE. EUROPOL hosts and maintains IVAS (Investigation Video and Audio System), which is a database of material generally seized by law enforcement agencies in EU member states or countries with third party agreements with EUROPOL (e.g. Australia, Canada or the USA) or seized as a result of joint investigations in these countries. Project Vic[70] maintains a hash (and associated meta-data) database for material seized and held in the US and administers rules of engagement for the various Project Vic members around the world (Law Enforcement Agencies, Non-Government Organisations, Industry etc.). While there is no international hash database provided by Project Vic, international collaboration may take place under the auspices of Project Vic, but this currently take place on a bilateral basis.[71] The National Center for Missing and Exploited Children acts as the clearing house for seized material from federal and local law enforcement agencies in the USA and in doing so contributes to both NGO and Industry hash-sharing platforms which extend beyond the USA into International organisations.

At a national level, of the countries currently connected to ICSE, the following maintain databases of seized material: Australia (the Australian Police and the Queensland Police Service both have

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66   Quayle, E., and Jones, T. (2011), "Sexualized images of children on the Internet".
67   Microsoft (2017), "Ensuring Data Integrity with Hash Codes", 30 March 2017, accessed 15 February 2018, https://docs.microsoft.com/en-us/dotnet/standard/security/ensuring-data-integrity-with-hash-codes.
68   Griffiths, P. (2018, personal communication). Victim Identification Manages Queensland Police.
69   *Ibid*.
70   Project VIC is a coaltion of law enforcement and private sector partners providing solutions to real-world challenges. It champions a transformation in the approach to child exploitation investigations by developing innovative technologies and victim-centric methodologies. See http://projectvic.org/about/.
71   Griffiths, P. (2018, personal communication). Victim Identification Manages Queensland Police.

separate databases, and there is a project in place to provide a national solution giving direct access to all states and territories); Belgium; Canada (the Royal Canadian Mounted Police maintain a national database which has limited functionality from the various provincial and regional agencies in Canada. The Ontario Provincial Police and Toronto also maintain their own collections to assist with their victim identification function); Denmark; France; Germany; Netherlands; New Zealand; Sweden; United Kingdom (UK Child Abuse Images Database: CAID); United States (Homeland Security Investigations and the Federal Bureau of Investigation also have their own collections, as do other agencies such as the US Postal Service and the Department of Justice). It is likely that there are other image libraries in Austria, Finland, Ireland, Israel, Italy, Japan, Moldova, Norway, Spain and Switzerland used as an aid to victim identification.[72]

An example of a hash database is provided by INHOPE, an international network of hotlines, as described below.[73]

BOX 1: INHOPE and the ICCAM system

INHOPE is the global umbrella organisation uniting national Internet hotlines engaged in combating online child sexual exploitation and child sexual abuse material. The mission of INHOPE is to support and enhance the work of these hotlines to strengthen international efforts to combat child sexual abuse using a multi stakeholder approach. The network consists of 51 hotlines in 45 countries worldwide. When members of the public come across child sexual abuse material on the Internet, they can anonymously report the suspected illegal content to the hotline in their country. The aim of the INHOPE Hotline Network is to streamline processes for reporting illegal online content when it involves the sexual abuse or exploitation of a child. Hotlines often encourage reporting even for suspected exploitation, such as 'child modelling' (INHOPE, 2016).

In 2015 INHOPE with the support and funding from the European Commission developed and launched the ICCAM (I-''See'' (c)-Child-Abuse-Material) system initially as a pilot project and ultimately was rolled out to the full INHOPE network. The Hotlines receive reports from the public on potentially illegal content. These reports that contain a URL pointing at the content, are entered in the ICCAM system.

Crawling and assessment: ICCAM crawls the URL and downloads images and video to a centralised infrastructure based in INTERPOL. The system then allows the Hotline analyst via a browser to remotely classify the content under predetermined criteria (e.g. baseline and national). Once the content has been confirmed as child sexual abuse material the relevant elements of the report are forwarded to the INHOPE Hotline in that country.

Hashing technology: As part of this, hashing technology is deployed to 'finger-print' reported images and video, which allows for more rapid action in the work flow and automatic flagging of 'new' confirmed CSAM content that has not been reported to or seen by law enforcement previously. 'New' confirmed CSAM content is automatically flagged to law enforcement victim identification team in INTERPOL. This also minimises duplication of effort as analyst can see what has already been assessed as illegal (baseline or national) even if the content reported was a totally separate report to another Hotline at any point in the past. All of these elements speed up report handling plus reduce the amount of traumatic CSAM material that Hotline analysts must view. A simple reflection of these factors is the ''Notice & Takedown statistic'' which has improved dramatically to where 75% of confirmed CSAM reports were removed from the Internet within 72 hours (INHOPE 2016 Annual Report).

Data: ICCAM has the ability to gather almost real-time global data on the trends and statistics on the dissemination of online CSAM and the consequential actions by hotlines (e.g. notice and takedown times). This allows for period-by-period comparison and analysis.

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72   *Ibid.*
73   Howard, D. (2018, personal communication). Network Services & Training Manager, INHOPE.

An example of an image database is provided below.

As can be seen from the previous section on public reports, a number of the hotlines provide yearly information on public reports and proactive searching. A brief overview of this data from the IWF, CyberTipline and Cybertip.ca is presented here.

IWF: In 2016 59,550 reports were received which were assessed as criminal content from a total of 105,420 reports, representing a 12.5% decrease from 2015. Age profiles of children suggested an increase in self-produced content, with public reports more likely to be of children 10 years old and under. The IWF classification of the images indicated that nearly half of children under 15 years of age were in either Category A or B (the two most egregious categories), although this represented a decline from previous years. Their report indicated an increase in the number of domains hosting CSAM, and of these 80% of all webpages that contained CSAM were concentrated across five domains: .com; .net; .se; .io, and .cc.

Social networks were the least likely to contain CSAM and image hosting sites the most consistent for hosting CSAM. 2016 saw Europe hosting more identified pages containing CSAM than any other region , representing a 19% increase for 2015. The top five countries hosting CSAM URLs were: the Netherlands; the US; Canada; France and Russia. There was a decline in the number of newly identified hidden services and a large decrease in the number of web pages deemed to be commercial.

CyberTipline: This is a US-based service and is hosted by NCMEC. Their data showed an increase of 90% between 2014 to 2015 in reports alleged child sexual exploitation or sexual extortion, with 1,428 sexual extortion reports being made between October 2013 to April 2016. The majority of these reports came from Internet companies, but 24% came from child victims.

Cybertip.ca: This is operated by the Canadian Centre for Child Protection. Between 2002-2009 the hotline responded to over 215,000 CSE reports from the public (with 514 arrests).[74] Data from their Survivor's Survey of 150 adults indicated that all had been subjected to child sexual abuse and video-recorded. 61% of those responding to the online survey felt that it was likely their images had been distributed. The primary perpetrators were family members or part of the extended family (82%), 87% said they were under 11 years when the abuse started and for 42% the abuse lasted over ten years. Over the last 15 years, over 266,000 reports had been received by cybertip.ca, with over 19,000 forwarded to a Canadian law enforcement agency.

INHOPE Foundation: In 2014, 89,758 URLs were reported to this global network of hotlines, which was a 63% increase from 2013. In 2014 most CSAM was identified on image hosting sites, websites, file hosting sites, social networking sites and banner sites. Ninety-one per cent of images were hosted for non-commercial purposes. The INHOPE 2016 report indicated that the network received 9,357,240 reports with 8,474,713 confirmed as CSAM and suggested that the majority of CSAM encountered by hotlines depicted predominantly pre-pubescent females.

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74   Bunzeluk K. (2009), "Child Sexual Abuse Images: An Analysis of Websites by cybertip.ca", Winnipeg: Canadian Centre for Child Protection, accessed 20 January 2018, https://docplayer.net/19341017-Child-sexual-abuse-images-an-analysis-of-websites-by-november-2009.html.

2. STUDY DESIGN AND RATIONALE

There have long been calls for global metrics for CSAM but these are very difficult to establish given the complexity of these crimes. Specifically, global metrics would aid in evidence-based advocacy and programming. Research continues to be limited by lack of standards, size of sample, or generalizability of findings. For a range of reasons, most research and analysis of CSAM has previously focused on single databases or even subsets of images from within a database. However, as technology rapidly advances, CSAM is more and more becoming a globalised concern and the need for bigger picture analysis is strong. This study therefore aimed to frame the analysis of CSAM trends in a much more global perspective.

The design therefore was to broaden our net as much as possible for a global perspective. We aimed to gather detailed perspectives from a sample of CSAM experts from all over the world. We sought to establish and understand trends in victim, offender and content characteristics over time. We sought also to examine the trends identified in our qualitative data with preliminary analysis of complementary quantitative data from multiple sources wherever we could.

QUALITATIVE INTERVIEWS

Semi-structured expert interviews with the primary objective of investigating perceived trends in the age of victims and the severity of the sexual activity in CSAM formed the basis of this study.

An interview guide was developed that covered a breadth of topics thought to impact OCSE (Appendix A). The interview guide covered victim profiles, common characteristics of CSAM, offender profiles, changes in the sexual content of CSAM, changes in production and distribution methods, and questions about how policy and practice around online sexual exploitation could be improved. We chose these topic areas given their relevance to developing global metrics as well as their potential to identify both the age of victims and the sexual activity in the material. We wished to explore whether there were

changes in the ages of the children or the severity of sexual activity as evidenced in CSAM.

We interviewed law enforcement agents and hotline analysts who had at least one year of current experience working with CSAM since they would be able to speak to current incidents and recent changes. This population was also selected because they would be familiar with material involving both undetected and detected offenders as well as unidentified and identified victims.

Respondents were recruited with invitations and flyers that were distributed to key stakeholders and organizations. Once participants were recruited and screened for eligibility, they were consented into the study. Studies were primarily conducted in English, with a small portion being conducted in Spanish. While it was a requirement that the participants fluently speak English or Spanish, it was often not the participants' primary language. Two participants used professional translators to participate in the study. Interview extracts from all the participants have been edited with brackets for readability.

The research team was composed of a Research Leader and a Research Assistant. Both team members had Master's degrees in public health or health sciences and several years of research experience. Both team members had conducted national and international research on the prevention of child sexual abuse and were knowledgeable in OCSE. They both were certified in ethical human subject research and had previous training in qualitative interviewing, transcription, and analyses. The Research Assistant had professional qualifications in Spanish language skills and had conducted previous interviews in Spanish. Interviews were analysed using the grounded-theory method.[75] The team members were trained to conduct semi-structured interviews following the interview guide (Appendix A). Interviewers walked the participant through a series of discussion topics related to the study goals and objectives but had flexibility to probe further on topics in which the participant was particularly knowledgeable. Interviews took approximately thirty minutes to one

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75   Bryant, Antony and Charmaz, Kathy (Eds.) (2007), "The SAGE Handbook of Grounded Theory", Los Angeles: Sage, accessed 3 February 2018, https://uk.sagepub.com/en-gb/eur/the-sage-handbook-of-grounded-theory/book234413.

hour. Following the interview, audio files were transcribed. In the case of Spanish interviews, transcripts were also translated. Two initial transcripts were coded line by line, and then line codes were compiled into a codebook. After the codebook was developed, three transcripts were double coded to check for consistency and understanding in applying codes. Codes were then applied to the remaining transcripts. These codes were analysed and organised to identify emergent themes.

A total of 18 qualitative interviews were conducted. Participants were from EUROPOL and INTERPOL, as well as hotlines and agencies in Australia, Colombia, Finland, France, Mexico, New Zealand, the United Kingdom, Slovenia, Spain, South Africa, and Taiwan.

COMPLEMENTARY QUANTITATIVE DATA

Our search for such quantitative data encountered some expected barriers. Many agencies around the world simply lack the resources to generate and maintain complex databases, and where they do, data provides a particular picture based on local priorities. Where databases do exist, access is usually closely limited for obvious and justified reasons. Comparisons between these sources can also be complicated given it is collected along procedural rather than research priorities.

Invitations and flyers were initially distributed to law enforcement and hotline agencies around the globe requesting data on CSAM. This recruitment method failed to yield significant data. The team then instead asked law enforcement and hotline analysts who participated in the qualitative portion of the study to provide quantitative data. Four agencies agreed to supply data for the project. These agencies varied greatly in the type of data they shared. See Appendix B for added detail of what was supplied by the four agencies.

Cautions on the reliability of existing CSAM databases being used to draw conclusions about trends have been noted previously.[76] The quantitative data that we were able to collect for this study therefore doesn't allow for representative conclusions. However, it is presented throughout the results section in parallel to the trends identified by the experts in the qualitative data.

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76   See e.g. NetClean (2016), "10 important insights into child sexual abuse crime: the NetClean report 2016".

3. RESULTS

Qualitative interviews with 18 experts from around the globe were used to discuss trends in OCSE, specifically, interviews were focused on trends in the age of victims of OCSE and the severity of the sexual activity being depicted in CSAM. To fully understand how and why these changes were taking place, the qualitative interview guide sought to develop a framework around participants' background and experience working with CSAM, characterise the 'typical' victim depicted in material, discuss changes in the sexual content, production, and distribution methods of material, and review current policy and practice methods that could be improved or built upon. Below, each component is further explored.

UNDERSTANDING WHO PARTICIPATED

Participants were law enforcement agents and hotline analysts who had at least a year of experience working with child sexual abuse material; however, most of the participants had served their departments considerably longer, with the upper limit being approximately 20 years of service. Participants described their roles as incredibly demanding, with many taking on far more responsibilities than merely investigating or analysing material. They often worked with small teams of individuals and felt their departments were underfunded or in need of additional staff. The individuals spoke to the variety of activities they performed, including analysing material, investigating perpetrators, identifying victims, coding material, and educating the public. Below one investigator describes the educational aspect of his position:

> "[in my department] we are also responsible for going out to provide public education where we are warning the public about the dangers of cyber space; clearly emphasising the issue of distribution of 'child pornography', creation of 'child pornography', and, also, production…"

Similar demands on law enforcement were noted in NetClean's qualitative study, with one of their eleven truths being supported by the fact that "17% of [police] say identifying victims is not prioritized in their organization" and "63% say they have too much material to go through to have time to work on identifying victims".[77] Being responsible for so many different aspects of the investigation greatly affected what participants could accomplish. We asked our participants about their current caseload, and they ranged widely in how many cases they investigated the past year. Some participants reported their teams focused on a very small number of cases (30-50), while others had the resources to analyse hundreds of reports. We discussed whether the current caseload was similar or different than previous years, and most agreed they were receiving more material, but were not always able to investigate more cases. They felt that advances in technology and changes in reporting procedures had led to their agencies receiving more reports or uncovering more imagery than they had previously. As one hotline analyst described:

> "I suppose the workload increases […] because we do a lot of work where we will work with our local police forces, who may come to us for advice and assistance. As we've become a more established team and people know who we are and the mechanisms are in place for people to make referrals, […] we see an increase in the work because more people want to come and ask for our help basically."

While an increase in reports seems like a good thing given the apparent increase in material being circulated, participants felt they could not keep up with the demand. Consistently, lack of funding prevented law enforcement from investigating the additional reports:

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77   Netclean (2015), "Eleven Unbelievable Truths: The NetClean Report 2015", 39, 40.

"The amount of referrals that are coming in [are] increasing. From an output capability point of view, because our resources haven't increased, we haven't been able to increase the number of investigations that we've done, which are tied to the level of [resources] that we have. [...] If we had more staff, we would have greater output. As I said, certainly the number of cases that have been through, to us, has increased over the last three or four years."

Some participants described hierarchies their agencies had in place for prioritising cases. Investigators discussed new material and younger children as the main reasons to prioritise a case. It is important to note that some participants did not prioritise any case over another since they felt any material featuring a subject who was under the age of eighteen necessitated an investigation. The following quote gives an example of the investigative hierarchies that one team leader used:

"We look at a variety of factors. We look at, for example, any new material, so if there's content that we haven't seen before, where there's a potential for abuse taking place, we look at the severity of the material, we look at the number and unity of subject matter. If somebody's presenting initially from intelligence as a clear, established boy lover, for example, into very young children, into babies, that kind of thing, those sorts of elements get prioritised. Acting in a distribution capacity, that would get priority over a position element. The lifelong extent and length of offending type of material, those would be the main [priority]. And ultimately if we identified that the username has been seen before, or the person has been seen as a previous offender, or had previous criminal behaviour, we would look to prioritise it as well."

Prioritising cases only makes sense if there are victims or offenders that pose greater risks to community safety. However, the interaction between these variables has not been well-documented or standardised. Clearly this department saw a benefit in prioritising cases based on a hierarchy, but that was not always the case. Understanding risk profiles or the interaction between variables (such as victim age, the newness of the material, or the distribution method used) and their potential to lead to an arrest or identified victim would help establish a best practice.

CHARACTERISING THE TYPICAL VICTIM

Every participant agreed that victims were predominantly white. Some participants reported they handled a small number of cases involving Asian and Hispanic children as well, but black children were by far the rarest. No explanation was given for the race disparity amongst victims. Also, despite the recent abundance of teen imagery and underage self-produced material, participants still anecdotally reported most victims were prepubescent children.

The profile described by the reports and our participants did differ on the gender of victims. The three reports consistently show more female victims. However, some of our participants noticed that in their experience there was an even split between male and female victims, while others reported that their cases were mostly female. Participants were also quick to point out each perpetrator typically had a type and that the online location at which the perpetrator was discovered corresponded to certain gender preferences, i.e. being on a 'boy-lovers' forum.

The majority of our participants reported that they had witnessed a decrease in the average age of the victim, or alternatively stated this as an increase in very young victims, although proportionately there were still more prepubescent and pubescent victims.

BOX 3: CHILD CYBER CRIME GROUP (Colombia)

The Child Cyber Crime Group within the Colombian National Police is a law enforcement agency dedicated to investigate online sexual exploitation of children in Colombia.

The Group provided us with a database of thousands of victims of commercial exploitation. Our analyses were limited to the 696 cases that involved victims of child sexual abuse material. The average age of victims is presented as well as the proportion of male versus female victims in the table below. Victims' ages ranged from 2 years old to 17 years old with the total average age of victims being 13 years old across all five years. Also of note, the majority of their victims were female with only a total 13% of victims being males across all five years.

Victim information from the Colombian Police Force

Category	2010	2011	2012	2013	2014	2015	2016 (thru July)
Avg. Victim Age (years)	14	14	13	13	13	13	13
Victim Gender	19% Male	12% Male	23% Male	18% Male	12.5% Male	14% Male	11% Male
Number of Cases	16	34	44	50	72	355	125

WHY AND WHEN DID THE AGE OF VICTIMS CHANGE?

Participants were unable to give an exact time the perceived change had taken place, but it seems to have been very recent. For example, one participant attributed the change to being within the past few years:

> "I would say that there are more offenders who are interested in prepubescent [children] and, now, increasingly in the last number of years, in younger than prepubescent - so in infants and children basically."

Another participant described the same change in victims' ages, but instead of an increasing amount, the participant saw it as a widening of an age preference that already existed amongst offenders:

> "I think initially the ages were probably in, [or] heading towards, just [prepubescent] – probably in the 10 to 14 kind of age group. We're now seeing a lot that are shifting slightly downwards towards the 6 to 8 age group, and again, a slightly smaller portion that are under that, infants and toddlers. If you [...] consider it a bell curve type of situation, the ages have shifted slightly younger, simply because in the early days, the bulk of the material presented was in that higher age group and now we're looking at them being younger and, in many cases, [prepubescent]."

Another participant attributed the change to being a global phenomenon:

> "...lately the victims are at younger ages. There is a tendency, I would say an early sexualisation of children, and it is true that we are seeing victims of increasingly early ages. [...] that has also been the case [elsewhere]."

Given the international perspective of this project, it was interesting that some participants distinguished between the materials being produced in their country versus abroad. A participant from Colombia remarked:

> "[Younger material] is produced in other countries. It's not Colombian pornography [...] the pornography with younger kids are always produced in other countries."

Point de Contact is a hotline agency in France that was established by the Association of French Internet Providers to enable the reporting of CSAM. The organisation works in conjunction with the INHOPE network to combat OCSE.

In the year 2015, French Point de Contact handled 4,547 cases of online child sexual abuse material. Of these, the victims' ages were categoriaed as infant in 96 (2.1%) cases, prepubescent in 1,836 (40.4%), pubescent in 1,924 (42.3%), and indeterminate in 691 (15.2%). The victims' gender was determined in 4,226 (92.9%) cases, and skewed heavily towards female victims, with 3,883 (91.9%) of cases involving girls, 233 (5.5%) involving boys, and 110 (2.6%) involving both. Age by gender was not available from the summary report.

Likewise, some participants felt changes in the age of victims might be because the laws in their country surrounding CSAM and the subsequent enforcement of those laws were the reason they were seeing certain types of victims. As one participated explained:

"In [redacted], we see more kids because sometimes they can avoid being caught. Because, usually, they upload the content over a foreign website or crowd-host platform, so they can easily get away [with distributing material without] being caught. [...] According to our law, child sexual abuse content, if your only possession, is a very minor crime [and] the penalty is you just have to pay a fine."[78]

When asked why they thought the age of victims was getting younger, there was not a consistent answer as to why this change occurred. A notable response was the appearance of new forums on the Dark Net targeting those with attractions to very young children. The following are participants' commentary on the appearance of new forums on the Dark Net:

"On most of the boards, it is actually forbidden to post anything under two, but in this board, [redacted], it's actually the only thing that you can post. You have two categories. You have the babies, which is between zero and two, and then you have the toddler category, which is between two and five. This is new, actually. [...] Maybe there were boards [before] I didn't know of, but this very popular board dedicated to baby lovers is kind of new."

"I would say we're seeing more new material than we have ever seen before. That is down to a number of factors. It's down again to the increased access to the Internet and increased access to devices through which it can be produced. That's one of the less important factors for this material. What's more important is I call it the focusing factor. When you have facilities or services like we have on the Dark Net and have had for the last number of years where individuals can come together. They can talk about their sexual preferences openly. They can admire the abuse that each other have perpetrated on children through the material that they're able to contribute to one another and to distribute between one another. When you have forums and website available where they cannot be, or at least believe that they cannot be, traced, then those factors all become multiplied. The willingness of individuals to encourage others to produce material, to produce the material themselves, and to post it, and then to talk about that among each other is increased in those forms."

Further discussion around Dark Net forums dedicated to extremely young victims suggested that they did not exist a few years ago and investigators are only now uncovering these sources for younger content. Furthermore, participants implied perpetrators might feel a sense of safety in discussing their attraction to extremely young children within these forums as well as encouraging each other to produce this material since such topics had previously been too taboo to even discuss on prepubescent forums.

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78   The name of the country has been redacted to keep perpetrators from further exploiting this country's laws.
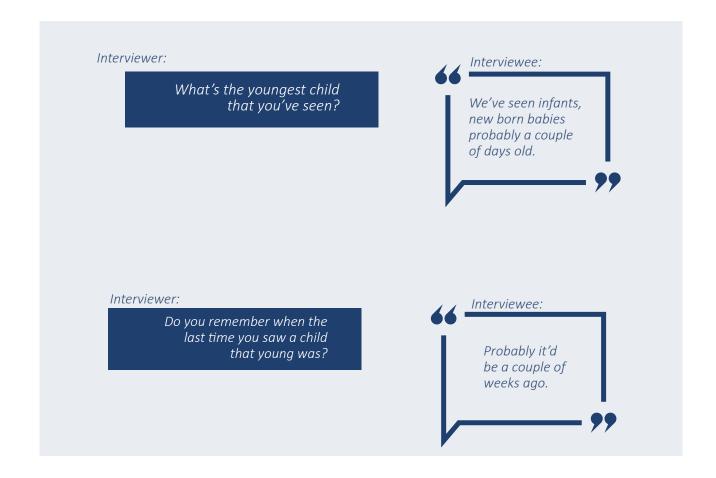
However, the Dark Net was not the only reason cited for the decrease in age. Another participant reported that the change may be due to 'mandatory reporting' laws. Mandatory reporting laws require individuals to report if they learn or suspect a child has been abused or neglected. These laws have led to a significant increase in reports of child sexual abuse. The rationale is that perpetrators might find it is easier to molest a child who is too young to speak and, thus, cannot complain or suggest they have been abused. If they are unable to express that they have been abused, an adult or caregiver in that child's life is unlikely to make a report to the authorities.

Another explanation was that perpetrators and consumers are seeking new and more extreme content.

"The victims can only get so young. We have seen the abuse of babies and very, very young toddlers depicted. That's going to play off because they can't get any younger than that. We're seeing that it has. [We are at] that point where the material is depicting the abuse for what it is, rather than trying to sugar coat is as smiling, happy faces, happy family time kind of thing."

We also asked about the youngest victim participants had seen, and every participant had come across material involving an infant or toddler during their career, even those who did not think there had been a change in the age of victims.

Several participants reported that the youngest child they had seen was days, weeks, or only a few months old. These extremely young children prompted the law enforcement agents to prioritise cases that involved younger children, especially when they believe the content was new or that the child may still be alive.

Interviewer:

What's the youngest child that you've seen?

Interviewee:

We've seen infants, new born babies probably a couple of days old.

Interviewer:

Do you remember when the last time you saw a child that young was?

Interviewee:

Probably it'd be a couple of weeks ago.

**BOX 5: GUARDIA CIVIL
(Spain)**

The Technical Unit of the Judicial Police within the Civil Guard – Division of Children and Sexual Exploitation of Children, is a law enforcement agency in Spain.

Only partial descriptive analysis was possible with this limited dataset. While conclusions should not be drawn, the analysis did not seem to indicate an increase in the number or proportion of cases involving infants. The first table below shows infant cases as a percentage of total cases over a six-month period. Overall, among unique hashes, 8.7% had an infant victim. Victims again skewed towards being female, and cases involving infants even more so. 72.4% of non-infant cases were female, compared to 85.0% of infant cases. 19.2% of non-infant cases were males and 8.5% had victims of both genders, compared to 8.8% male and 6.3% both for infant cases.

The Guardia Civil uses a 6-tier severity score to rate child sexual abuse content. Cases involving infants tend to feature more severe content, i.e. penetration and adult on child activity instead of suggestive posing and/or child on child activity. These differences were statistically significant using the Chi-square test (see bottom table).

Total cases of online child sexual abuse investigated by Guardia Civil

Time period	Total N cases	N cases w/ infants	Percentage infants
July-Dec 2008	11	3	27.3%
Jan-June 2009	48	0	0%
July-Dec 2009	NO DATA		
Jan-June 2010	NO DATA		
July-Dec 2010	NO DATA		
Jan-June 2011	65	0	0%
July-Dec 2011	NO DATA		
Jan-June 2012	NO DATA		
July-Dec 2012	917	84	9.2%
Jan-June 2013	397	55	13.8%
July-Dec 2013	NO DATA		
Jan-June 2014	48	0	0
July-Dec 2014	111	2	1.8%
Jan-June 2015	87	0	0
July-Dec 2015	150	9	6.0%
Jan-June 2016	153	22	14.4%

Severity of content for infant and non-infant CSAM in Guardia Civil data

Category	Infant	Non-infant
0 – Other relevant material	8 (4.6%)	151 (8.5%)
1 – Nude or erotic poses	3 (1.7%)	131 (7.4%)
2 – Sexual activity between children	6 (3.4%)	351 (19.8%)
3 – Non-penetrative sexual activity between children and adults	49 (28.0%)	209 (11.8%)
4 – Penetrative sexual activity between children and adults	100 (57.1%)	862 (48.7%)
5 – Sadism or bestiality	9 (5.1%)	66 (3.7%)

Mantel-Haenszel Chi-Square p < 0.001

EXPLORING CHANGES IN THE SEXUAL CONTENT OF MATERIAL

In addition to the age of victims decreasing, there may be a connection between younger victims and more aggressive sexual content. Egregious sexual content was often limited to investigations on more private platforms or platforms that protected offenders' identities, such as the Dark Net. The Canadian Centre for Child Protection also found a correlation between the age of victims and the severity of content in their report[79] They found that younger victims experienced higher proportions of explicit and extreme sexual assault. Similar findings have been reported by the recent study conducted by ECPAT and Interpol on unidentified victims in child sexual exploitation material stored in the ICSE Database.[80]

Descriptions of the sexual behaviour perpetrated against younger children by our participants ranged from close-ups of genitals to forceful and sadistic activity. Some investigators felt there had been a shift from 'older' CSAM methods that would involve dressing up children and making the engagement seem enjoyable or pleasurable for the child whereas images nowadays depicted the abusive nature of act themselves.

> "I would say that [the material] is becoming more and more aggressive. For example, [...] before August 2015 we didn't analyse any images in TOR, so that might change my opinion. Because in torrent, 90% of content is [...] penetrative. In TOR, the images and the videos are [...] the worst."

Differences in distribution methods have been linked to differences in offenders and offense types in USA based investigation[81] Likewise, NetClean's qualitative study similarly found that "63% of [police] say anonymization technologies were a crucial challenge to identifying offenders who have produced child sexual abuse material".[82] They specifically comment on the difficulty that TOR presents, which was expressed by some of our participants as well. Several participants attributed the more aggressive activity to the false sense of security that the Dark Net gave them.

> "[The dark net] is really difficult [for] law enforcement. They do [enforce the law] and work there, and they try to get the offenders caught, but it's really difficult, because it's difficult to trace. In a way, you can share totally illegal material, and it's not safe, but, in a way, it's easier. You don't get caught, so it's easy. [...] Why is it aggressive? They have the opportunity to produce aggressive material, and they think it's really difficult to get caught. I think [it's also the fact] somebody will pay a great amount of [money] if you produce aggressive material."

One participant perceived the online culture as apparently rewarding the production of younger, more aggressive material. The participant described the behaviour by saying:

> "I think the more you can produce or exchange, the worst you can show to your other groups or to the other members of these groups, you can rise in the ranking or you get more members."

Beyond sexual activity alone, another noticeable change was perpetrators disgracing their victims' bodies with words:

> "In recent years, the content, the photos by themselves are getting high, and the sexual activity is getting lewd, so we can see [offenders] put objects into children's vaginas, or they will over... We saw some cases lately, [offenders] writing some words on children's bodies, not good words, [words] like 'bitch'. [...]'She loves to be doing this'. So it's not just sexual activity, it's getting cruel."

Writing words, phrases, and usernames on children's bodies was also suggested as a way to prove to other members the material was new, belonged to a certain producer, or fulfilled a sort of bragging right. Anecdotally, it has been suggested that producers are scrubbing images of identifiers and EXIF data to protect themselves from being traced, so it is surprising that producers would be willing to risk purposefully placing an identifier to recruit new members or achieve a higher rank within their member groups.

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79   Canadian Centre for Child Protection (2016), "Child Sexual Abuse Images on the Internet", 14 and 15.
80   ECPAT and Interpol (2018), "Towards a Global Indicator on Unidentified Victims in Child Sexual Exploitation Material".
81   Seto, M. C., National Criminal Justice Association (NCJA), and United States of America. (2015), "Internet-Facilitated Sexual Offending".
82   Netclean (2015), "Eleven Unbelievable Truths: The NetClean Report 2015", 24 and 25.

While the majority of participants felt the sexual activity had become more severe, some felt there had not been a noticeable difference. They still saw aggressive sexual activity being perpetrated against victims of all ages, but not a stark increase in violence or violence against a specific age group. A participant who felt the activity had remained constant (no more or less aggressive than in previous years) described content relating to age in the following way:

"We've seen cases of toddlers being abused. Rarely, rarely to the point of actual penetration, but clearly the offenders genitals are visible, placed somewhere over the victim. That is the kind of aggressive material we can witness with regards to toddlers. I find that the content involving male offenders and young prepubescent victims particularly aggressive because of the nature of the act. Because these children are clearly under age. In comparison it does seem a lot more shocking than when you see a

pubescent victim who could be 18, but appears to be a minor. We are still obliged to qualify it as child abuse material. It's not exactly the same type of abuse we witness in that case."

Differences in experience and perspectives of the trends such as these highlight the utility in assessing sexual activity with the scales that have been developed.

UNCOVERING THE TYPICAL OFFENDER

While the literature has focused on convicted sex offenders, the law enforcement agents and hotline analysts we spoke with gave insight into both detected and undetected offenders. They suggested offenders continue to grow more and more protective of their identities as technologies and investigative techniques advance. Every participant said it was rare to see an offender's face nowadays, and when an offender's face is visible, those tend to be adolescent offenders or 'rookie' offenders. For the most part, offenders only showed body parts

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83   Child Notable – Abuse imagery depicting visually prepubescent children (typically 12 years of age or younger) Age Difficult – Abuse imagery depicting postpubescent victims still believed to be under 18 years of age Child Erotic – Imagery depicting nude children not considered to be a lewd display Child Cartoon Erotic – Cartoon images produced to show children (or children characters) in sexual situations

and made sure no personal identifiers (i.e. scars, tattoos, deformities) were visible.

> "It's extremely rare that we can see the offender. If we can see him, it's only parts of his body, or if it's the whole silhouette his face will usually be hidden under a mask. We hardly ever see the face of an offender."

Consensus amongst interviewees was that most men acted alone – either purchasing sex from children (a problem in low-income countries), extorting children online through social media, or grooming children they were close to (i.e., family members). The relationship between offender and child changes depending on which of the aforementioned situations is taking place. Offenders of younger children tend to be intimate, with one participant acknowledging:

> "You know, with younger kids, it often is either some kind of a familial relationship or something close to that like a boyfriend or something, in terms of having actual access to the child, especially at a younger age, or maybe we've seen a couple where it's babysitters, but I'd say mostly it's more familial relationships for the younger ages because of course, as soon as you get into the online abuse and grooming and things like that, it's going to be total strangers rather than somebody that they actually know".

Unlike victims where participants discussed common characteristics, giving profiles that were supported by other reports, many participants felt there was no common characteristic amongst offenders. The participants who gave an offender profile often mentioned older males, probably in their 30s to 50s, who were white- a typology of convicted offenders. Women appear to be very rarely involved in the production of material, though some said they were starting to see women produce CSAM, especially when being coerced by a man (such as a boyfriend) or for money. One participant echoed this notation, stating:

> "I would say [there is a] tendency for female offenders to accept for profit, because we now see an area where mothers are abusing children on [webcam] or live shows for money. [...] I would say the [CSAM] produced by women is always --as I know of— [coordinated by a man]."

A few participants did imply there were times they saw women acting of their own volition, but again women were considered maybe '1 in every 100' offenders, if that. Some participants reported that they never actually saw women.

IDENTIFYING PRODUCTION AND DISTRIBUTION METHODS

Though it is generally understood that child sexual abuse material is produced and distributed in a variety of ways, participants described investigative efforts as being a constant race to outpace new methods.

A notable difference between today's producers and old producers, are the number of mediums available. Participants mentioned that technology like digital cameras, laptops, and cell phones have greatly influenced who produce images. Though there may be some evidence that higher quality images are considered more valuable, cell phones and webcams seem to have become the norm. This finding is again supported by the qualitative study of police that found "mobile phones and videos are becoming increasingly common in investigations".[84] In particular, they allow perpetrators to offend in their own homes and at their convenience, which may contribute to the age of children decreasing.

A participant explained the biggest change he had experienced:

> "From the top of my head, I'd say more and more amateur content [is being produced]. Meaning home, self-produced content, unfortunately. This is parting with the given impression that CSAM is something that you maybe find in more exotic countries, typically Eastern Asia with sex tourism. The fact is, we see more, if we're talking about ethnicity here, we've seen a lot of Caucasian / white children being abused by what seems to be a parent or a close relative within the framework of a household. That's what I refer to when I say amateur content."

Likewise, distribution methods have grown. Distributors were characterised as being fluid and a step ahead of investigators. They often exploited new technologies and deftly used apps' and other networks' privacy policies to their advantage. A participant described distribution in the following way:

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84   Netclean. "Eleven Unbelievable Truths". 16

"It changes all the time. I mean, the last couple of weeks we had a high number of cases in Snapchat. It's very newly used by [offenders]. Yeah, I think it changes a lot. It changes every week, I think, by the numbers, and every application. [...] I think [the dark net] is still a high number. Peer to peer is same, constantly used."

Another participant explained the popularity of live streaming, a distribution method that has only very recently become prominent:

"I think yes, [distribution] changed a little bit. Not just a little, quite a bit. Live streaming is I think a big issue. A live stream abuse, or a distance abuse, when children are put into prostitution or forced into prostitution in different parts of the world – Southeast Asia, Africa, South America – things like that. And somebody in other continents would pay to view this. [...] So those observers, payers, watchers, whatever, they would gather those videos for their own purposes, as they paid for them."

Live streaming presents a particularly challenging situation to law enforcement, because if produced properly, there is no evidence that the crime ever existed, even though law enforcement may see evidence of money transfers and call times. Likewise, without witnessing the abuse, it is difficult to charge consumers with 'possession' of CSAM since there is no actual recording left. Furthermore, it has the potential to cross international jurisdictions as well as involve requesting assistance from the webcasting service.

There also seems to be vast differences in the type of content hosted on each platform. As mentioned earlier, more aggressive and younger content are found on more secure places, like the Dark Web.

"The younger victims would tend to be in the areas that have the greater levels of security, and that community element. The overt kind of open platforms such as social networks and your standard Internet platforms would tend to be slightly older victims. It comes down to the degree of comfort that the individual has in terms of the platform they're using and the way they discern the age of the victim."

"Interviewee: it has differences, because the pornography or the materials that you can find on the deep web, on the dark web is [more] aggressive than the pornography that you can find on the social media.

Interviewer: Are they different with ages and gender as well, not just sexual content?

Interviewee: They are younger.

Interviewer: Why [do you] think that they are different? Why is social media different than the other places?

Interviewee: It depends. [...] On the social media they have to be more discreet. They have to be careful with the things that they are doing versus [other areas of the web]. Because on the other [websites] they don't have to be careful because [...] the material is very dark, like they are very safe."

Anonymity, sense of safety, and more extreme content tend to be common characteristics of material distributed on the dark web. Social media seems to be a place where participants found older victims or less aggressive CSAM. These differences in content and victims suggest that there may be room for further investigation to develop risk profiles and investigative hierarchies.

IMPACTING POLICY

Participants expressed improving policy on three levels: globally, nationally, and locally. Globally, participants wanted greater collaboration between law enforcement agencies during investigations. Some investigators related frustrations over their inability to secure search warrants in a timely manner, or hitting severe roadblocks due to paperwork and legalities that inhibited them from effectively cooperating with other investigators on cross-boarder cases. Furthermore, participants had mixed feeling about industry partners. Some felt they made their job easier, while others found them to be obstacles. A participant eloquently stated his opinion on the topic:

"We've all heard the phrase 'You can't prosecute your way out of this issue'. There is a need for a multi-disciplinary approach to looking at this type of thing, especially where we overlay the idea that a lot of the material is generated out in areas where extreme poverty exists, and this is a way of remedying that poverty, as a way of physically trafficking children, or digitally trafficking children through, like webcams. In terms of the offending, there needs to be tools that allow law enforcement to work together across jurisdictional boundaries much more effectively. There needs to be tools in place that allow the investigations to be done in a timely and effective way. There needs to be tools that allow case referrals to happen very quickly. Legislative tools that allow law enforcement to get subscriber information from other jurisdictions easily and quickly, and get information out of service providers easily and quickly."

Nationally, participants wanted databases to be implemented and maintained. They also desired stricter laws for people who perpetrate these crimes. They felt they were often stunted by the ways they were allowed to investigate material online in comparison to other fields and wanted to be given more freedom in their approach to taking down material, conducting sting operations, and probing leads. A participant highlighted this notion:

"This is a topic I really feel that it hurts everyone, that as societies makes us look very bad. And, at the end of the day, the effort and the sum of all, not only the police. This is a job that must be done from different areas, from different strata. Both in society and government, and industry in the private sector, in companies. We all have a substantial responsibility in this. And I think that the dissemination of information of what is happening really is fundamental. Let people know that simply downloading a single image containing such is a crime and, therefore, can go to jail. I think that is fundamental. I think people need to know that this is a crime, a crime that is paid and paid dearly. People go to jail for doing this kind of behaviour."

Locally, participants consistently brought up needing more resources and funding. They felt that while many people and politicians recognise online child sexual exploitation as a problem, they never allocate the appropriate funds for training, staffing, and new technologies. Addressing those concerns would be paramount in ensuring that law enforcement can effectively do their jobs.

4.   CONCLUDING DISCUSSION AND LIMITATIONS

As noted across the reviewed literature, the interviews with law enforcement and the limited complementary quantitative data presented here, CSAM crimes are varied and subject to change, terminology differs across researchers and practitioners, and inconsistent ways of operationalising and measuring CSAM makes comparison across studies difficult. This has had a negative impact on global efforts at data collection across different forms of child sexual abuse and exploitation and is evidenced to be the case with online CSAM. Our capacity to evaluate the scale of the problem in terms of the quantity of CSAM is compromised by the volume of online content in the open, and also hidden, Internet, and the reality that content may be removed but not destroyed and copied endlessly. To date we have been dependent on criminal justice records and public reports to hotlines (as well as proactive searching) for data, but both are subject to biases, and are likely to underestimate the volume of CSAM in circulation. Studies using data sourced from existing databases (such as ICSE) also face challenges as the data was not collected for research purposes but rather for operational reasons and reflects the vagaries of reporting and managing missing information.

What we can conclude is that criminal justice data from public records, as well as research surveys, would suggest an increase over time in the number of CSAM crimes. However, some of this data is now quite old, and public records also reflect changes in legislation and recording of crimes across different jurisdictions. It is also difficult to unpick whether the increases in recorded CSAM crimes reflect an overall increase in these crimes, or a greater investment by law enforcement (possibly aided by technological tools) to detect and prosecute them. Youth-produced images also pose new challenges for law enforcement in terms of resource demands alongside their ability to determine the age of the child and whether they have been produced as part of coercive activity by adults or peers, or represent behaviour that is consistent with adolescent development and risk-taking.

Mapping of existing national and international CSAM databases would suggest that they fall largely into two groups: hash collections and image collections. While there are a number of databases globally, there is limited connectivity between them. Differences in how data is defined and recorded means that it is impossible to draw firm conclusions as to whether there have been changes in the gender, age and level of violence within recorded CSAM. There is some suggestive evidence that the percentage of egregious images has increased over time, but inconclusive evidence in whether there are changes in the ages of children, except that since 2011 there appears to have been an increase in the volume of CSAM involving pubescent children, thought to be linked with trends in growth of self-produced content (facilitated by wider access to new technologies). Across three studies, younger victims are associated with greater levels of sexual violence, produced within a family context and more likely to be widely distributed. However, the preponderance of images is of pubescent and pre-pubescent children and the numbers of images of very young children (infants and toddlers) remain relatively low. What is consistent across different datasets is that the majority of victims and offenders are white Caucasians, and while there has been an increase in other ethnic groups, these number remain disproportionately small. This does require further investigation given the increasing availability of Internet connectivity through hand-held devices and the concerns expressed about, for example, live streaming of sexual abuse.

The qualitative results from expert interviews confirm the study hypothesis that victims of OCSE appear to be getting younger, and the decline in age has happened recently. However, this is far from clearly confirmed. The 2016 report from the IWF suggested a decline in the percentage of reported images of children under 10 from 80% in 2014 to 53% in 2016, and a corresponding increase in victims aged 11-15 (18 to 45% respectively). The IWF concluded that this may relate to the increase in youth-produced images alongside the fact that since 2014 IWF analysts have been allowed to proactively search for content. The public are more likely than analysts to report children under the age of 10, and where there is more severe abuse. When IWF analysts find a forum with thousands of images of child sexual abuse, they work to remove the forum as well as capture the URLs of every image

on there (which might be pulled from another site). They then seek to remove each image hosted on the other sites as well. The IWF conclude that this technique appears to be associated with finding more images of 11 to 15-year-old children.

The experts within the study had not reached a consensus as to why they concluded that the age of victims is decreasing, but one suggestion was the appearance of new forums on the Dark Net specifically dedicated to younger children, which did not previously exist. Such a market place was thought to naturally encourage the production of new material as well as facilitate its sharing. The Dark Net is seen as a notorious safe house for some of the most egregious content, and as law enforcement and hotline analysts begin to specifically target these forums, it is speculated that they will undoubtedly see an increase in young victims. Another explanation given for the decreasing age of victims was that offenders have gained a sense of safety and confidence on private platforms (e.g. live streaming) that make it easier to produce violent material.

When participants discussed distribution methods, some mentioned outdated policies and legislation that inhibited them from being proactive in investigations. Similarly, a few participants suggested that investigative efforts have continued to be blocked by companies and countries that do not fully cooperate with law enforcement. Despite the ongoing international dialogue around child online sexual exploitation, participants believed that the public appears to misunderstand the gravity and implications of restricting investigations.

Participants also emphasised the fact that additional funding would significantly help their investigative teams. Funding would address the majority of issues participants had with current practices; it would allow them to add staff members, in turn processing more cases, build national databases of images and videos, and appropriately train staff. It was felt that drastic increases in the number of cases reported each year and lack of funding have left professionals with little ability to implement valuable resources, such as the development of a national image databases, as well as annual staff training. Furthermore, it was suggested that efforts should be made to encourage collaboration between researchers, advocates, and law enforcement agents so that the field can continue to grow and promote best practices.

LIMITATIONS

When recruitment began for the quantitative portion of the study, invitations and flyers were distributed to law enforcement and hotline agencies around the globe requesting data on online sexual abuse images. These initial invitations yielded very few responses. Upon further probing, it appeared many countries lacked the funding and staff needed to maintain national databases, especially databases that would retain the level of detail our research team desired to establish standards for evidence-based advocacy and programming. As one agent acknowledged, even if his department was presented with additional funding, he would probably dedicate the funds to more investigative staff rather than sacrifice a team member to data entry and management. Other departments and organisations were advocating for or had recently received funds to establish national databases but were still in the beginning phases of designing and implementing their databases.

6. RECOMMENDATIONS

Law enforcement agents and hotline analysts are seeing changes in CSAM. However, expert opinions are not sufficient to establish global metrics; substantial quantitative data is necessary. As the limitations of this study suggested, there are still many barriers to overcome before global metrics and/or indicators can be developed.

RECOMMENDATION 1:
Invest in the development and maintenance of a national database of CSAM in each country.
It is difficult to determine the cost-benefit ratio of agencies dedicating staff time as well as their often limited funds to maintaining a national database. However, to more effectively establish global trends in OCSE, it is crucial that law enforcement agencies throughout the world have databases or the ability to track relevant information about the material they process and investigate, including characteristics of offenders, victims, and the sexual activity depicted in the imagery.

RECOMMENDATION 2:
Track and analyse trends in CSAM data nationally and globally.
Governments must track and analyse trends in CSAM data both at national levels and in cooperation with international law enforcement to better understand and therefore more effectively fight OCSE.

RECOMMENDATION 3:
Promote participation in research by law enforcement agencies.
The benefits of evidenced-based advocacy and action are far reaching but collaboration is often restricted by the need to negotiate complex ethical processes associated with sharing sensitive data, or simply from a lack of resources. There are clear opportunities to foster collaboration between law enforcement agencies and professional researchers that would benefit both partners. Researchers and advocates should work to strengthen their relationships with law enforcement agencies and hotlines in order to facilitate such projects.

RECOMMENDATION 4:
Move towards standard variables for collecting, storing and analyzing CSAM data.
Analysis of limited quantitative data allowed the research team to test assumptions about how law enforcement agencies collect and store CSAM data. It was assumed that agencies would vary slightly in how they collected, coded, and defined variables. However, vast differences were noted in what organisations considered important to include in their databases and how they maintained them. Some variables will need to be standardized across databases for global metrics to be achieved.

RECOMMENDATION 5:
Consult stakeholders from around the globe to develop a set of basic shared variables and promote agreement to store CSAM data in line with these.
Bringing together key stakeholders to define variables and standardise the way data is captured within databases would assist investigators, advocates, and researchers in establishing and comparing trends. It is not enough to have large databases with lots of variables, rather we need robust databases with useful, and carefully defined variables to better understand and more effectively act to prevent this crime from happening.

Bringing together key stakeholders around the globe to define variables and standardise the way data is capture within databases would assist investigators, advocates, and researchers in establishing and comparing trends. It is not enough to have large databases with lots of variables, rather we need robust databases with useful variables to understand and prevent this crime from happening.

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APPENDIX A – QUALITATIVE INTERVIEW QUESTION GUIDE

About the Participant:
1. Would you please describe your role as it pertains to investigating child sexual abuse materials?
2. How long have you been investigating child sexual abuse materials?
3. How many cases did you handle last year?
    a. Is that similar to previous years, or has your caseload changed?
    b. About how many of your investigations result in an identified victim?
    c. Do you prioritize particular cases? (younger victims, multiple victims, newer content)
    d. What changes have you seen in the content of child sexual abuse materials over your career?
        i. Why do you think these changes have occurred?

Victim Profile:
4. Can you describe the typical victim in the child sexual abuse materials that you analyze?
    a. What is the average age of children in child sexual abuse materials?
        i. What is the youngest child you've seen? When was this? How often do you see children this age?
        ii. What would you say the proportion of Infant / Toddler / Prepubescent / Pubescent children are in the material you analyze?
    b. What is the common gender and ethnicity of children in child sexual abuse materials?
        i. How does the gender and ethnicity relate to the different age categories? (For example, do infant victims tend to be male while prepubescent victims tend to be female?)
    c. Are victims different (age, gender, ethnicity) in cases where you're able to identify a child versus cases where you're unable to identify a child?
        i. Why do you think those differences exist?

Infant / Toddler / Young Child:
5. Have you noticed any changes in the content of infant / toddler / prepubescent child sexual abuse materials, or in the amount of such materials, either in absolute terms or relative to pubescent abuse materials?
    a. Why do you think these changes are happening?
    b. What policies or resources do you think would help to prevent this from happening?

Offender Profile:
6. How often is an offender visible in the material?
    a. Does the presence of an offender change depending on the age or gender of the child?
7. When visible, can you describe the typical offender in cases with either infants, toddlers, or prepubescent children?
    a. How old would you estimate the average offender to be?
    b. Is there a common gender?
    c. Are there typically multiple offenders? If, so, how many?
        i. If there are multiple offenders, are they the same gender or opposite gender?
    d. What is the common ethnicity of the offender?
        i. Does it normally match the ethnicity of the child?
    e. Are the offenders in cases with young children different than the cases with pubescent children?

Sexual Content:

8. Has the sexual content of child sexual abuse images changed over time?
   a. Is it more or less aggressive than in the past?
      i. Why do you think those changes are happening?
9. How does the sexual activity relate to the age categories? Meaning, will you please describe the differences in content between infants / toddlers / prepubescent / pubescent?
   a. Does it normally involve child on child, adult on child, or solo activity?
      1. In child on child, are the children similar ages?
   b. How does the sexual activity relate to the gender of the victim?
      i. Why do you think these differences exist?

Production and Distribution:

10. Do you know how the material was produced (e.g. grooming of contact, child prostitute, covert filming)?
11. Have the production methods changed? (webcam, cell phone, hidden camera)
12. Have the distribution methods changed? Meaning, what mediums do individuals use to trade the material (P2P, Email, deep web, websites)?
    a. Are different types of sexual content or ages traded on different platforms?
       i. Why do you think that is?
13. Where are materials typically filmed/produced (e.g. on the street, in hotels, in a house)?
    a. Does the location change when the material involves younger children?
14. How often would you say a series of images or videos is traded? (meaning, do you mostly come across private collections or do you see series circulating)
    a. What would you consider an actively traded case of child pornography?
       i. Are there differences between cases that are actively traded and cases that are not actively traded?
       ii. Do you think the age of the child influences whether the case is actively traded?
          1. If yes, why do you think that is?

Policy Impact:

15. What do you think would be helpful to disrupt the production and distribution of child sexual abuse material?
    a. Are there resources that would be helpful for you that do not currently exist?
    b. Do you have any recommended changes or addition to the policies surrounding child sexual abuse material?

Insight:

16. Is there any information, other resources, or policies that we haven't discussed that would help you more easily identify children?

APPENDIX B - QUANTITATIVE DATA

Point de Contact (France)

Point de Contact is a hotline agency in France that was established by the Association of French Internet Providers to enable the reporting of CSAM. The organisation works in conjunction with the INHOPE network to combat OCSE.

Point de Contact provided a summary report on cases reported to the hotline by year from 2010-2015. This report describes: a) the total number of reported cases by Internet service type (e.g. website, P2P, forum, etc.), b) the number of cases in each broad content category (e.g. 'child pornography', child nudism, adult pornography accessible to children, etc.), c) the number of cases from each country of origin, and d) the action taken by the agency on each case.

Point de contact was unable to provide victim details (such as age or gender). However, these data can be used to inform how CSAM comes to the attention of a national reporting hotline, and to help identify gaps that might exist in law enforcements' current approach to identifying exploitive images.

Point de Contact also provided a summary report of information hosted in France provided by INHOPE for the months of Jan-Nov 2015. The report describes the total number of actions taken by French authorities, as well as the gender and age distributions (infant, prepubescent, pubescent) of cases. The data supplied only spans the past year, so it was impossible to determine temporal trends.

Guardia Civil (Spain)

The Technical Unit of the Judicial Police within the Civil Guard – Division of Children and Sexual Exploitation of Children, is a law enforcement agency in Spain.

Guardia Civil provided a partial database from 2008 to 2016 that describes online material that the police have investigated. At the time of data collection, this agency is in the process of categorising their data, and so additional data might be available at a future point. From the data provided it was unclear how much data from each year had been included in the dataset.

For all investigated material, this database included the six-month window in which the material was identified (e.g., July-Dec 2014), both a broad content description (e.g., 'sexual activity between children','sexual activity between an adult and child') and more specific content description, victim age categories (0-13 years, 13-18 years) and whether an infant appears in the content.

These data are the most pertinent to the primary research question. While offender information and other victim demographic information (e.g. race) are missing, the content descriptions may provide an opportunity to examine temporal trends in content severity and the presence of young children.

Child Cyber Crime Group - Colombian National Police

The Child Cyber Crime Group within the Colombian National Police is a law enforcement agency dedicated to investigate online sexual exploitation of children in Colombia.

The Child Cyber Crime Group provided a database of Colombian victims of sexual exploitation from 2010 to July 2016. Given that not all the cases pertained to online child exploitation, our investigation was limited to cases denoted as victims of CSAM. Victim age and gender are summarised by year. These data are extremely useful for our primary research question; however, there are too few cases to detect statistically significant differences. However, we do see agreement between interviewers and the national database.

Child Rescue Coalition (United States of America)

Child Rescue Coalition is a non-profit organization that partners with US investigators, police officers, and other key stakeholders to aid in the apprehension and conviction of child abusers. They mainly provide technological assistance as well as host a large database of CSAM hash values.

Child Rescue Coalition provided us with a brief data summary from 2004 to June 2016 that describes the number of new image hash values they categorised each year from law enforcement. While this agency has access to millions of hash values of CSAM, they do not collect detailed information on victims and, therefore, could not help us answer our primary research question. The summary data they provided us categorises material into five areas:

- Child notable – abuse imagery depicting visually prepubescent children,
- Age difficult – abuse imagery depicting post-pubescent victims still believed to be under 18 years of age,
- Child erotic – imagery depicting nude children not considered to be a lewd display, and
- Child cartoon erotic–cartoon images produced to show children (or children characters) in sexual situations.