The value of Covert Human Intelligence Sources: Using practitioner perspectives to develop a template for data collection in order to measure the value of Covert Human Intelligence Source information in low policing

By

Kristine Grzibovska

Canterbury Christ Church University

Thesis submitted for the Degree of Master of Science

2022

Abstract

The use of CHISs in the UK has had a chequered and controversial history. What little research exists, in the main, concentrates upon the ethical dilemmas associated with what is by its very nature a secret world of professional activity. Because of the inherent sensitivities involved and the need to protect sources, little research exists on how to measure the effectiveness and value of a CHIS. This is an area that professionals themselves see as an important consideration beyond subjective views of effectiveness. Little was researched due to a lack of access to police data. Three research questions were identified: (1) What are practitioner views on the value of CHISs and how it can be measured? (2) What are practitioner views on the nature and development of a template for measurement? (3) Using the template, how can the value of CHIS be measured? This research employed a Human Source Management (HSM) framework focusing on the enhancement of professional practice in CHIS management (Crous, 2009). Using a post-positivist perspective, data was gathered using a consequential mixed methods approach. This approach consisted of three stages. The first stage used semi-structured interviews to gain the views and experiences of practitioners relating to CHIS handling, and what they felt were the best ways to measure value. The second stage involved thematic analysis of the data from stage one and the design of a template for the collection of data identified by practitioners as important to any measurement. Practitioners were reengaged to provide feedback on the template prior to use. The third and final stage focused on utilising the improved template to gather the data on 30 CHISs, and to calculate an overall effectiveness score for each CHIS in relation to a) individual meetings and b) over a three-month period. The findings suggest that there is potential for an objective and useful operational assessment of the value of CHISs, that is nuanced to the control strategy and crime harm rate of different geographical locations. This could be a useful tool, particularly for Authorising Officers distanced from CHIS contacts who rely upon subjective opinion of handlers as to value. The thesis concludes with recommendations for further research.

Acknowledgements

A huge thank you goes to the participating police service for unique access to personnel working in what is an area normally hidden from the research gaze. Thank you also for allocating resources to gather the data, without which stage three of this study would not have been possible. This access has been gratefully received and very much appreciated! A big thank you also goes to the gatekeeper for his commitment and help. Thank you for all serving police officers who have taken the time to participate within this research. For obvious reasons I cannot name all those who have helped, but you know who you are!

I cannot express enough thanks to my supervisors, Professor Steve Tong and particularly Dr Martin O'Neill. The supervision and help has been highly appreciated. Thank you for the opportunities you have given me to improve my knowledge and skills alongside this Master thesis.

My completion of this research could not have been accomplished without the support of my friends, Kiera Selway, Sean Jones, Natalia Glaz, Amy Turner, Ed Thomas, Ula Mydlowska, and especially my housemate Becky Palmer. I also want to thank my family, Irina Grzibovska, Igor Grzibovskis, Artjom Grzibovskis, and Stanislav Grzibovskis for their support and caring during the completion of this thesis.

Abbreviations

ACPO	Association of Chief Police Officers
AO	Authorising Officer
CCCU	Canterbury Christ Church University
CHI	Crime Harm Index
CHIR	Crime Harm Index Rate
CHIS	Covert Human Intelligence Source
CID	Criminal Investigation Department
CoP	College of Policing
DRAR	Data Retention and Acquisition Regulations (2008)
EU	European Union
GDPR	General Data Protection Regulation
HLO	Harm Linked Outcome
HMICFRS	Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services
HSM	Human Source Management
IOCCO	Interception of Communications Commissioner's Office
IPCO	Investigatory Powers Commissioner's Office
ISComm	Intelligence Service Commissioner's Office
IRA	Irish Republican Army
LCS	London Corresponding Society
MO	Modus Operandi (operating method)
MP	Member of Parliament
NPOIU	National Public Order Intelligence Unit
NPU	National Political Union
OSC	Office of Surveillance Commissioners
PACE	Police and Criminal Evidence Act (1984)
PEACE	(Acronym) Planning/Preparing, Engage/Explain, Account clarification and challenge, Closure, Evaluation
RIPA	Regulation of Investigatory Powers Act (2000)
SDS	Special Demonstration Squad
UK	United Kingdom
US	United States

Table of contents

List of Tables

List of Figures

Introduction

The police and intelligence agencies see CHISs as a vital tool for policing activities. CHISs may provide intelligence which cannot be obtained through any other means (Hewitt, 2010). They can help to gather intelligence which is crucial for investigations, detections, and the prevention of crimes. Therefore, CHISs are important for, both, high and low policing activities. There is a clear distinction between high and low policing. Low policing agencies tend to focus on gathering criminal intelligence on the security of the community to build cases, whereas high policing agencies are focusing on gathering and absorbing the intelligence on national security matters (Brodeur, 2007; Brodeur, 2010; Luscombe and Walby, 2015). Nonetheless, the risks associated with the use of CHISs are known by the police and intelligence agencies (Clark, 2001). Historically, detectives kept their CHIS confidential simply to use them to enhance their careers (Harfield, 2006). For instance, in the case of Donald and Cressey, Donald registered Cressey as a CHIS to engage in criminal activity under the cover of legitimacy (R v Donald (1997); Clark, 2001).

It is important to clarify the difference between two types of CHIS, informers and undercover officers. Informers are individuals who associate themselves with criminal world and are in the agreement with the police to supply information for personal gain. Undercover officers are police officers who are employed by the police and infiltrate criminal world for intelligence purposes. This research is specifically focusing on informers. The official definition of a CHIS is specified in Part II s8 under RIPA (2000) which states that a person is a CHIS if they create and uphold a relationship with a person for covert purpose (Billingsley, 2001). This research refers to informers as CHISs throughout. Much can be achieved through the use of CHISs such as recovery of property, arrests, saving lives and the prevention of crime. Therefore, the use of CHISs by the police is self-explanatory (Clark, 2001).

This research focuses specifically on low policing and whether CHISs provide valuable information through which practitioners may achieve successful outcomes. Authorising Officers (AO) are in charge of approval of all appropriate applications to ensure compliance with the Regulation of Investigatory Powers Act 2000 and Covert Human Intelligence Codes of Practice in provision of priorities and control strategies (College of Policing (CoP), 2022a). Currently, AO's must rely upon the views of officers but this might be subjective and prone to unreliability. Therefore, this research is focusing on:

1. What are practitioner views on the value of CHIS and how the value can be measured?
2. What are practitioners' views on the nature and development of a template for measurement?
3. Using the template, how can the value of CHIS be measured?

At this point in time the effectiveness of a CHIS is based upon a subjective measurement of value by officers handling this specific CHIS. Subjective reasoning is prone to bias, therefore objective means of measuring the value may be more suitable for the reflection of true effectiveness. The analysis of practitioner views on what makes a CHIS valuable will be used as the foundation for the development of the template which could be utilised universally to calculate the value and effectiveness of each individual CHIS. Furthermore, the measurement of value and efficiency must not be based simply on economic grounds because this would involve only costs without considering any outcomes produced. Due to the secrecy and confidentiality inherent in this field of policing, it is a difficult area to research.

1.1 Some Problems: an overview

Traditionally, the police have been unwilling to discuss the CHIS-based system, leaving this subject under-researched (Billingsley et al., 2001). Such reluctance may be because police officers want to keep their methods secret, as well as protect the identities of their CHISs. When it comes to handling CHISs, the potential value of information held by a CHIS must be understood, but also the fact that a CHIS may usually be actively involved in crime themselves. Nonetheless, available literature suggests CHISs are the most valuable and cost-effective tool for fighting serious and organised crime (Williamson and Bagshaw, 2001). In 1993, the Audit Commission encouraged officers to use CHISs and focus on proactive policing rather than spending all resources on reactive work. The report suggested that the police paid out £60 per person arrested, £57 paid per crime detected, and around £1 paid out to a CHIS per stolen property to the value of £12 recovered. However, the Audit Commission only considered the reward paid out to informers without considering the resources spent on the management and handling of CHISs.

Throughout policing history CHISs proved to be useful and effective as a policing strategy. The government must be cautious when establishing the legal and practical framework around the use of CHIS. Officers must have flexibility to employ a CHIS to obtain full value. However, they must not be allowed to operate in a manner which may develop corrupt practices. The management, including the measurement system used to assess value, must be opened to third

party scrutiny and analysis (for instance those people more remote from the handling of the CHIS). This is to ensure officers use CHISs appropriately, for instance dispense with CHIS's who provide limited useful intelligence or focus resources on those CHIS who provide the most useful intelligence. The police must operate under risk of scrutiny while under uncertain circumstances (Billingsley, 2001). Furthermore, the Labour Party argued that there was a growing need for financial accountability and intelligence-led, proactive policing. This may be achieved through greater involvement with communities (Raine and Wilson, 1995; Home Office, 2004; Clark, 2001). They believed that proactive policing methods would reduce the number of reactive responses to crime, which would further reduce the costs spent by the police on resources. Consequently, CHISs, as members of the public, seem more desirable to the police as this policing tool fits the best value and the efficiency plan (HMICFRS, 1999).

Current debates around CHISs mainly focus on undercover operatives without the examination of the other type of CHIS, employed CHISs. An Undercover Policing Inquiry revealed the actions and operations undertaken by the Special Demonstration Squad (SDS) and the National Public Order Intelligence Unit (NPOIU) (Undercover Policing Inquiry, 2021). The Undercover Inquiry mainly focused on breaches of human rights and codes of ethics by the officers who were involved in serious criminal activities and in sexual relationships with subjects of interest. It is important to mention most conduct undertaken by the SDS and NPOIU took place before the enactment of the Human Rights Act 1998, Regulations of Investigatory Powers 2000, and Data Retention and Acquisition Regulations (DRAR), 2018. However, a few, such as RIPA 2000, have focused on the use of CHISs as professional CHISs who are paid by the police.

Until 2017, the Office of Surveillance Commissioners (OSC) had been responsible for oversight of CHIS regarding judicial matters and the RIPA 2000 regulatory provisions. The provisions set out by the Act mandates that all use of CHISs must be necessary, justifiable and proportionate for preventing and detecting crime, and national security. The annual report published by the OSC highlights a substantial decrease in authorisation of CHIS activity by law enforcement from 2014 to 2017. It has been highlighted by the Chief Surveillance Commissioner, The Rt. Hon. Lord Judge, that his office had seen a decrease in the number of applications made and authorisations granted for the use of covert tactics after the changes brought about by The Protection of Freedoms Act 2012. The Act has changed the threshold. The authorisation would be only granted where law enforcement is investigating criminal offences attracting a maximum custodial sentence of six months or more or offences relating to the sale of tobacco or alcohol to underaged children (Protection of Freedoms Act 2012 –

changes to provisions under the Regulation of Investigatory Powers Act 2000 (RIPA), 2012, p.5). In 2017, 2,310 CHISs were authorised and 2,184 were declined (Office of Surveillance Commissioner: Annual Report, 2017, p.14). The Commissioner further stated that in the year 2014 to 2015, 127 reports were received of RIPA breaches. In 2015 to 2016, 100 irregularities had been reported. 92 breaches or irregularities were reported in 2017. The breaches relate to all covert activity which has been authorised under RIPA Part III including but not limited to CHIS use, undercover officer deployment, and direct surveillance. Most breaches were categorised into similar groups. These categories include but are not limited to inexperience, pressure during the events demanding urgent focus, and acknowledgement of what exactly has been authorised. Nevertheless, the breaches and irregularities decrease every year. This may be due to the decrease in the applications made by law enforcement officers. In 2017, the OSC was merged together with Interception of Communications Commissioner's Office (IOCCO) and the Intelligence Service Commissioner's Office (ISComm) creating the Investigatory Powers Commissioner's Office (IPCO). The latest annual report from IPCO in 2020 highlights the introduction of the Covert Human Intelligence Source (Criminal Conduct) Act 2021. The Act supports the continuation of the use of undercover officers and Covert Human Intelligence Sources. The Act further introduced enhanced safeguards for juvenile and vulnerable adult CHISs and a requirement for all criminal conduct authorisations to be notified to IPCO within seven days (IPCO, 2020, p.17). The annual report of CHIS authorisations in 2020 shows a slight decrease to 2,086 compared to the number of authorisations in 2017 (IPCO, 2020, p.75).

Many articles have been published scrutinising how much the police have spent on CHISs (Ward and Boyd, 2020; Weaver, 2017; Graham, 2020; Gantzer, 2020). The articles do not mention how effective the CHISs were and why certain amounts are paid. Nonetheless, the Undercover Policing Inquiry had a direct influence on the new proposed law covering CHISs and the Covert Human Intelligence (Criminal Conduct) Act 2021 was created. Prior to the enactment of the 2021 Act, some members of parliament (MPs) raised the concern about allowing CHIS immunity. Arguing that the immunity would allow CHIS to commit crimes including murder, torture, and sexual violence (Lowe, 2021). Nonetheless, the authorities must consider the safety and welfare of CHISs as they undertake a risky role to protect the community.

1.2 The CHIS defined

It is important to define terminology before moving to the substantive elements of the thesis. There has been confusion between the terms 'informer' and 'informant' (Billingsley, 2009). Previous definitions of an informer were unclear and simply described an informer as someone who informs about another, whom the individual suspects is breaking the law (Black, 1968). Rapp (1989) suggests that the terms of an 'informer' and an 'informant' are considerably different. An informant is someone who willingly provides information as a victim or a witness of a crime, whereas an informer is someone who associates with criminals and supplies information for the purposes of gain (i.e. money). Furthermore, Rapp (1989) suggests two main categories of informers. These include the agent in place, and an agent provocateur. The primary difference between 'informants' has been identified within a sociological model created by Greer (1995). Greer's (1995) model identifies an informant as a source of information, which may include an 'informer'. The model divides informants into four different categories. The four categories include: outside single event informant – witness, outside multiple event informant – a witness who always tends to see crime taken place, inside single event informant – accomplices who gives information only to help himself out at the time, and inside multiple event informant – regular informers who are registered with the police as Covert Human Intelligence Sources and are known as CHISs. Other academics simply emphasise that informers are closely connected to criminals and may be involved in crime themselves (Harney and Cross, 1968). The negative perception of informers discouraged individuals to come forward. This stimulated the police to apply neutral or positive labels on CHISs such as an asset, a source, a human source, or a Covert Human Intelligence Source (Hewitt, 2010).

1.3 Thesis structure

Historically, the police have been unwilling to discuss the use of CHISs. This may be for justifiable reasons. The CHIS-based system is strictly confidential due to the potential risks around the exposure of CHISs and policing strategies. However, there are questions that may be answered without the risk of exposing the techniques, and the identities of officers and CHISs. This research employs a Human Source Management (HSM) theoretical framework. This framework is primarily focused upon modernising and improving CHIS management practices (Crous, 2009). This research, through a post-positivistic approach, focuses on analysing practitioner views on what makes a CHIS valuable and how the value can be measured. This then is used as the foundation for the template utilised for the measurement of the CHIS value which can be used universally by law enforcement agencies. Moreover, within

this research, the template has been discussed with practitioners and utilised on a small number of CHISs in relation to individual meetings over a three-month period.

The first chapter concentrates on the historic use of CHISs in England and Wales, the developments within policing and criminal investigations, the nature of CHISs and associated problems. The use of CHISs is one of the oldest intelligence gathering techniques (Marx, 1992). Although there have been developments within policing and criminal investigations, the use of CHISs is still fundamentally important. CHISs are considered to be cost-effective as they may contribute to the certain investigative goals such as the recovery of property, arrests, and the prevention of crime (Audit Commission, 1993; Clark, 2001). Nonetheless, a few historic cases demonstrate where investigators used the CHIS system for corrupted means. For example, the Turf Fraud Scandal exposed two investigators who worked closely with criminals, exploiting the CHIS-based system (Morse, 1877). Therefore, this research is extremely valuable as it will show the value of the CHIS and provide objective means of measuring their effectiveness.

Ontological and epistemological perspectives shape this research. Chapter two explores the philosophical perspective of this research. These philosophical perceptions of the reality and the knowledge must be regularly reflected upon within the research. The awareness of the philosophical stand provides the research with clarity and justifies the methods used within the research. This research took a post-positivistic view on the reality and the knowledge. Post-positivists perceive the world as one reality which may be observed by all. However, due to human judgement all that is observed cannot be fully truthful (Fox, 2008). The covert policing area is unresearched due to its sensitivity, therefore the qualitative approach was deemed to be the best foundation for the analysis of the subject area. Semi-structured interviews provided an opportunity to discuss the views and experiences of practitioners with them. Through thematic analysis of semi-structured interviews, this research explored the views practitioners have on the value of CHISs, how it may be measured and what successful outcomes may be achieved through the use of CHIS. The themes which there observed within the data have been the foundation for the creation of the template. The practitioners have given feedback on the template through further semi-structured interviews. The final stage focused on the quantitative analyses of thirty CHISs by utilising the template. The analyses were primarily based upon Harm Linked Outcomes in relation to the Control Strategy. It is also important to mention that the researcher did not have experience with CHISs at the time of this research, meaning the findings observed throughout the research are based upon human reasoning (Neiman,1994).

Chapter three discusses findings. It is believed that one third of crime is solved with the help of CHISs (Billingsley et al., 2001). Practitioners suggested that CHISs are a valuable tool to obtain actionable intelligence. The information obtained through CHISs may then be analysed and sorted into four types of intelligence products. These products include strategic intelligence, tactical intelligence, subject profile, and problem profile (College of Policing, 2022b). Handlers can task their CHISs to obtain relevant information or infiltrate a certain group to obtain information. Practitioners suggested several successful outcomes that may be achieved through the use of CHISs. These successful outcomes including intelligence, drug seizure, recovery of property, seizure of offensive weapons and firearms, cash seizure, prevention of crime, safeguarding people, locating missing persons, arrests, and prosecution. Some of these measurable outcomes have then been used to create the template. Practitioners suggested further improvements to it prior to the template being utilised within the final analysis of CHISs, which further increased the reliability and validity of the proposed template. During final analysis, thirty CHISs were examined using data for their activities over a three-month period. The analysis focused upon the calculated value for each individual contact and then an overall value for each CHIS.

The significance of findings is discussed in chapter four. The findings explored the three fundamental questions within this research. These questions are (1) What are the practitioner views on the value of CHISs and how it can be measured? (2) What are practitioner views on the nature and development of a template for measurement? (3) Using the template, how can the value of CHIS be measured? Harfield (2009), identified the same drivers for the use of CHISs as the practitioners within this study. Practitioners suggested that CHISs are a valuable tool to policing because they have an access into criminality, they are aware of the future intentions of criminals, and have access to crucial information. Furthermore, through the use of CHISs, many outcomes can be achieved. Nonetheless, a variety of resources goes into the handling of a CHIS. This research considers three fundamental costs suggested by Stockdale et al. (1999), including employee costs, and running costs.

This research contributes to the existing knowledge of CHISs and has established the template which may be utilised for data collection to discover the CHIS value. The final chapter concludes the thesis and makes recommendations regarding the template and further research.

Chapter 1 – Literature Review

2.0 Introduction

Covert policing was a mystery for anyone not involved directly with covert methods. Historically, the police have been reluctant to discuss covert techniques such as the use of CHISs (Billingsley, 2001). Such reluctance is due to the secret and sensitive nature of this policing strategy. Nonetheless, CHISs have been used throughout the history of policing. Prior to the development of technology, the use of CHISs was almost the only method for gathering information (Marx, 1992). Although there have been developments within criminal investigation and policing (including the establishment of the 'new police'), CHISs are still believed to be one of the most efficient policing methods (Audit Commission, 1993; Billingsley, 2009). Through the use of CHISs many successful outcomes can be achieved including the detection and the prevention of crime (Billingsley et al., 2009). However, investigators may see success in different ways. Brookman and Innes (2013) established four different types of success that homicide detectives see within criminal investigations. The four types include the outcome of the case, procedural success, the reduction of community impact, and the prevention of crime. This chapter explores the historic use of CHISs, developments within policing and criminal investigations, the nature of CHISs and the issues which arise with the use of CHISs.

2.1 Selective history of policing

There is no overall agreement on the reasons for developments of the police service (Rowe, 2014). Before the establishment of the 'new police', the old policing system was based on Bow Street Runners, parishes and watchmen. Few records survived about the Bow Street Runners. During the Gordon Riots in 1780, the Bow Street Magistrates' Office was set on fire, consequently losing all records up to that date. The rest of the records were destroyed in 1839 when Bow Street Runners were disband (Cowley, 2011). Historical accounts of the development of the British police can mostly be found in the memoirs of former Chief Constables, and senior politicians (Emsley, 1996). Those with traditional, orthodox, views, see the development of the police as a crucial stage in the evolution of policing (Lee, 1901; Reith 1948). Some simply argued that the Bow Street Runners were 'rogue' and had no proper authority, favouring arguments for the establishment of the 'new' professional police. This traditional view is fundamentally based upon deep conservative assumptions. The conservatives, including Sir Robert Peel, established professional policing as a response to

rising crime threats which threatened to impact civilised existence and social order (Reiner, 2010). Many opposed the establishment of the 'new police' as the policy surrounding policing was vague and difficult to understand. Although the Bow Street Runners had been doing their best, street crime was rising (Cowley, 2011). Therefore, a professional law enforcement institution was a rational response to changing social circumstances as described in traditional accounts (Rowe, 2014). That said, between the establishment of the new police in 1829 and elimination of the Bow Street Runners in 1839, citizens preferred to employ the Bow Street Runners instead of police constables (Goddard, 1956). This may have been due to the lack of trust in the new police.

After the establishment of the 'new' professional police, other counties were likewise encouraged to establish police services on the same principles as the Metropolitan police. Furthermore, one of the last Bow Street Runners, Henry Goddard, was appointed as Chief Constable for the Northampton police force (Goddard, 1956). This is significant as it shows that the Bow Street Runners were not viewed with suspicion and disrespect, because Goddard would not otherwise have been given this post. This may mean that the public viewed the 'new' police as if it was established to control them. Revisionists believe that the 'new police' was established to control the working class and protect the interests of the ruling class (Reiner, 2010; Newburn, 2017). In addition, one sixth of the original 3,000 recruits left four years after the establishment of the Metropolitan Police (Reiner, 2000; Critchley, 1978). This was because of inefficiency and indiscipline in the early stages of professional police development (Bailey, 1981).

However, after the fatal stabbing of a police officer in 1833 at the Cold Bath Fields in Clerkenwell, London during the meeting organised by the National Political Union (NPU), the public began to favour the new organised police. Although many have argued that riots and opposition had continued for some time, they had decreased by the end of the1830s (Storch, 1975; Cohen, 1979; Brogden, 1982). In fact, Palmer (1988) argues that the 'new police' were accepted by the mid-1830s.

Nonetheless, new policing has features of 'old policing' in its methodologies. For instance, public engagement in police work and involvement of other agencies were core features of 'old policing' (Myhill, 2006). These methodologies includes the use of CHISs.

2.2 Developments within criminal investigation and investigative methods in England and Wales

Unlike mainstream policing, criminal investigation has seen a slow development. Morris (2006) argues that criminal investigation developed over four main timelines: the heroic period (1829-78), organisational specialization (1878-1932), central leadership (1933-80), and central initiative and control (1981 to present day). Although the establishment of the 'new' police took place in 1829, some investigative functions were carried out still by the small amount of Bow Street Runners away from the Bow Street itself. After the elimination of Bow Street Runners in 1839, the new policing system did not introduce investigative practice straight away. Investigations during the heroic timeline were mainly relying on the fact that members of community knew each other which seem to make investigation easier at the time (Phillips, 1977). Furthermore, there is evidence of some informal investigative work where commissioners deployed officers to look at specific cases. The murders of Lord Russell in 1840 and Good in 1842 brought a lot of negative media attention, the preventative purpose of the police in these murders would not bring justice, thus commissioners in 1842 recommended to the Home Office to establish an official detective department (Stelfox, 2009; Tong, 2009). Home Secretary criticised the work of Bow Street Runners arguing that their methods were wrong as they included the communication with the criminals or their associates who would give them information that led to the detections which would otherwise not take place. Due to the Fenian Clerkenwell explosion, Departmental Committee recommended to attach investigative department to each Metropolitan Police division (Morris, 2006; Stelfox, 2009).

Despite the developments within criminal investigations, CHISs were and still are used for policing purposes. Police services are always looking for new effective policing methods. Despite this, CHISs are one of the best methods to obtain intelligence even in the 21st century. During the heroic period of criminal investigation (Morris, 2006) there was no formal training. Informal apprenticeships were seen as the only way to gain knowledge and experience needed to become an investigator. However, many of these issues were brought up in the Turf Fraud trials (Morse, 1877). During this trial many senior detectives were convicted of corruption.

During the organisational specialisation period, criminal investigation departments developed expertise by responding to various problems within the community. An example of development is the Special Branch from 1881 to 1883 and the practical assistance from surgeons within investigative practice whose original role was to look after the welfare of officers. Professional developments took place not only within organisational area, but further developments were also seen in forensic resources. Despite the developments, the police were ineffective during the Ripper murders in 1888. The Desborough Committee (1920) argued that

detective work did not need any specialist training as experience would fulfil the requirement for the job role (Tong & O'Neill, 2019). Investigators within the new policing system did not have any help in the developments of their techniques as national guidelines relating to criminal investigation did not exist at the time. The first handbook for investigators was translated from German to English in 1906 in the hope to help develop criminal investigation within Metropolitan Police (Stelfox, 2009; Adam and Adam, 1906; Adam, 2015).

The present timeline, central initiative and control, includes the rise in crime and social change overall. The Association of Chief Police Officers (ACPO) developed communications between the police and the public. Moving from 125 forces in the 1960s to 43 forces, reduced the inefficiencies posed by small forces in investigative practice. However, investigations were still relying on confessions which led to many miscarriages of justice. Due to the high number of miscarriages of justice, the Fisher Inquiry (1977) provided recommendations for the reform. These recommendations were considered by the Royal Commission (1981) who, consequently, introduced PACE (1984). Sir Phillips (1981) suggested that the Royal Commission highlighted the fact that most offenders were detected through interrogation following the interview of someone else arrested for a different offence rather than due to the 'skilful' detective practice (Phillips, 1981; Morris, 2006). Police and Criminal Evidence Act 1984 was established to clarify investigative powers and procedures for professional standards for investigators, and to enshrine rights of citizens suspected of crime into statutory form. Sanders and Young (2012) argue that the Act did not improve criminal investigations, specifically regarding the questioning of suspects. In addition, the police were faced with allegations of unprofessional conduct. Undercover operations conducted by the Metropolitan Police through Special Demonstration Squad and National Public Intelligence Unit may have consisted of unprofessional police conduct regarding overall practice and necessity of their actions (Griffin, 2020).

2.3 The perspectives of investigative success

Investigators vary in their perceptions of success. Therefore, to establish the value of a policing strategy, all perceptions of success within criminal investigation must be explored. Success may determine whether a certain action or evidence was effective or not, in other words it will help to determine the value. Historically, whether an investigation was successful or not would be determined on whether a suspect was charged with a crime (Brookman and Innes, 2013). This perspective of success within criminal investigation could be flawed by human errors such

as the false accusations and the prejudice leading to miscarriages of justice. The consequences of human errors could be clearly seen in the cases of Menson v UK, the Stephen Lawrence Inquiry and the Damilola Taylor Inquiry (Bridges et al., 1999; Sentamu et. al., 2002). Brookman and Innes (2013) identified four main perceptions of success that homicide detectives believe in. In their opinion success could be found within the outcome, procedure, the reduction of community impact, and in the prevention of crime. Some perspectives of success could also interlink. For example, due to the time restraints and pressure during criminal investigations, one could focus on procedural success as if the procedure is followed correctly the conviction is also more likely to be successful (Eck, 1992). The major factor whether the investigation will be successful or not could be determined by how detailed information provided by a CHIS is (Greenwood et al., 1977; Reiner, 1992). It is difficult to measure the success due to the different types and variety of investigative methods included in each investigation. Maguire (2008) argued that the prevention of crime, cannot be measured due to the absence of crime itself. However, by observing the intelligence supplied and the contribution it had to prevention of crime will allow to see overall intelligence picture.

2.4 Selective history of the use of CHISs as intelligence sources in England and Wales

Before technological advancements, human intelligence (HUMINT) was almost the only version of intelligence collection (Marx, 1992). Prior to the nineteenth century development of professional police services and intelligence agencies, authorities were limited in being able to obtain information about illegal activities. Thus, CHISs became the eyes and the ears for powerful individuals. For example, in Ancient Rome, CHISs were known as '*delatores*' which meant individuals who had been gathered to collect information. Their testimonies proved to be crucial in treason trials during the time of Caesar Augustus, Rome's first emperor (Sheldon, 2005; Routledge, 2001).

Even centuries later, in England the judicial system relied heavily upon CHISs for their effectiveness in bringing criminals to justice. Individuals who participated in crime but also assisted prosecutions received a pardon, exempting them from any further consequences **(**Bloom, 2002). However, on occasion false information provided did lead to execution. During the time of Elizabeth I, informing was associated with many problems and individuals who were informing were referred to as troublesome who only informed on individuals due to hatred and spite (Coke, 1797). In 1576, legislation was enacted which included the need for licensing of those who informed, and harsher punishment for those individuals who made false

accusations (Dean, 2002). During the reign of Elizabeth I, the public were divided in their religious views consequently dividing the nation. This led to the deployment of CHISs into the Catholic community. One of the CHISs was Anthony Tyrrell who was in fact a Catholic priest. During his third visit to jail, he asked to become a CHIS. The authorities have accepted, thus he begun to supply information about his associates while still in prison. Tyrrell gathered information through the conversations with Catholic prisoners (Holmes, 2004).

Oliver Cromwell increased the use of CHISs for the purposes of political policing in the time of republicanism. This was because it was difficult to keep track of radicals. Thus, Cromwell's government focused on gathering intelligence by expanding resources on CHISs. This included their own agents and those who were either recruited or volunteered (Stove, 2003; Arpin, 2006; Haynes, 2002). Although it proved to be a successful tool for intelligence gathering, there was seemingly a negative pattern to CHISs. Most approached informing as a means for revenge against their enemies, and some actively worked as provocateurs (Greaves, 1992). There was no clear system nor procedures in place to manage and regulate CHISs. In 1817, CHISs were exposed and criticised for acting as agent provocateurs against the Chartist movement. This arguably began the continued negative perception of the use of CHISs in Great Britain (Donnelly, 1951; Elton, 1954). Furthermore, some criminals simply exploited the unregulated system, without necessarily providing any benefit to policing. For example, Jonathan Wild had ruled London's underworld from around 1710s until his execution in May 1725. He exploited the system of 'informing' to his advantage. If he disliked someone or they asked for a large amount of money for the information, he would simply inform the authorities of those individuals and their involvement in crimes. This way, Wild gained profit from the organised robberies and from the reward given by the authorities for the information he supplied (Johnson, 1734).

Despite the negative perceptions of the use of CHISs, the British government through the Home Office regularly employed CHISs in the late eighteenth and early nineteenth centuries specifically targeting selected political subjects. These CHISs gathered intelligence on those who were involved in the 1780 anti-Catholic Gordon Riots, those who attacked factories and machinery between 1811 and 1817, but not limited to those who were involved with the London Corresponding Society (LCS) (Emsley, 1979). An example of a CHIS who was employed by the government was George Lyman. He was a member of LCS. Every report he prepared for the LCS he replicated and sent an extra copy to the government (Reynolds, 1998). Furthermore, the Bow Street Runners apprehended the Cato Street Conspirators in 1820

through the use of a CHIS. The Cato Street Conspirators were attempting to kill the British cabinet members alongside with the Prime Minister. In this instance, a CHIS helped to prevent a horrific event which would have taken place if not for the intelligence provided (Brain, 2021).

After the development of the 'new police,' many reforms followed regarding policing in England and Wales. Within the reforms the failures of the French police were considered, as Vidocq's plain clothed brigade were considered to be spying on French citizens (Edwards, 1977). This caused fear in England. The public feared that the 'new' police would be spying. Therefore, a portion of the reforms in Britain were focused on embracing police uniforms in the hope of reassuring the public that police officers were not working as spies **(**Reynolds, 1998).

2.5 The nature of CHISs

In 1994, the ACPO stated a broad definition of a CHIS as an individual who provided information on the criminality or offenders. This information may be given freely for a financial gain or other advantage (Dunnighan and Norris, 1996). Greer's (1995) sociological model identifies an informant as a source of intelligence. The model includes four different types of informants: outside single event informant (witness of a singular event), outside multiple event informant (a witness who tends to see and supply information on multiple crimes), inside single event informant (one of the accomplices who gives information only to help themselves out at the time), and inside multiple event informant (regular informers who are registered with the police as Covert Human Intelligence Sources and now known as CHISs). There is, however, a clear distinction between the "informant" and the "informer". Victims, witnesses, and complainants are usually referred to as informants, whereas a informer is someone who is closely connected to the criminal, meaning either participating in crime themselves or the least associating with the criminal (Harney and Cross, 1968; Rapp, 1989). Throughout policing history and even in modern society, many refer to CHISs with pejorative terms such as 'snitch', 'rat', 'grass', 'tout' and so on, relating a CHIS work to negative activity (Greer, 1995). Even when the police tried to encourage people to supply information, they used negative associations connected to betrayal to do so, 'Rat on a Rat' (BBC, 2004). However, in recent years police services and intelligence agencies apply more neutral or positive labels to CHISs. These include Covert Human Intelligence Source, asset, source, and human source. Nonetheless, CHISs were, and still are, regularly employed by the police and intelligence

agencies. Therefore, there is a clear need to explore practitioners' views on the value of CHISs and successful results that may be achieved through the use of CHIS.

Billingsley (2009) suggested that previously officers used CHISs to enhance their careers and reputation. Regrettably corruption in this area has repeatedly emerged as a theme throughout the history of policing. This raised questions about the professionalism of all investigators (Cowley, 2011; Johnson, 1734). However, good relationship between a CHIS and a handler must be established in order to obtain valuable information (Nunan et al., 2020). The relationship can be both built or lost (Walsh and Bull, 2012). Only in the late 1960s, the Home Office set guidelines on the use of CHISs to minimise police corruption and improper use of CHISs while emphasising the importance of CHIS to policing (Billingsley et al., 2001). In modern police service, the role of handlers is usually fulfilled with experienced Detective Constables who have undergone specialist training (Bryant and Bryant, 2018). Specialists must comply with RIPA 2000. This legislation covers legitimacy of the use of CHISs reducing the risk of unethical conduct and corruption. The Act highlights throughout the need for proportionality and necessity, specifically in relation to Article 8 of Human Rights Act 1998 – the right to private life. However, not all aspects of CHIS handling can be supervised. For example, the relationship cannot be fully monitored, yet it is fundamentally important to the information elicitation from CHISs (Russano et al., 2014; Semel, 2012). Furthermore, some suggest that a good relationship and intelligence gathering approach under PEACE, which is underpinned by Police and Criminal Evidence Act (PACE) 1984, assists with securing disclosure from offenders who provide vital information in relation to emerging threats and disruption of terrorist planning (Clarke and Milne, 2001; Clarke and Milne, 2016; Moston and Engelberg, 2011; Goodman-Delahunty et al., 2014). Nonetheless, it is almost impossible to establish who is in control within the relationship between a CHIS and a handler (Hewitt, 2010). Some historic cases do provide examples of when a CHIS and a handler's role have switched (Clark, 2001). Nonetheless, CHIS are considered efficient and therefore must be professionally handled (Audit Commission, 1993; HMICFRS, 1999; Crous, 2009, Billingsley, 2009).

CHISs help to obtain intelligence on relevant groups within a society, agencies simply cannot be diverse enough to have expertise in all languages, religion and cultures. Specifically, with the rise of terrorism investigations, UK intelligence agencies need to obtain intelligence on surrounding ideologies and groups that may be involved. Furthermore, many individuals involved in crime or radical activities do not use electronic means of communications such as

phone or email, they prefer to use other means of communications which the authorities cannot monitor (Hewitt, 2010). A CHIS is more difficult to avoid as it may come in the form of a friend or a family member. However, it is still possible to counteract surveillance conducted by a CHIS simply by limiting the circle of knowledge.

The existence of CHISs has a similar deterrent effect as CCTV cameras. In fact, a covert audio recording device can be placed to wait for the crucial information which might never be mentioned, yet a CHIS is able to ask direct questions and for any details in the right circumstances. In 1791, social theorist Jeremy Bentham, came up with the idea of a prison structure placing cells around the large tower, this tower would allow only few officers to observe all prisoners without prisoners' knowledge of whether they are being observed or not (Marx, 1992). Foucault has expanded the theoretical model in which the tower represented policing agency and prisoners represented the wider population. This mainly applied to general surveillance through technology such as CCTVs, however it may be applied to the use of CHISs and infiltration into targeted groups (Mathiesen, 1997). Therefore, one of the key aspects of why CHISs are used is deterrence. Simple knowledge of the possible infiltrator within the group shapes human behaviour. CHISs are a potential weapon for damaging the interests of targeted groups by creating suspicion and paranoia (Marx, 1974). For example, British intelligence agencies recruited CHISs who were members of Irish Republican Army (IRA), as a result IRA became paranoid and have killed more of their own members than the police or intelligence agencies did in the same period. Although some of the recruitment methods were based upon coercion of IRA members who were in police custody. British intelligence agencies threatened IRA members in custody by stating the fact that if they do not cooperate, they will release a rumour as though they did aid, seeking to place them in as the targets for revenge (Urban, 1992).

Furthermore, the impact posed by a CHIS goes beyond the deterrence, paranoia, control and sabotage. CHISs can become provocateurs. On behalf of the intelligence agencies and the police, CHISs are able to discredit a movement or organised plans. This method moves policing from being reactive to proactive. However, it is not clear how one may measure the absence of crime and whether a crime had been prevented or disrupted due to the measures put in place or for any other reasons. This method highly relies upon great intelligence and therefore may be measured accordingly. However, CHISs must not provoke any illegal activity that would not take place otherwise (Hewitt, 2010).

It is clear why intelligence agencies and the police may favour the use of CHISs. Yet, the deployment of CHISs involves finding individuals who are willing to cooperate or who can be convinced by handlers to cooperate. In the past several practices of employing CHIS were questioned. In 1995, Delroy Denton, whilst registered for the Metropolitan Police as a CHIS, raped and murdered Marcia Lawes (Newburn, 2012, pp.432; R v Denton [2002]). Hoddinott conducted an inquiry into the management of CHIS by the Metropolitan Police due to the complaint the police received. The report highlighted several instances when officers broke the law whilst dealing with CHISs. Hoddinott stated that detectives broke the law when they had allowed two violent individuals, Delroy Denton and Eaton Green, to stay in England to use them for intelligence purposes. This forced chief officers to rewrite the procedures for handling CHIS's. The motivation of CHISs to assist the police or intelligence agencies vary greatly. It depends upon who is recruiting, CHIS's personal circumstances, and the time when a CHIS is recruited. The motivation of a CHIS can also be socially constructed through relationship between handler and CHIS (Dunnighan and Norris, 1996). Even though there are so many negative associations with the role of a CHIS, some individuals may assist the police simply for money. It is clear that the police and intelligence agencies are ready to pay for the intelligence provided. A study in 1996, found that CHIS payments normally were around £100 per piece of information received (Dunnighan and Norris, 1996). However, not all are motivated by money. There are a number motivations CHISs which include: financial reward, the fear motive, revenge motive, perverse motive, the detective complex, desire to reform, mercenary motives, appreciation to the police or prosecutor, and many more (Hewitt, 2010). Furthermore, potential CHIS must have certain skills as well as those who are recruiting the CHIS. Suitable CHISs must be able to comply with confidentiality, prepared for the risk of exposure, and pressure that is generated by the dishonesty. These attributes do impact CHIS's work, yet they must be resilient to fulfil the role. To recruit suitable and valuable sources, handlers must have characteristics involving patience, knowledge of human psychology, flexibility, and commitment (Hewitt, 2010). No matter the motivation, there is always a risk of a handler being intentionally or unintentionally misled by their CHISs.

2.6 Problems with the use of CHISs

Many claims were raised by the public over unprofessional practice of CHISs, mainly targeting undercover officers. Troubling mass protests during the 1960s in London forced Chief Officers to avoid over policing and under policing the streets as both would further increase public disorder. The world was shaken by the Vietnam War, the assassinations of US President John

Kennedy and Martin Luther King, and the ongoing civil rights protests around the world. England itself was affected by these events causing national concern and public disorder. Intelligence was and still is vital for the police. By infiltrating as ordinary citizens police officers have access to vital information by attending activists' meetings and establishing relationships within the group. Ex undercover officer, Peter Francis (2020), highlighted a few aspects which included unethical practice of undercover policing after retirement as SDS officer. Public concerns over their freedom and privacy lead to the establishment of Undercover Policing Inquiry. The inquiry investigated actions undertaken by SDS and NPIOU focusing mainly on authorisation, operations and accountability. There are serious doubts as to whether the actions should be reviewed through modern practices. There was no statutory procedure for the authorisation of all undercover activity nor the appropriate training for the Chief Officers and operatives themselves at the time. Perhaps the change between the Labour Party and the Conservative Party during the first years of SDS were not helpful in keeping the clear goals for the Special Demonstration Squad and guidelines to follow because of the near opposite ideologies of the parties. Nevertheless, the two most troubling issues explored by the inquiry were the involvement of officers in sexual relationships in which some of them fathered children, as well as the use of deceased children's identities for covert names (Evans, 2020; Patel, 2021). These actions are unethical and raise moral dilemmas. It is important to ensure the professional behaviour by the officers at all times; however, it is also as important to mention that these actions could possibly save undercover officers lives. Restricting officers to certain conduct will potentially expose CHISs and undercover operatives.

To ensure fair judicial process, clear guidance on the handling of CHISs and evidence must be clearly explained within statutory and regulations (Billingsley, 2009). RIPA s27(1) provided immunity for authorised actions to officers and CHISs. In fact, this section primarily focused on statutory regulation rather than on immunity itself (Whitaker, 2001). It ensured that all actions undertaken by CHISs were authorised (legal) and the safety of CHISs secured. Some may see a loophole within this Act as it allows CHISs to encourage others to undertake criminal activities that would otherwise not be committed. Three decades before the establishment of RIPA, Lord CJ Parker stated that CHISs must be protected, yet CHISs must not entrap anyone into criminal activity (Birtles, 1969). To elaborate, RIPA does not fully provide CHISs with blanket immunity. The defence of entrapment does not exist within British law, yet it is considered an abuse of process of the court for law enforcement officers to entrap an individual into committing an offence which would otherwise would not be committed. Whether the use

of CHISs is ethical or not is not clear. CHISs and handlers put themselves at risk of physical and mental harm. Two major stressors, not to be discovered and the importance of gathering information, always need to be balanced. This limits the freedom of investigation in the legal and operational terms (Nincic, 2015). Immediate social networks must be available for CHISs during investigations to reduce high-level of stress. This brings up many ethical issues, specifically about the safety of those involved. Furthermore, CHIS's work come from manipulation of relationships which in itself is undesirable and therefore ethically wrong, however it is done for the purposes of preventing crime and safeguarding the public which is an honourable action. The authorities understood the difficulty in examining ethics within covert methods and ensured the evidence would be excluded from the trial if it intervenes with the fairness of the trial. The evidence provided through these actions may be excluded under s78 of Police and Criminal Evidence Act 1984 in the interest of justice or under common law discretion preserved by s82(3) of PACE. Not all information provided by the CHIS will be seen as legal and therefore will not be used at the trial (Loosely, 2001). Cases based of only CHIS information would most likely collapse. After all, everyone is entitled to a fair trial under Article 6 of Human Rights Act 1998.

Historically, investigators kept their CHISs confidential as they helped them to enhance their careers and reputations (Harfield, 2006). For example, the case of Turf Fraud involved detectives who had cooperated with criminals in close conspiracy (Morse, 1877). The corruption of high ranked detectives spread the concerns around the public and created further distrust. The Turf Fraud trials resulted in a complete reorganisation of detectives within the MPS and the creation of the Criminal Investigation Department (CID). Unprofessional use of CHISs creates concerns about ethics, integrity, the professionalism of the police leading to consequences involving criminal corruption within public authorities, acquittals, and major system restructuring (Billingsley, 2004; Hirsch, 2002; Butterfield, 2003). Handlers must ensure that their CHISs are safe and healthy. A number of cases took place where officers have exposed their CHISs, consequently jeopardising their lives. In Swinney v Chief Constable Northumbria (1996), officers left a document containing CHIS's identity within the police vehicle. The documents were stolen, leading to the exposure of Swinney and her family to threats of violence and arson attacks. RIPA 2000 stresses the duty of care towards the CHISs.

Historic literature emphasises on the substantial number of miscarriages of justice which took place as a result of unprofessional relationships between investigators and CHISs during the last quarter of the 20th century (Lark, 2001; Billingsley, 2004). The drive towards

professionalism and accountability was driven by the Conservative and Labour governments during the 1980s and 1990s (Reiner and Spencer, 1993). The management of CHIS handlers and CHISs themselves became one of the priorities to improve within investigative practice (Audit Commission, 1993).

The handling system was very fragile and could be easily abused through unprofessional relationship between a handler and a CHIS. Over time, incidents were considered to be individual failings rather than systemic due to unwillingness to address a more deep-rooted issue (Billingsley, 2004). Good rapport and management is important when handling a CHIS, because in worse case scenarios CHISs might gain control over the handler. It is difficult to establish who controls who as two opposing forces want something from each other. It was suggested that the criminal underworld closely mirrored police practices such as the protection of CHISs, recruitment, and rewards (Clark, 2001). This makes it difficult to gain a trustworthy CHIS and makes it difficult to spot those who abuse the handling system. More often investigators are the customers who seek to buy the information from CHISs rather than the other way around. The police have a responsibility to prove their effectiveness and accountability to the public and the government, whereas criminals do not have that pressure. This gives a certain level of control to CHISs over law enforcement agencies (Billingsley, 2003). The only way to ensure the agreement is met by both parties is to closely manage and monitor the CHIS and ensure no laws have been broken. In addition, to improve the control over CHISs their motives must be understood (Brown, 1985). Previous cases where CHISs were brought to the United Kingdom for various reasons, yet they continue to commit crime within the UK despite the agreement (Williamson and Bagshaw, 2001; Harfield, 2019). The benefit and performance cannot be established with poor management and poor handling system. Both motives and agreements must be clear (Ericson, 1993).

The assessments conducted by officers, which are then submitted to Authorising Officers for authorisations may not sufficiently explain how recent and reliable the intelligence is. Assessments may fail to address aspects of the proportionality argument in the way set out in the Codes of Practice. The proportionality test within the Codes of Practice states that prior to the use of CHIS alternative lines of enquiry must be considered and that the activity by the CHIS intends to prevent more serious criminality; the criminality proposed must be outweighed by the benefit to the public interest (Home Office, 2021). Some reviews received by authorising officers (which are meant to be an overall update of developments), tend to be repetitive and sometimes overused entries on the issue of collateral intrusion. How the CHIS are debriefed

and rewarded is not discussed in sufficient detail to allow the AO to be satisfied with the arrangements for managing the CHIS. For OSC, the area which causes greatest concern is the use of CHIS. The management of CHIS and the measurement of their efficiency is complex (Office of Surveillance Commissioner: Annual Report, 2017). Officers must consider their safety and welfare as well as intelligence products they produce.

The use of covert techniques by the police can potentially impact the legitimacy of the police and the criminal justice system (Innes, 2000). Concerns about the legitimacy of police conduct with the use of CHIS surfaced when it became apparent that a substantial number of CHISs were involved in serious crime themselves, yet the police were still willing to follow up on the information received from them (Manning, 1980; Collison, 1995). Moreover, Innes (2000) suggested that one major problem may become apparent if the police increase their use of CHISs. The police service may end up paying for all information they obtain from the public as well as CHIS (Hewitt, 2010). All persons have different motivation as to why they are supplying information to the police. This often makes it difficult to evaluate the information received accurately (Innes, 2000). The police must consider their legitimacy as it will reflect upon their effectiveness and efficiency and influence the willingness of the public to co-operate with the police and obey the law (HMICFRS, 2017). Nonetheless, the information supplied by CHIS is crucial for policing activities and informative decision-making (Crous, 2009).

Currently, handlers must examine their CHISs, and intelligence obtained , using a 3 x 5 x 2 grading system (College of Policing, 2022b). This allows for standardised grading of all pieces of intelligence (Data and Intelligence Services, 2021; College of Policing, 2022b). This method of assessing CHISs and intelligence obtained from them is subjective and broad, and by its very nature is not specific enough to allow for a nuanced consideration of CHIS value. It does not consider outcomes or cost, as a more specific objective measure could. Thus, objective calculations of CHIS value may provide a clearer understanding of the value a CHIS brings to the police service. To obtain data for objective analyses, a template must be established which may be applied to all CHISs reflecting upon the intelligence, outcomes achieved and costs incurred.

2.7 Summary

CHISs seems to appear only in the negative light as an immoral police method, specifically when discussing the cases of Johnathan Wild or the Turf Fraud Scandal. Moreover, the Hoddinott Inquiry highlights two CHISs the police employed overlooking their previous

criminality and hiding the crimes they committed whilst being registered CHISs. Academics and historians looked mainly on the negative features of CHIS use yet did not mention how valuable CHISs are to policing. However, they were and still are used for policing purposes on daily bases. It is clear that little research was done to suggest the perceptions of value that CHISs bring to policing, nor is there much research to suggest how the value of Covert Human Intelligence can be measured. The lack of research suggests that further research must be done to understand the value of CHISs and how it may be measured. This area of policing is very sensitive due to many risks and harm posed to stuff and civilians involved. Some literature indicates that CHISs are cost effective and must be used more often. However, there is no objective measure in place to find out whether CHISs are effective or not. This suggests a number of broad research questions:

- What are the practitioner views on the value of CHISs and how it can be measured?
- What are practitioner views on the nature and development of a template for measurement?
- Using the template, how can the value of CHIS be measured?

Chapter 2 - Methodology

3.0 Introduction

Philosophical perceptions on a reality of the world influence the choices made within the research (Jackson, 2013). Philosophical perspective is split into two metaphysics, the ontology and epistemology (Chia, 2002). Ontology focuses on the nature of being, whereas epistemology is the theory of knowledge (Bracken, 2010). Researchers should consistently reflect upon their philosophical perceptions and theoretical framework to evaluate their decisions and actions within the research process. This research employed a Human Source Management (HSM) framework through a post-positivist perspective, focusing on the enhancement of professional practice in CHIS management. Post-positivists perceive the reality as singular entity, yet it is perceived differently by each individual due to human inferences (Fox, 2008). From the review of the literature, three questions were identified: (1) What are the practitioner views on the value of CHISs and how it can be measured? (2) What are practitioner views on the nature and development of a template for measurement? (3) Using the template, how can the value of CHIS be measured? The research consisted of three stages. The first two stages focused on gathering data through semi-structured interviews. The qualitative approach attained practitioners' views on the value of CHISs and experiences with successful achievements using CHISs. Through thematic analyses the template was created to allow relevant data to be gathered for analyses of CHIS efficiency. Within the final stage of this study the template was utilised, and analyses were conducted using an efficiency-based equation. The analyses primarily focused on the Control Strategy and whether, within a three-month period, CHISs supplied valuable information. Nonetheless, this research has its limitations, and the template may be improved further.

3.1 Philosophical and theoretical perspectives

To understand the research and the choices behind it, the nature of reality from the viewpoint of the researcher must be explored thoroughly. Different perspectives involve similar views into a few different categories depending upon what can be known about the reality and how the knowledge could be gained. Such perspectives are the features of paradigms. A research paradigm is a type of approach to conduct research that was verified by the research community. It is a theoretical framework with assumptions about ontology, epistemology, methodology and methods. The main differences between the paradigms are not the preferred data but rather the views and assumptions behind them (Valsiner, 2000). The number of paradigms and views of reality varies from author to author, yet there are paradigms that are

generally accepted by all: post-positivism, critical theory and interpretivism (Cupchik, 2001; Smith, 1989). These three paradigms seem to be the most active within social sciences, yet they are fundamentally different according to their: view of reality, reasons for conducting the research, views on types of methods, types of data being valuable, and views about relationship between research and practice. All features of the paradigm are fundamentally important. Behind each one of them lies the philosophy of science which is reasoning the nature of truth (ontology) and what it means to know (epistemology). An individual could reach the nature of truth either by truth of reasoning or truth of fact as explored by Gottfried Leibniz (1646-1716) (Kreiling, 1968). Everything in the universe is connected including the functions of society and human behaviour. This connection allows an individual to find the nature of truth behind anything through simple reasoning. However, humankind can only grasp a small amount of such truths as human reasoning is troubled by questions it cannot dismiss yet also cannot answer. Therefore, an individual must also learn through the truths of fact, meaning through experience. Therefore, as idealist Immanuel Kant (1724-1804) argued both reason and experience are crucial for the understanding of the world around us (Neiman, 1994). Therefore, it is important to mention that the researcher does not have experience in handling CHISs or intelligence gathering for policing purposes.

Ontology and epistemology are two major parts of philosophy, called metaphysics. Metaphysics are purely focusing on two fundamental questions, what is reality (ontological question) and how can we know the things that exist (epistemological question). The answers to these two questions create a belief which then reflects on what is real and what cannot be real; what can be learned and how this knowledge may be acquired (Graig, 1998). This research is based on the belief that everyone perceives the world differently through their own experiences, meanings and values. Many internal and external factors influence the view of reality, these factors include social relationships, social class, gender and so on. This places the research as though there is one singular reality that applies to all, yet people perceive it differently. The understanding of reality is imperfect due to human conjectures and external influences. As a result, this research is based upon a post-positivist perspective. Post-positivists believe that the aim of the inquiry must be to obtain an answer as close as possible to the truth keeping in mind all possible biases and values which may influence the research. Post-positivism came after positivism, it is a philosophical perspective which arose in the second half of the 20th century which covers an understanding that reality itself can be objectively observed and recorded resulting in understanding of that reality (Fox, 2008). Post-positivism

did not fully reject positivism but has modified it. Positivism was based upon naïve realism which did not cover all the aspects of human conjectures and biases that may influence research and observation. Post-positivists took a more critical realist approach to research and understanding of the reality around them considering that their perceptions, observations and analyses may be flawed (Fox, 2008). It is clear that the only thing that stays the same is change and everything else is evolving in itself. Therefore, any type of research conducted at the time is close to its truth yet in the future will most like be falsified through further investigation.

The professional management of CHIS is important. Although current practice post RIPA 2000 have moved closer to classic HSM practice, there is a clear need to develop professional practices further to enhance the HSM framework (Crous, 2009; Cooper and Murphy, 1997). The HSM framework focuses on the development of formal professional practices to enhance and modernise the management of CHIS (Crous, 2009). By implementing practices surrounding this framework the police could enhance the knowledge of criminal environment and contribute to intelligence-driven strategy across the organisation (Crous, 2009). Traditionally, CHIS were used as an investigative method directed at specific crimes. Therefore, it may be difficult to implement new practices in line with HSM. The development of practices under HSM implies the need for deployment of sources against the priority targets. The most substantial development in modern HSM practice is formal tasking and directing of CHIS (Innes, 2000). There are several advantages to the development of professional HSM practices. The advantages include, but not limited to, an increased intelligence at all levels of policing which contributes to the decision-making and an effective use of resources according to the Control Strategies and the level of risks within the communities (Crous, 2009). The measurement of value is linked to important aspects of HSM practice. This research aims to contribute to existing professional HSM practices.

3.2 Methods

Research can be divided into two categories, qualitative and quantitative. Qualitative research is more in-depth, mainly described as interpretative, critical or postmodern research (Creswell and Poth, 2016). In contrast, quantitative research is broad and involves large sampling. It focuses on obtaining one truth which is primarily an empirical, positivist and postpositivist approach (Henrickson and McKelvey, 2002). However, it does not mean that certain paradigms use only specific methods to collect specific data. Some research may require the use of mixed methods (Tashakkori and Teddlie, 1998). The Mixed method approach involves combining qualitative and quantitative methods. This approach enables the research to become in-depth

and improves the validity and reliability (Abowitz and Toole, 2010; Flick, 2002; Creswell, 1999; Greene et al., 1989; Johnson et al., 2007). Therefore, this research was based upon consequential mixed method approach.

The aims of this project were to establish the value of CHISs and to create a template of how value of CHISs can be measured. The research is split into three stages. The first two stages of this research focuses on practitioners' views on the value of CHISs and how they felt the value can be measured. Semi-structured interviews allowed a structured yet open conversation between principal researcher and interviewee (Whiting, 2008). The research participants, at the point of this research, were working in the intelligence role either managing CHISs, supervising or managing those that do, and officers who work as analysts for intelligence purposes. Due to high sensitivity and confidentiality of this research, purposeful sampling best fitted the features of this study. During the first stage of this study sixteen practitioners participated within semi-structured interviews. Within the second stage eight of the same group of participants agreed to partake within semi-structured interviews. The final stage included data involving thirty CHISs. Research participants were asked the same open-ended questions, with scope for further questions to consider areas of interest that arose in responses. This allowed some structure to the interview yet not restricting the interview. Using semi-structured interviews this research was able to gather reliable data while also considering structure for the objective purposes. Data analyses of semi-structured interviews from phase one are the bases for the creation of a template in phase two. The second part of this research focused on creation of a template for gathering data. The template was based upon what practitioners felt were the key areas required for measurement. Within the second stage of this study the proposed template was discussed with eight practitioners who had taken part in the first stage of the research. They were able to provide feedback on the template within semi-structured interviews. The questions within the second stage primarily focused on whether the template reflected what was raised by practitioners in phase one, and whether the template needed to be amended in any way. Phase three of this research utilised the template. This last phase focused on the work of CHISs over three-month period.

3.3 Qualitative phase of research: Stage 1 and 2 (semi-structured interviews)

The main aim of interviews for positivists is to generate data which is held independently of both the research settings and the researcher/interviewer. One way of achieving this is through structured interviews. Positivists argue that the lack of structure and flexible conversation will

result in an absence of comparability of one interview with another as well as interviews being time consuming. Selltiz et al. (1964), argues that in order for the interview to be reliable and measurement to be appropriate, interviewers must ask each question as stated and in the same order, interviewers must not show any emotion to the answer given, suggest possible answers or skip questions (Brenner, 1981). This will improve the quality of the research and increase the degree of control over the measurement process. In contrast, interactionists view interviews as essentially about a symbolic interaction – observational encounter. Interactionists tend to reject structured interviews this is because un-structured interviews allow the respondents to use their unique ways of defining the world and it allows respondents to raise important questions. However, open-ended interviews are still in itself a form of social control which shapes what people say. Subsequently, Cicourel (1964) claims that there is no distinction in the practical skills of researchers, interviewers and methodologists with different philosophical perspectives. All are concerned with the 'synchronisation of meaning' and all use rules of evidence, stocks of knowledge, rules of managing one's presence before others, and so on. These shared common rules are accepted in conducting and analysing interviews. Thus, error is not necessarily evidence of poor reliability but of normal interpersonal relations. To increase the reliability of this research and in-depth analyses of the phenomenon in question, semi-structured interviews which were used, increased the control over the process through structured questions while also provided an opportunity for participants to raise other important issues if they wished (Carruthers, 1990).

Construction of interview questions was based on a traditional survey model with adaption of narrative information collection rather than on symbolic interactionist theory. The responsibility of question-and-answer control process is entirely exercised by the researcher (Horton, 2004). Through the construction of questions, the formulation of standardised meanings were established (Kvale and Brinkmann, 2007). In this instance by constructing the question 'what, in your opinion, is the value of CHISs?' the research explored practitioners' views on the value that CHISs bring to policing. Other questions ranged from 'Please, provide three examples of successful use of CHISs, without providing any sensitive information?' to 'How has your interaction changed during COVID?' (see Appendix C). According to interactionists and critical theorists, interviewees are viewed as experiencing subject who actively contrast their social worlds and hence the research must generate data which would give an authentic insight into people's experiences (Fontana and Frey, 2000).

3.4 Pilot Study

To further increase the validity and reliability of the qualitative phase of this research, a short pilot study was conducted involving five serving police officers to ensure the questions were clear and focussed (In, 2017; Zailinawati Abu, 2006). It is important to mention that no data was collected at this stage, the pilot study purely focused at formulating the questions. The aim of the pilot study was to prevent misinterpretation of questions. Even simple words and the smallest changes in the wording may affect the distribution of responses (Belson, 1981). Therefore, the questions were carefully designed, and supplementary questions written to gain further explanation if necessary. For instance, the question 'In what ways it is not possible to measure the value of CHISs?', the supplementary question of 'On which aspects, of Covert Human Intelligence work, it is difficult to put value on?' have been added if further explanation was necessary. Positivists believe that the language used by the interviewer serves primarily as an instrument for communication of social facts. Thus, it was important to ensure all questions were asked the same way and in the similar order within both stages of the study. Furthermore, the pilot study allowed for an average completion time to be calculated, which assisted the recruitment of research participants with a more accurate time scale for completion.

3.5 Qualitative data analyses

The most common method of data analyses within qualitative research is thematic analyses. Thematic analyses fundamentally rely upon themes and patterns observed by the researcher (Hawkings, 2017; Lapadat, 2010). This analytical approach may be used to examine a variety of different forms of data including diaries, historical documents, video files, and interview transcripts (Lapadat, 2010). First two stages within this research were based upon semi-structured interviews and therefore have been analysed through thematic analyses. Interview transcripts within this research were constantly re-read to ensure an in-depth understanding of each interview (Braun and Clarke, 2006). Similar views than were coded which followed by the process of sorting and labelling of data (Reilley, 2009). No software, such as NVivo, have been used within the analyses of qualitative data. All analyses have been conducted manually. Codes were developed through inductive approach. An inductive approach of data analysis involves formulating raw data into a summary, establishing links between findings from the raw data and research objectives, create the basis of the structure involving experiences or processes that are clear within the raw data (Thomas, 2006). It is important to critically analyse the text by re-reading the material and continuously taking notes (Braun and Clarke, 2006). The creation of the template and improvements of it primarily depended upon thorough

analysis of interview transcripts and therefore have been read multiple number of times ensuring the validity of the template.

3.6 Quantitative phase of the research: Stage 3 (Productivity analyses)

Recent policing research is highly focused on evidence-based policing which may explain the significant increase in quantitative studies. It is difficult to reach quantitative conclusions to policing research areas due to varying interpretations, meanings and communications within the policing world. Therefore, the easiest and self-explanatory way to explore the policing world would be through qualitative research. However, there needs to be significant evidence that the certain tactic or approach is valuable and is effective as a policing method. This research was based upon two stages, qualitative research which was the stepping-stone to quantitative research to design a template to then collect data for analysis of CHISs.

The valuation of outputs was one of the main challenges this research overcame. In order to establish the value that CHISs provide the police with, one must look at what area of crime they help to tackle. The information CHISs supply is vital, the information is even more valuable when it contributes to Control Strategy set out which individual police services prioritise. This is because Control Strategy consists of highest threats the community is threatened by. To properly assess the crimes the level of urgency according to level of harm must be explored. Sherman et al. (2016) suggests a methodology of how the seriousness of crime harm may be measured. By looking at crime through the minimum sentence days, Sherman et al. (2016) created Crime Harm Index (CHI). The index was created to better understand the difference of the level of harm caused to victims by different types of crimes. This research specifically focuses on the data provided from the police service and is analysed within the findings chapter utilising Sherman's (2020) approach (For in depth explanation of how to calculate CHI see appendix L).

Once each crime type is given a CHI number, the number of crimes per year within this crime type should be multiplied with the CHI number given. (CHI scores, county related, which are used in this research may be found in Appendix L)

Furthermore, Sherman (2020) suggests that CHI score maybe be divided by the number of populations to obtain Crime Harm Index Rate. The CHIR may show the rate at which a particular category of crime affects certain communities. This method may be applied to specific area, towns, cities or countries, and each will have a unique Crime Harm Rate for different crimes. In contrast to Sherman's methodology of Crime Harm Rate, an experimental

statistic was published by the Office for National Statistics (ONS, 2021), which focuses on the 'Crime Severity Score' for different geographical locations. The main difference between CHI and Crime Severity Score is that unlike CHI, Crime Severity Score is calculated through average sentencing guidelines. Sherman (2020) argued that the calculation of severity rate should not be based upon average sentencing as it must only reflect upon the harm of the crime. If an average sentencing is used to calculate the severity of the crime it would reflect upon prior convictions of offenders and possible aggravating factors. This would not reflect the harm caused by a crime, it would show the harm caused by that specific offender. Therefore, in order to ensure that the calculation in this research solely focused on the level of harm caused, the CHIR was used as the basis for further calculations and analysis F(See Appendix M for an explanation of how to calculate CHIR).

For the purposes of this research the categories of crimes were merged together into more general categories according to the police services' Control Strategy (See Appendix K for crime categories within control strategies). The reasoning behind this was to assess whether the CHIS were contributing to the priorities set out by the individual police service and the Home Office. Statistics were taken from the Office for National Statistics (June 2021).
The table below sets out the calculated CHIR for the purpose of this study.

Table 1: 'Crime Harm Index rate for each category within the Control Strategy Area'

Force priorities	No. of crimes (June 2021)	Crime Harm Index (sentence days)	Crime Harm Index Score (for the county)	County's population (June 2021)	Crime Harm Rate
Exploitation	85,948	511	43,919,428	1,868,242	23.5
Serious Violence	94,923	1,655	157,097,565	1,868,242	84.1
Abuse	85,891	363	31,178,433	1,868,242	16.7
High Harm Crime	61,485	149	9,161,265	1,868,242	4.9
Terrorism	Unknown	2,725	Unknown	1,868,242	Unknown
Other (volume crime)	67,277	8	538,216	1,868,242	0.3

The most frequent output obtained from a contact with a CHIS is intelligence. Thus, it is important to look at total intelligence outputs produced due to contacts with a CHIS (See appendix M how to calculate overall value of intelligence reports supplied). Other potential outputs and outcomes (identified as measurable by practitioners) were calculated in a similar manner. Three categories of 'positive outcomes' we identified from the practitioner

perspectives. 1. physical value of any recovered property (cash, drugs, property recovered in pounds), 2. Other positive achievements (arrests, outcome of an investigation, people safeguarded, missing persons found), and 3. weapons (weapons recovered). The value of subcategories are also influenced by the number of such outcomes and CHIR score (See Appendix N how to calculate overall value of subcategories).

Lastly, the final calculation to factor into any CHIS value calculation relates to costs. Costs spent on the particular contact with a CHIS are an input done by the police to receive an output from a CHIS. Dunnighan and Norris (1999) argued that not only reward costs but operational costs and running costs must be considered for any cost-effectiveness analyses. One must look at research and dissemination (operational costs), employee costs (running costs), and rewards (other costs) (Stockdale et al., 1999) (See Appendix O for how the costs were calculated within this study).

3.7 Methodology for calculating efficiency relying on outputs and inputs

Once the means of calculating outputs and inputs was identified, it allowed for an analysis of a number of CHIS over a three-month period. A simple efficiency equation was used to calculate overall value. This was:

$\frac{\text{Output}}{\text{Input}}$ = Efficiency

Outputs and inputs differ in units and therefore it would be problematic to try and relate them together. Therefore, the outcome of the suggested equation formed what was labelled Harm Linked Outcomes according to costs spent (HLO/£):

$\frac{output}{input}$ =HLO/£

Similarly, to the efficiency equation, HLO/£ will have an outcome of a decimal number e.g. 0.3. This then may be turned into percentage by multiplying it by 100 e.g. 0.3 x 100 = 30%

The percentage will show the consistency of the value brought by CHIS.

However, in order to see whether the contact brought value or not and whether the CHIS is valuable to policing activities, one must have a marginal value to determine whether a CHIS is below or above it. Anything above Marginal HLO/£ is of value or efficient and anything below is not. To see whether the CHIS does provide valuable outputs, a marginal HLO/£ must be established. Marginal HLO/£ will be different for different sets of data as it reflects on a CHIR to which county it is related to and is time specific (See Appendix P for how estimated marginal value was calculated within this research). **3.8 Sampling**

Based upon research area and research questions, purposeful sampling was best fitted for this study. Purposeful sampling excludes practitioners who are not involved in the subject area, meaning practitioners do not have an equal chance of being selected (Daniel, 2012). To conduct purposive sampling, researchers pick participants according to the characteristics which are relevant to the study (Morse, 2004). At the time of the research practitioners were all in the role of the handlers of CHISs or a supervisor of the handlers. This sampling method allowed to generalise the results, and which could be related to all handlers within all police services. The generalisation of the results shows the external validity of the research (Fritz and Morgan, 2010). This research included sixteen practitioners in the first stage of the study, eight research participants within second stage, and data focusing on 30 fully registered CHISs over a three-month period. The development of criteria was also overseen by an expert senior officer to ensure reliability (Daniel, 2012).

3.9 Access

A gatekeeper may facilitate access without passing on all relevant information disrupting the reliability and validity of the whole research. In this instance the gatekeeper was highly interested in the research and was looking for the successful outcome while safeguarding the handlers and any sensitive information that might be passed on. Therefore, there is a possibility that the research participants were encouraged to leave certain important information out due to the fear of the leakage of sensitive information further leading to unreliability of the research. To further secure the safety and anonymity of research participants, participants were encouraged to use nicknames instead of the real names. This further encouraged participants to speak more freely within the research study.

The qualitative stages of this study which focused on semi-structured interviews involved sixteen practitioners from whom some of whom participated in first and second stage of this research, making it eight research participants who participated in two semi-structured interviews. It is important to mention that this research was conducted from outsider-outsider point of view (Mulling, 1999). This is because the researcher was an external individual to the police service. This provided the freedom over research areas, however it created problems with the access (Dwyer and Buckle, 2009).

3.10 Ethics

This research followed ethical guidelines thoroughly to protect the interests of the participants and the researcher. The Enlightenment model of positivism was the first to be examined for its

utilitarian ethics (Denzin and Lincoln, 2011). Positivists focused on informed consent, no deception, privacy and confidentiality, and absence of psychological and physical harm following the guidelines and statutes. While it seemed that their code of ethics covered everything, it seems of that it mainly protects the institutions and not individuals excluding the primary purpose of a code of ethics - to protect individuals from unethical biomedical research. For example, the ethics of Enlightenment model failed in Laud Humphrey's deceptive study of homosexuals, Project Camelot in the 1960s, and Stanley Milgram's deception of subjects in his psychological experiments (Cowley, 2010). This model creates the grounds for unethical research and experiments consisting of deception and for challenges to the subject's moral worth and dignity (Guba and Lincoln, 1989). Thus, it is clear that some research studies must be abandoned in order to protect both the researchers and participants. This exact action was undertaken by Haney, Banks and Zimbardo in 1973 in their simulated experiment of a prison environment (Hewitt, 2010). On the basis of life-threatening behaviour observed by them within only five days of a simulation, Haney et al saw the need to conclude the experiment rashly. Despite the fact that the participants are recruited on the voluntary basis, only in rare occasions participants withdraw from the research studies. This is because many perceive the consent form to participate within the study as a social contract that should not normally be broken (Diamond and Reidpath, 1992; Milgrath, 1964). Therefore, it is essential for the researcher to take the responsibility of duty of care and ensure from the beginning of the research that their interests are protected and they are safe from any physical or psychological harm.

This study considered all negative aspects of the research that may harm either the researcher or any of the participants. It was all considered in health and safety risk assessment form and approved by the University's Faculty of Science, Engineering and Social Sciences Ethics Committee (See Appendix H). Furthermore, for the data processing to be lawful the research must comply with General Data Protection Regulation (GDPR), the Data Protection Act 2018 (Cornock, 2018). GDPR applies when the research involves the collection of personal data within European Union (EU) and requires safety measures to be put in place for the responsible researcher who is handling the data (UK Data Service, 2021). Personal data may be collected only when there is a legal basis for this conduct. The legal basis in research mainly involve there is a legitimate interest, consent from research participants, and if the research is conducted in the interest of the public (UK Data Service, 2021).

The project involved the collection of personal identifiable information such as voice recording during the interview stages within the research, however it was all considered and agreed upon between the researcher and the contributing police force in the Data Sharing Agreement. All recordings were permanently deleted as soon as the transcript was fully typed up on to the secure university's computer system. During the first stage of the study sixteen police officers who fit the selection criteria accepted the invitation to participate within this research study. The research participants were required to participate in the semi-structured interviews answering set of questions to inform the template which was created and discussed with the research participants within the second stage of the study. Originally this research planned to organise a focus group for the second stage of the study, however due to limited amount of time and the availability of the officers it was impossible to organise the focus group. Therefore, during the second stage of the research, which was also based upon the semi-structured interviews, eight police officers who previously participated within the first stage of the study also participated within the second stage of the study. This change of method within the stage two of the research was approved prior to conducting it by the Ethics Panel. The research participants were expected to partake in the semi-structured interviews to explore the template, they have been asked a set of generic questions about the template and whether any amendments needed to be done to it prior to the data collection in the third stage of the study.

Furthermore, to ensure compliance with GDPR, the Data Protection Act 2018 and CCCU's data policies, research participants within this research have signed the consent forms (See Appendix A). The research participants then had an opportunity to read participant information and discuss any issues if was necessary. All communication between the researcher and research participants were through the gatekeeper to ensure the safety and anonymity of the officers who voluntarily participated within the study. To fully ensure the anonymity of the research participants they used nicknames to sign the consent forms not to put their identities into jeopardy. Together with the consent forms, the research participants received a research participant information sheet (See Appendices B & E) where the project itself and the aims of the project were clearly explained, what was expected of them and the safety of their identities and the contact information if they had any questions which in this case was the gatekeeper. Research participants had a chance to express their views and contribute to the creation of the template which gathers data for further analyses of the value, effectiveness and efficiency of CHISs have to policing. Within the research participant information sheet the researcher had also explained how the research participant can withdraw their consent and what would happen

to the data they had provided once consent had been withdrawn. Respondents could have simply emailed to the gatekeeper to withdraw the consent who then would inform the researcher about the withdrawal and the need to delete the data provided by the research participant and any documents provided such as the consent form.

The type of personal data collected within this research was ethnicity, gender, age, and history of employment (length of service, years working with CHISs/intelligence). This personal data was collected to allow for an understanding of the background history of the respondents (age, gender, ethnicity). To ensure the safety of the research participants and compliance with GDPR, research participants were all anonymised as mentioned above, and any data collected from the research participant both personal and non-personal was stored on secure University's computer system to which only principal researcher had access to. University data protection policies were strictly complied with during this research.

3.11 Reflections

During this research a great number of issues required adaptability and flexibility. In March 2020, UK entered into first lockdown as safety measures at the time of COVID-19 pandemic. The safety measures prevented this research from conducting face to face semi-structured interviews, and for a good proportion of time it restricted access to the library consequently to the literature it held. This research was conducted during several lockdowns and tough safety measures proposed by the government. All academic research encountered challenges posed by the pandemic throughout 2020 and 2021, this research was not an exemption. Pandemic further presented problems with organising times and dates for the interviews due to the limitations of working from home, possible distractions from the family, and high workload. Nonetheless, this research received a great involvement from practitioners and interest in this study. Semi-structured interviews for the qualitative phase of this research were conducted between May 2021 to August 2021. Furthermore, the university expressed concerns during the pandemic regarding the use of online platforms and whether they were compliant with GDPR. It was determined that Microsoft Teams was GDPR compliant. However, there was major concern in the use of Microsoft Teams within this research as Microsoft Teams includes the names of those participating within the meeting. Due to the sensitive, covert work done by the practitioners on daily bases they needed to stay anonymous. To ensure research participants within the research were anonymous the contributing police service agreed to organise the meetings themselves through Zoom.

The sensitivity of the study and the data collected, meant that the research needed to be carefully sanitised throughout the course of it. This was done to ensure the research participants could not be identified by anyone as well as ensuring the anonymity of the police service they work at. This research did not have direct access to research participants nor to the data concerning CHISs. All research participants were referred to by nicknames within semi-structured interviews. For the collection of data within the final stage of the study, Detective Superintendent had asked one of the practitioners to gather the data by utilising the template proposed within this study during overtime hours. The police service has contributed with some resources for the completion of this study. The template have been utilised to gather the relevant data by the practitioner within the police service.

3.12 Summary

This research was conducted during COVID-19, yet still have been completed within one year and three months while tackling any difficulties encountered. This research focused on the value of CHISs to policing and their efficiency. During the first two stages of this research the template was created solely from practitioners' responses from stage one and validated within stage two by them. During the third stage of the study the template was utilised for data collection purposes which further allowed to conduct thorough analyses of each individual contact made with 30 CHISs as well as providing an overall harm linked outcomes over costs for each individual CHIS. Participants were recruited with the relevant background such as handlers of CHIS or a supervisor of the handlers. The qualitative stage of this study was analysed through thematic analyses and the last quantitative stage was analysed.

Chapter 3 – Findings

4.0 Introduction

Around one third of all crimes is either detected or prevented using CHISs (Billingsley et al., 2001). This alone may be the evidence of value that CHISs bring to policing. This chapter will explore the findings obtained within all three stages of this research. This research has used nicknames of participants for the presentation of data to ensure anonymity. This research aimed to assess the value brought by CHIS to policing through a consequential mixed method approach. The first two qualitative stages of the research focused upon the views and experiences of officers who handle CHIS and informed the creation of a data collection template which in turn allowed for analyses of the value 30 CHISs at the last quantitative stage of the study. The three stages were further divided into sub-themes. This chapter explores the analysis from all three stages of the research. The first and the second stages of this study involved thematic analyses. Thematic analyses allowed for categorisation of the data by themes, providing an opportunity to create a template for the analysis of CHIS value. Analyses from the first stage of the research focused on practitioners' views and experiences with CHISs and what they felt were the best ways to measure the value of a CHIS. Thematic analyses from the second stage of the study focused on improvement of the template which would then be utilised to collect data in order to be able to evaluate thirty CHIS at the third stage of the study. The final analysis of value is based on efficiency calculations which involves inputs and outputs. The analysis is conducted on an individual contact basis (i.e. from every contact) and then an overall value for each CHIS is also calculated.

4.1 Handling CHISs

First theme identified with was the time spent on planning and preparing for the interaction with a CHIS. Handlers spent a large amount of time on planning and preparing for a contact with a CHIS, this ensures that every contact with a CHIS has its purpose and will not continue longer than it must. Ten (62.5%) practitioners suggested that the time spent on planning and preparing for the interaction with a CHIS depends upon who the CHIS is, whether it is a first initial contact, and whether it is a phone call interaction or a meeting. Therefore, it is difficult to establish approximate time spent on planning and preparing for the interactions.

> *"All depends on who the CHIS is I suppose." ~ HUGH*

"This is something that can't be measured, because there is quite a lot of planning that goes into each interaction and each meeting" ~ BETH

However, it was identified that the times between planning for a phone contact and physical meeting vary. The planning for an initial phone call could be done quickly if the phone number for the CHIS or potential CHIS is available. Yet, the planning for the meeting may well take from two hours to a day. Four (25%) research participants suggested that the time for the planning and preparing for a phone call contact is usually around one hour long. Yet, two (13%) respondents suggested that the time for the planning for the phone call is around eight hours. The rest responses ranged between one hour and eight. The average calculated time spent for the planning of phone contact is two hours. The time spent for planning and preparing for the physical contact has massively increased in the comparison to the time spent for the planning and preparing for the phone contact. Three (19%) respondents suggested that the time spent for the planning of physical contact is around three hours. Further three (19%) research participants suggested that time spent may well add up to sixteen hours. The rest of responses ranged between three hours and sixteen hours. The average time calculated for the planning and preparing for the physical contact is eight hours. Twelve (75%) practitioners suggested that the reason for this is that the physical meeting exposes both parties, CHIS and handlers, to higher risks. Handlers not only need to plan what they need to speak about with a CHIS, they must also research a safe place to meet them and the route which a CHIS will have to take to stay safe and ensure not to be identified by others within that location.

"First of you need to know about the source, you need to know what they are talking about, you would then need to know the people they are talking about, where they going to be, where they likely to be committing a crime, the person you are going to meet, the CHIS, you need to know about their family and any current problems that they have, you have to know about any kind of interaction with the police that they might have" ~ MOE

Therefore, unlike the phone contact, sixteen (100%) practitioners said that the minimum number of handlers involved in a meeting is two. Yet, depending on the risks and whether it is an initial contact or not, more officers may be involved. Some meetings with a CHIS may require a cover team in place to ensure the security and safety of both handlers and the CHIS.

"You always need two people and there would probably be 2-4 others involved for the safety of both, handlers and CHIS. So four to six people." ~ CHRIS

Furthermore, the length of the contact was identified as a theme. Sixteen (100%) respondents suggested that the length of an interaction depends upon the purpose of the contact, irrespective of whether it is a phone contact or a physical meeting. For example, if the purpose of the physical contact is to provide a CHIS with financial gain, it would last for only a couple of minutes. However, if the purpose of the contact was to discuss the information gained within the past week, the contact could take a few hours.

> *"If you are arranging a meeting to purely check on their welfare, to make sure they are alright, that could be done in half an hour or even less, or even less if the meeting is just to provide them with money, financial gain… if you looking to meet them and get a full debrief of everything you asked them to do over the last week then that can take hours sometimes." ~ DANIEL*

4.2 The value

Practitioner views on the value of CHISs were similar. It was identified that CHISs contribute to four intelligence products. These four intelligence products have been observed as themes. The themes were derived from the views and examples of real-life experiences of practitioners. The four intelligence products include strategic intelligence product, tactical intelligence product, subject profile, and problem profile (College of Policing, 2022b).

Firstly, six (38%) practitioners highlighted that CHISs offer an insight into criminality, that would otherwise be unknown or overlooked which contributes to strategic intelligence and the establishment of long-term goals. Furthermore, six (38%) research participants suggested that the CHISs are able to provide officers with certain details of offenders' lives, motives, plans, and even potential victims. The insight into such criminality assists strategic planning as well as enabling an organisation to allocate resources according to current or long-term issues affecting the community.

> *"they give us an insight into the crimes that are occurring that we would not necessarily hear about." ~ ROSITA*
> *"They are living a certain lifestyle that police officers would not necessarily be previewed to and wouldn't have an insight to" ~ Rachel*

Secondly, sixteen (100%) practitioners further identified that intelligence provided by CHISs is targeted and actionable making it a useful source for tactical decision-making to both identify and resolve immediate threats. Practitioners suggested that CHISs can provide crucial missing

information within the investigations. These small and crucial pieces of information include phone numbers, names, addresses, registration numbers, the times of future drugs deliveries, crime scenes that have been overlooked and so much more. This information is vital for both proactive and reactive responses to crime within the community, whether it is an on-going organised crime investigation or an unsolved murder. In addition, seven (44%) of research participants suggested that handlers have the opportunity to assign a task to a CHIS with a purpose of obtaining information specifically relevant to the issue at hand. This highly assists tactical decision-making, builds up a successful case which consequently protects the community from further harm.

- *"I had a CHIS who supplied information about Class A drugs. And they have provided vehicle details, including registration, make, model and the colour of the car as well as the description of the vehicle's occupants and where the drugs were being stored in the vehicle." ~ BETH*
- *"I think it's pretty much assists every area of policing to be honest. Not many murders go by that we don't have CHIS reporting on, the person who is responsible, MO, the circumstances around it, where the suspect has gone, what he has disposed of." ~ PAUL B*

Thirdly, eight (50%) respondents suggested that CHISs provide information on offenders and victims of different crimes contributing to offender's or victim's profiles. CHISs are able to supply handlers with information of identities, criminalities, relationships, places of residence of offenders that they might know in the area which further helps to build up subject profiles until the offender have been apprehended. For instance, CHISs are a great tool when it comes to tackling organised crime groups as they are able to provide information on relationships subjects have with their friends, and family etcetera, as well as inside conversations. This information helps to establish links within that specific organised crime group, identifies gaps within intelligence available, contributes to subjects' profiles, and contributes further to decision-making process regards to acting. CHISs also supply information on victims. Many vulnerable people who are being manipulated and threatened by criminals simply cannot ask for help.

> *"It gives you inside information especially about relationships and conversations that you wouldn't hear, you know you can get." ~ PAUL B*

"say you have a drug user who is allowing his or her property to be used for drugs or drug dealing and there are children in the property. So, a successful result would be for the police to attend either disrupt it or take the children into care or at least put them into social services system" ~ RACHEL

Fourthly, intelligence obtained from CHISs contributes to problem profiling which is focusing on emerging crime, high-risk issues, and locations which need to be prioritised. Four (25%) research participants suggested that through the use of CHISs, officers are able to find out quickly about what is taking place in the community. Furthermore, it provides an opportunity to find out of where and what crime is likely to occur, providing with an opportunity to prevent it by taking appropriate actions. This information provides greater understanding of emerging crimes and areas at risk which could be a potential foundation for further analyses and research on the criminality within the area or criminal groups who operate within the area.

"you can have a CHIS call you and say.. a known drug dealer is currently right now supplying cocaine at this specific location. And then we are able to direct overt policing or a drug squad if you like to go to that area at that point in time and hopefully catch the drug dealer' ~ CHRIS

All four products contribute to tackling priority areas set out by the force. These priorities fall under Control Strategy Areas of the force. CHISs highly contribute to tackling threats and risks the community faces. Force's Control Strategy Area is victim based and includes exploitation, serious violence, abuse, high harm crime, and terrorism. Volume crimes such as criminal damage, theft etcetera are also important and need to be tackled as small crimes have potential to escalate or be part of higher harm crimes.

"you are meeting them every week every other week and you are getting the intelligence on all the control strategy area, whether that is violence, safeguarding, threat risk, harm, stabbings, cuckooing, firearms sometimes, vulnerability around children and you could be getting, if you have a full strategy around it, you might be getting results every week on all of those areas." ~PAUL

4.3 Tangible results

Sixteen (100%) practitioners felt that information provided by CHISs may lead to tangible results that may be measured. Each suggested successful result was viewed as a theme which was derived from practitioners' views and examples of real-life experiences of practitioners.

Most of the successful outcomes follow one another. It is important to note that all practitioners felt that a successful outcome does not just equate to a successful conviction. Successful outcomes can take many forms. These include drug seizure, property recovery, recovery of offensive weapons including firearms, cash seizure, it could involve finding a wanted individual and of course apprehension of an offender.

"There could be anything, from arrests… recovering weapons, recovering property, recovering drugs, u know ultimately prison sentences.. variety of outcomes are successful" ~ Claire

The first theme observed was the seizure of drugs. Eleven (69%) research participant believed it to be a successful outcome. Most of the CHISs usually have some sort of connections to drugs, whether associating with drug dealers or taking drugs themselves. Consequently, most if the information supplied by those CHISs is drugs related.

"most CHIS you find have a drugs background" ~ PAUL B

"so every day, we would normally get a drug deal or a drug dealer arrest.. so that could be a runner who stopped and checked location that was provided, found to be in the possession of drugs" ~ ROSITA

The second theme observed was the recovery of stolen property. Seven (44%) practitioners emphasised that property recovery is another successful result which CHISs help to achieve on the daily bases. CHISs might not be involved in theft, robbery or burglaries themselves, yet they could potentially come in to contact with information about an offender who was involved in the burglary or theft.

"so, if CHIS is talking to an offender potentially or CHIS tells us or if a friend tells them that they been doing burglary and they've got things for sale, so for example we could look at high end jewellery for example... u know... that was stolen from the house burglary, there are thing we could put in place to sort of retrieve that from them" ~ DANIEL

In some cases, CHISs provide information about stolen property before it has even been reported stolen.

"if we had some stolen property go overnight then the location could be provided, we can make attempts to go and recover it" ~ ROSITA

The third theme observed was the seizure of offensive weapons and firearms. Six (38%) research participants considered that another successful result is the seizure of offensive weapons and firearms. It is important to recover weapons and potentially save innocent lives.

> *"local drug dealers… were dealing cocaine and weed… got hold of two machine guns… because they were so cheap… , they were stolen from elsewhere and (and) two because they wanted some protection to scare off other drug dealers. We initially did not know where those were but then we had some further information that (another drug dealer is to arrive) onto their territory, we had the information that the people who possessed the firearms were then going to go and shoot them but obviously, it comes that we want to do some intervention" ~ MOE*

The fourth theme observed was the arrests and the prosecution of offenders. The successful results of drugs seizure, property recovery and offensive weapons recovery most likely will lead to arrests and possibly prosecution.

> *"So, I think across the whole range of criminality as long as it hits the force control strategy we can recruit and provide information via CHIS, that leads to successful prosecutions." ~ BELLE*

4.4 Non-tangible results

Practitioners felt that not all results are tangible. One of the main priorities for the police is to prevent crime, ensure it is safe to live, work and visit the area. The first theme observed within non-tangible category was the prevention of crime. Three (19%) practitioners believed that prevention is a successful outcome.

> *"an example would be… planned a theft of an ATM machine, where information was obtained as to which store was going to be targeted and how it was going to be targeted, background work that had been done and who was involved which allowed to put things to be put in place which would prevent it from taking place." ~ ADAM*

Similarly, to prevention it is almost impossible to quantify how much value information provided by the CHIS contributed to various investigations. The intelligence aid to investigations was the second theme observed within the category of non-tangible results. CHISs are able to fill in the missing pieces which could secure the conviction or improve a going investigation.

"So basically we had a CHIS, who was living with one of the main players in a drugs OCG. So they were living at the address… and the advantage of that is that you could put a camera on the address, like an overt tactic put camera on address and get movements at the address. But because they were living at the address they could give us exact movement of people coming in and out" ~ PAUL B

The third theme observed within this category is the safeguarding of individuals. CHISs do provide information on vulnerable people who are being used for the distribution of drugs or their properties being used to store the drugs in order to then sell them on. Eight (50%) research participants believe that CHISs contribute to protection of vulnerability.

"basically, protection of vulnerability" ~ CLAIRE

The table below provides a ranked representation of what outcomes, both tangible and non-tangible, research participants felt to be successful.

Table 2: 'Respondents' perceptions of the importance of outcomes of CHIS use'

Rank according to practitioner responses within semi-structured interviews	**Successful outcome**	**Number of practitioners deemed it to be successful**
1	Intelligence	16 (100%)
2	Seizure of drugs	11 (69%)
3	Arrest	9 (56%)
4	Safeguarding of people	8 (50%)
5	Recovery of property	7 (44%)
6	Seizure of offensive weapons including firearms	6 (38%)
7	Prevention of crime	3 (19%)
8	Prosecution	3 (19%)
9	Seizure of money	2 (13%)
10	Finding missing persons	2 (13%)

The table 2, indicates that all sixteen practitioners believed intelligence is one of the most important and valuable outcomes. Interestingly, prosecution is lower to the bottom, yet the arrests are one of the highest perceived results. The lowest outcomes were considered to be seizure of money and finding missing persons.

4.5 In what ways can the value of CHISs be measured?

The views on how the value may be measured greatly varied. Two (13%) practitioners suggested a few ways to measure the value of CHISs. One may say that the only way to measure it is through worse-case scenarios. One (6%) practitioner emphasised that it is only possible through 'turning off the tap'. If CHISs would not be used for a period of time, it would be clear to see the damage done to all policing activities and to the overall flow of intelligence.

"I think you could only go on worse case scenarios." ~ DANIEL

"Without turning off the tap and seeing what the impact is, I don't think there is a way of actually valuing it." ~BELLE

Two (13%) research participants suggested measuring the value through missed opportunities. The department keeps track of when the intelligence has been acted upon and when it has not been for one reason or another. This would be recorded as a missed opportunity. This way one can see that the information provided by a CHIS has been valuable, but proactive teams just did not have the time or resources to act upon it. Moreover, in the cases where a CHIS supplies information that contributes to an overall intelligence picture or provides missing pieces within investigations, it may be measured through tasking-result. This will clearly show whether a CHIS was able to obtain information that officers had asked for and whether it had any value to policing activities.

"we collect information each month, we have like missed opportunities… And then they decide if they have time to do anything with it. It is there in black and white (if they don't act upon it) it is just classed as missed opportunity and hey ho that's the way we work unfortunately." ~HUGH

"(intelligence) might be a missing piece. So we quantify that in terms of tasking results, if (investigators) ask us a specific question, like the investigators come to us and says we want to know this, this and this, and the CHIS is able to answer two bits of that information then we quantify that by giving them information straight back to the officer on the case…. They

supplied information, its exactly as the request was given to them. So really that is a result for them, because they had done what they had been asked." ~ PAUL B

Lastly, four (25%) practitioners said that the best way to measure the value of CHISs is by looking at intelligence and results. One may say that intelligence must be examined against the results, and another may say that intelligence and results must be looked at together as both of them are valuable successful outcomes. Tangible results are not always visible and take time to be seen, yet the volume of intelligence supplied by a CHIS may be seen immediately even during the contact.

"So we sort of measured how many CHIS we have, how much intelligence they produced against the results that we have achieved. That's probably the best way." ~ JO

"it is difficult to say. In real terms the only way you can measure it is on their results, but I suppose you could look at the amount of intelligence they provide so how many intelligence reports they provide would be good indicator of how well they are working" ~ JACK

4.6 Template

Practitioner views on the template were similar. In the second stage of the study eight participants provided useful feedback on the draft template. Five (62.5%) practitioners stated that the draft template (See Appendix D) was detailed and included most, if not all, tangible results they had identified in the first stage of the research. On the other hand, five (62.5%) drew attention to the complexity of the template, suggesting not all boxes could be completed for every single CHIS contact. For example, officers might not always recover firearms and offensive weapons, or there might have been an arrest, but no further action was taken by police. Furthermore, the outcome might not always be known.

"Excellent. Really good." ~ 2MOE

"Yeah, you see, I think it is very, very complex because recovery of firearms doesn't happen all the time, but it does happen." ~ 2BETH

Practitioners highlighted several areas requiring changes before a final template was created to gather data in phase three (See Appendix G). First, some changes had to be made to the wording to ensure it covered exactly what was needed. This included changing a 'meeting' to 'contact' because meeting is referring to a physical face-to-face meeting and would not cover phone

contacts which are more frequent. The word ‘reported’ was changed to ‘discussed’ because practitioners pointed out CHISs do not report crimes or offenders, they simply discuss the information with officers. Furthermore, the crimes may be prevented or disrupted, therefore practitioners asked to include both as some may see it as two different outcomes.

“there are a couple of things with regards to the sort of meetings there you put meetings I mean a lot of our contact is sort of over the phone, we might meet a source you know sort of every couple of weeks or ones a month even so. I am assuming by a meeting you meant like a general contact” ~ 2BELLE

“it is just the wording, so I would… because you said reported and obviously, they don’t report crime. So, it is just the wording” ~ 2PAUL

“It could be crimes prevented and crimes disrupted.” ~2JO

Practitioners identified that the phrase ‘intelligence report’ needed to be changed to ‘number of intelligence reports’, because CHISs may provide multiple pieces of information during one contact and numerous intelligence reports might be a consequence. This would be a way to distinguish value, because the more intelligence reports, the higher the potential value of a CHIS. Moreover, practitioners found it easier to look at crime type through the Control strategy Area, as the intelligence supplied will relate to an aspect of the control strategy. As a result, crime types were rejected in favour of the police services Control strategy Areas. This made it easier to navigate between different crime types, shortens crime categories and focuses specifically on the individual police service.

“*Yeah, the only thing I think is quite difficult is when we quite often, they can talk about one specific thing and that information could not get worked upon and not receive a result for some period of time” ~2PAUL*

“So basically, we have a control strategy so, you got property crime, you got violent crime, you got drugs, you got terrorism” ~ 2JO

In addition, four (50%) practitioners suggested inclusion of several boxes focusing on missed opportunities, taskings, targeted intelligence, intelligence payments and missed opportunity payments. Missed opportunities, taskings and targeted intelligence all reflect upon the value the information supplied by a CHIS. Practitioners explained that the missed opportunity takes place when where was a chance to respond or prevent the crime yet due to some reason the opportunity was missed. The tasking involves handlers to set a specific task for a CHIS (such

as gain specific information), this information consequently becomes targeted intelligence. Therefore, it was only reasonable to include these in data gathering.

> *"every area has targets, so you could put taskings, so we get taskings from other departments. And targeted intelligence could be as in like certain targets that we ask to report around." ~ 2JO*

> *"if you put that on there, about the intelligence payment and missed opportunity, that probably covers it all really" ~ 2JO*

Lastly, seven (87.5%) practitioners highlighted a few negatives of the template that could not be resolved. Three (38%) respondents felt it would take too long to fill out as it involves so many different aspects including tangible and non-tangible results. In addition, six (75%) research participants felt that the result is usually delayed and may not be seen for months. This means the value of CHIS cannot be measured at a present moment. However, it may be measured by looking at the past suggested successful outcomes.

"To be honest with you… it is going to be a long time for me to sit and go through. We've…. gone to a different computer system, so not sure if I could go back and have a look at all this because its real kind of complex thing really." ~2JO

"so, there is an awful lot on there so to gather all that information would take an awful amount of time" ~ 2JOHN

Furthermore, the template does not consider that some contacts may purely focus on welfare issues. The paper does not always reflect everything that goes on. Handlers need time to build a trusting bond with a CHIS, the build-up of such relationship is not considered within this template. In addition, some intelligence supplied by handlers may involve safety to officers or direct proactive teams to hot spot areas. Handlers cannot find out whether the information provided helped and possibly saved officers' lives or not.

"if you have five contacts with a CHIS, all telephone and we haven't been out and met them and during that time they actually had some welfare issues and actually they have not provided a huge amount" ~2JACK

"I mean where is some stuff that we do that we wouldn't actually know an answer. Like if we know someone is carrying a knife or a weapon for instance, we will submit the intelligence and they would create a briefing slide so it would go out to all officers on their daily briefings

to be aware stuff like that. So, it changes the tactics they would use for that, stop or the approach which obviously you got no knowledge of if that happens, or whether it has benefitted anybody." ~ 2BETH

4.7 Phase three: Final analysis of CHIS value

For the final analysis the police service within this study completed the template which was created through thematic analyses of qualitative stage of this study. Data on thirty CHISs was collected from contacts over a three-month period.

The final analysis used the Crime Harm Rate for each Control strategy Area of the participating police service. This was because these were the police services priorities in their geographical area. If utilised by other police services, calculating it based upon the control strategy for that area provides the nuance for that individual police service. Number of sentence days are based upon average sentencing in each Control strategy area. The number of crimes were based on statistics for June 2021 and allocated to specific Control Strategy Areas according to the type. The population number have been taken from last available estimate by the relevant County Council. See Appendix K for Crime Harm Index rate for each category within Control Strategy Area. The evaluation of CHISs was primarily based upon CHIRs of Control Strategy Areas (See Appendix K for Crime Harm Index rate for each category within Control Strategy Area). Furthermore, the input analyses were based upon Detective Constable hourly pay rate of £19.71 provided by the police service.

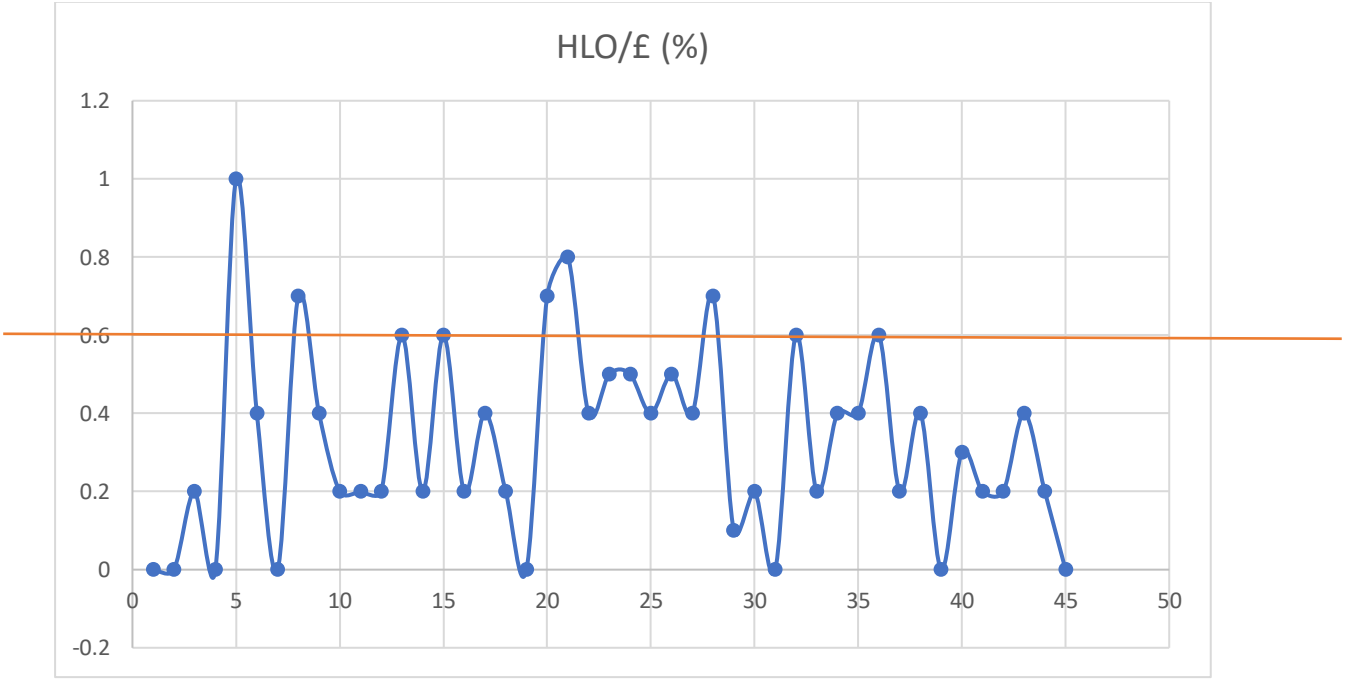
Marginal HLO/£ - 0.006 (0.6%) of harm linked outcomes comparing to resources spent. This means CHISs who have less than 0.6% of HLO/£ are not efficient according to the costs spent. Anything above 0.6% of HLO/£ is of some value to policing activities. Some results may come above 1.0 (100%), because the intelligence supplied, or successful outcomes achieved overflow and fit within Control Strategy Area. Below represents the use of the HLO/£ efficiency equation, described previously (see p.47), to try to estimate the value of individual CHIS interactions in the data provided. This demonstrates how the tool can be used to measure *individual meetings*, although an overall score for a three-month period might be more useful as a tool of effectiveness/value over time given the fact that some meetings may by design not achieve what is considered a desirable outcome. For example, CHIS 1 had over all 45 interactions with the handlers in the three-month period (See Appendix Q). The following calculation were applied to all meetings as shown in table 3.

Table 3: 'Calculated CHIS value for each interaction based upon Harm Linked Outcomes vs resources cost'

3	PP – 2h **£19.71/60min x 120 = £39.60** CL – 11 min **£19.71/60min x 11= £3.63** C/D – 30 minutes **£19.71/60min x 30= £9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1	HLO 0.3 / £137.36	0.002 (0.2%)

Appendix Q demonstrates analyses of all 45 interactions with CHIS 1. The table explores the outputs and inputs that went into each calculation. These calculations provide indications on the efficiency of this CHIS. The below figure demonstrates the efficiency of CHIS according to harm linked outcomes for CHIS 1 (for further analyses of 29 CHISs please see Appendices Q - AT).

Figure 1: 'Graph displaying the results of CHIS 1 calculated value'



By viewing the results of each interaction, it provides a clear view of the efficiency according to HLO/£ of this CHIS. Any contacts that are calculated to be below the marginal line (in the table in red) are viewed as inefficient based upon the control strategy and resources spent. The graph demonstrates that the CHIS was efficient. Some of the contacts have reached the marginal 0.6% of efficiency. This CHIS has only supplied information on volume crime

(Other) which had a CHIR core of 0.3. The highest percentage of HLO/£ this CHIS got was 1%.

Lastly, an overall average score was calculated for each CHIS by combining the calculations of individual meetings over that time. The table below represents the CHIS in order of value calculated, over a three-month period.

Table 4: 'Calculated overall CHIS productivity using Harm Linked Outcomes vs resources cost'

Rank according to productivity level	CHIS number	Average overall HLO/£ %
1	CHIS 8	15.19%
2	CHIS 9	14.13%
3	CHIS 2	11.48%
4	CHIS 14	8.81%
5	CHIS 3	8.58%
6	CHIS 23	6.74%
7	CHIS 11	6.55%
8	CHIS 6	6.40%
9	CHIS 7	5.78%
10	CHIS 27	5.76%
11	CHIS 17	5.86%
12	CHIS 21	5.44%
13	CHIS 12	5.04%
14	CHIS 30	4.84%
15	CHIS 16	4.43%
16	CHIS 4	3.93%
17	CHIS 15	3.80%
18	CHIS 18	3.74%
19	CHIS 20	2.71%
20	CHIS 5	1.19%
21	CHIS 25	0.88%
22	CHIS 13	0.46%
23	CHIS 29	0.42%
24	CHIS 19	0.38%
25	CHIS 1	0.33%
26	CHIS 10	0.28%
27	CHIS 26	0.25%
28	CHIS 24	0.23%
29	CHIS 22	0.08%
30	CHIS 28	0.06%

Within the table 4, CHISs are sorted by their efficiency according to HLO/£ %. The most productive CHISs according to the analyses are CHIS 8, CHIS 14, CHIS 2, CHIS 9, and CHIS 8 with the highest percentage of 15.19%. One third of CHISs are below 1% with the lowest score of 0.06%. Nonetheless, twenty-one CHISs seemed to be valuable to policing when the

measure is applied to their interactions over a three-month period. This is because their percentage score was calculated to be higher than the marginal HLO/£ of 0.6%. Consequently, the last nine CHISs have not reached marginal HLO, therefore are seemed to be inefficient based upon the instrument and calculations used**.**

4.8 Summary

This chapter explored all three stages of this research. During the first stage, this research explored views and experiences of practitioners through semi-structured interviews. Thematic analyses have been used to examine the data gathered within the first stage of this study. Sixteen practitioners have participated within first phase, allowing to explore most, if not all, successful outcomes of an interaction with a CHIS which then have been included within the draft template. There are two types of successful outcomes, tangible, and non-tangible. Tangible outcomes include seizure of drugs, recovery of property, seizure of firearms and offensive weapons, seizure of money, arrests, and prosecution. Non-tangible outcomes include prevention, safeguarding of people, finding missing persons, and overall contribution to the intelligence picture. These successful results have been included in the draft template which was evaluated by eight practitioners within second stage of this study. Second stage of the study was based upon semi-structured interviews to attain feedback on the draft template. Practitioners believed that the template was good, yet it was also detailed and complex. Practitioners suggested few changes to the wording and added certain bits that needed to be included in. The feedback was considered and did improve the template. The created template then was utilised to gather data on thirty CHISs within a three-month period. Within final analyses of CHISs, twenty-one of them have received HLO/£ % higher than marginal of 0.6%. This means that they have been valuable to policing activities with the highest percentage of 15.19%. Nonetheless, nine CHISs are below the marginal percentage of 0.6%. Therefore, according to HLO/£ analyses are perceived to be inefficient.

Chapter 4 – Discussion

5.0 Introduction

Conventionally, CHISs are a central source of information (Crous, 2009; Innes, 2000; Audit Commission, 1993;Bean and Billingsley, 2001; Lieberman, 2007; Miller, 2011). Crous (2009) suggested that by implementing HSM within this field, the police would enhance the knowledge about the criminality, inform their decision making, and professionalise the process. CHIS are able to provide information which primarily contributes to four intelligence products such as strategic intelligence product, tactical intelligence product, individual profile, and problem profile (Crous, 2009; College of Policing, 2015; Ratcliffe, 2008). Therefore, due to the variety of information that may be supplied by CHIS, this makes the implementation of HSM fundamentally important (Harfield, 2001; Crous, 2009). Formal professional HSM practices must be implemented to improve a structured intelligence system which informs all policing activities. This research aimed to establish objective means to measure the value of CHISs as a valuable addition to HSM practices. Measuring CHIS value objectively, if proven to work, would allow for more professional management of CHIS. The foundations for the methodology of objective evaluation of CHISs was derived from semi-structured interviews with the practitioners. Practitioners were able to express their views and experiences with CHISs, as well as the value they believe CHISs bring to policing. The data gathered within the qualitative phase of this study was carefully examined through thematic analyses which led to the discovery of several successful outcomes. These outcomes must be considered within the evaluation of CHISs. Furthermore, average resources spent on a contact with a CHIS were identified and were considered within the evaluation of value. Currently, CHIS handlers must assess their CHISs through intelligence management scheme of 3 x 5 x 2 while applying it to NIM (Data and Intelligence Services, 2021; College of Policing, 2022b). This assessment is subjective and prone to the unreliability. Authorising officers then must rely upon the professional judgement of handlers before authorising a CHIS. Thus, for the final evaluation of CHISs within this research an objective calculations of CHIS value were used. This chapter explores the significance of findings in relation to previous literature and existing knowledge about CHISs, as well as an objective method to measure the efficacy of CHISs. The structure of the discussion mirrors the finding chapter for clarity. The key aspects explored are the outputs which includes all outcomes mentioned by practitioners and inputs which include the resources spent on the maintaining of CHISs.

5.1 Handling CHISs

Cours (2009) explores the differences between the old and the new management of CHIS work. Seemingly, the system has moved closer to HSM due to, but not limited to, RIPA (2000), Codes of Practice of CHIS handling, and HRA (1998). The practitioners believed that CHISs are financially valuable supporting the arguments made by Audit Commission (1993). Audit Commission (1993) argued that CHISs are cost-effective. However, Dunnighan and Norris (1999) questioned the methodology and the conclusion made by Audit Commission within the report. However, the Audit Commission did not consider all relevant costs and resources which are involved within the management of CHISs. Stockdale et al. (1999) applied economic evaluations to policing activities considering all aspects of resources spent for one activity. They suggest three major factors must be considered when examining how much resources have been spent. These factors include employee costs, running costs, other costs. This provides the foundation for accurate evaluation of policing methodologies. This is important as part of HSM is looking for best value and effectiveness. Due to the exposure in the handling of CHISs, Hoddinott's report exposed, how the criminals had escaped liability for crime by supplying information to the police. It is very important to oversee how much value CHISs provide. Furthermore, the OSC and the IPCO have lately realised the decrease in the authorisation of the use of CHISs and consequently less applications. This research would provide a better understanding of whether the police should be using CHIS more frequently for efficiency in detecting and preventing crime. Therefore, an objective tool for measuring the CHIS value, especially in a field where it has notoriously led to corruption and scandal, would be very useful to aid HSM.

Several issues in the assessment of CHIS management highlighted within the IPCO report may be tackled by the use of the template developed within this research. The Commissioner stated that assessments may not contain sufficient detail to conduct the proportionality test properly according to the Codes of Practice (Home Office, 2011; Office of Surveillance Commissioner: Annual Report, 2017). By utilising the template, Authorising Officers will be able to conduct thorough objective analyses of CHISs efficiency over a period of time whereby it can be established whether a CHIS should continue to be registered. The efficiency of a CHIS over a period of time is flexible for the safety and welfare to be considered and measured against the intelligence value provided by the CHIS.

Within this research, several aspects of CHIS handling have been explored. It was necessary to explore the management of CHIS to establish what must be considered when calculating the resources spent on a CHIS for a specific contact. Dunnighan and Norris (1999) argued that too much time and resources go into the recruitment of CHIS. Their study showed that more than half of CHISs were recruited in police stations straight after an interview, which adds additional time and costs, and the costs for the recruitment which takes place outside of the police station can be almost doubled (Dunnighan and Norris, 1999). Furthermore, practitioners in this study highlighted that there is a need for the assessment of CHIS's suitability for the role after initial contact. Practitioners rely upon intuition and their experience when recruiting and maintaining CHISs, but this can be subjective and value ladened. (Dabney and Tewksbury, 2016). Practitioners said that during the assessment period handlers establish a relationship with a CHIS, explore their access into the criminality, and assess whether a CHIS will maintain good contact. Moreover, the research participants in this study highlighted recent changes to the timing of the assessment registration process, which they have not fully transitioned to. The initial registration process allowed twenty-eight days to fully assess a CHIS before registering them. This length of the process ensured that handlers knew the CHIS, knew their access to criminality, their associates, their welfare, and whether they would keep regular contact with them. It is important to employ CHISs from a community even if it is considered costly as it will increase awareness of the activities which take place within the community and will sustain a certain degree of surveillance (Innes, 2000; Hewitt, 2010).

Once a CHIS is registered, handlers must have regular contact with a CHIS. Much research has focused on how the information is obtained using CHISs and how the practice of information elicitation may be improved (Moffett et al., 2021; Brandon, 2014; Nunan et al., 2020b; 2020c; Vrij and Granghag, 2014). However, before any contact, whether by telephone or face-to face, handlers spend a large proportion of time on planning and preparing. Planning and preparing for a contact involves extensive research. Practitioners stated that they must know everything about this individual and they must have a clear purpose of the contact in mind. An average time spent on planning and preparing was calculated through practitioners' responses. There were separate calculations for phone calls and physical meetings. Planning and preparing for a phone contact, which is approximately two hours, is significantly lower compared to the time spent on planning and preparing for a physical interaction, which is approximately eight hours. Practitioners explained such difference in time spent planning and preparing related to the level of risks involved. For the physical contact, practitioners have to research and prepare for the

main purpose of the meeting, but they must also research a venue or a public area where they are able to meet the CHIS safely, establish the route the CHIS will have to take to attend the meeting, and they must also create a believable cover story in case the CHIS is spotted by any of their associates (College of Policing, 2022c). Detailed planning and preparation for unexpected circumstances safeguards both handlers and CHISs before, during and after the contact.

In terms of length of contact, research participants suggested that it would really depend upon the purpose of an interaction and other external circumstances. They suggested some contacts may last a few minutes if the purpose of the contact was to provide a CHIS with financial reward, whilst other contacts might last four hours if the purpose of the meeting was to discuss tasked information. Internal or unforeseen external circumstances can further affect the length of the meeting. For example, perhaps a CHIS obtained a large amount of unexpected information increasing the length of the meeting. Handlers must also ensure that the length of the meeting coheres with any cover story created. Meetings will not proceed any further if jeopardised. Interestingly, participants suggested more intelligence and successful outcomes were achieved through physical contacts compared to phone contact. It is important to mention that practitioners suggested that they do not use online platforms for the contact with CHISs. The increase in intelligence and other outcomes may be because CHISs feel more comfortable to discuss sensitive information in person, or they simply feel more protected. It may also relate the extent to which handlers are able to build rapport and effectively probe information when online or on the telephone as opposed to face to face. Yet, this method is more costly due to higher risks involved in a meeting and the necessity to have more officers involved to minimise the risk and therefore maximise safety (a minimum of two officers are required to do this). Dunnighan and Norris (1999) suggested that within their study handlers had physically met their CHISs around once every two weeks, the data gathered within this research supports their findings as the research participants have also stated that on average, they meet their CHISs physical once every two weeks. It is important to mention that during this research there has been a significant increase in contacts done over the phone due to COVID-19 restrictions (Stanier and Nunan, 2021).

Practitioners reiterated the fact that the number of handlers involved may vary depending upon who the CHIS is and the route the CHIS undertook to get to the meeting. As to the phone contact, they appeared to be more efficient due to lower risks and less resources spent.

However, it did lower the number of intelligence reports made and outcomes achieved after the contact.

5.2 The value and successful outcomes

Historically, the police have been unwilling to discuss the CHIS-based system. Reasons suggested for police unwillingness to discuss the use of CHISs may be due to the risk of exposing policing methods, protection of CHISs and handlers' identities, and the possibility of being subjected to public scrutiny (Billingsley et al., 2001). Nonetheless, the reluctance to discuss CHIS left this area unresearched. The use of CHISs is the oldest practice of information gathering which is still believed to be one of the most efficient policing methods (HMICFRS, 1999; Audit Commission, 1993). It is believed that CHISs are a central and significant source of information specifically in criminal investigations (Bean and Billingsley 2001; Lieberman 2007; Miller 2011). Therefore, it is important to understand the value of information provided by CHISs. The knowledge of this value clarifies whether the method should be used, the willingness to use this method for policing purposes, and whether it may be improved. The evaluation of CHIS value is left to subjective judgements, and usually the views of handlers who may be too close to see real value. Therefore, it would be beneficial to establish a more objective way to analyse the CHIS value. During the first stage of this study, practitioners highlighted the reasons why they considered CHIS were a valuable tool for policing. Dominant reasons include access into criminality, future intentions of offenders and access to a valuable information. These findings support the drivers for the use of CHIS identified by Harfield (2009).

Harfield (2009) suggested that CHISs are a desirable tool for investigators due to their proactive features. Using a CHIS, investigators may approach cases in a proactive manner rather than merely investigating offenders reactively. CHISs may be a tool for the disruption of organised criminal plans (Hewitt, 2010). Practitioners provided numerous examples of when they were able to prevent or disrupt crimes. These examples include from locating firearms before the loss of lives to recovering a large quantity of drugs before the distribution. However, the management of CHISs is complicated (Billingsley et al., 2001). CHISs must not provoke a criminal activity which would otherwise not take place. When considering whether the CHIS have instigated the crime, the courts inclined to focus on unexceptional opportunity. The guidance for 'unexceptional opportunity' test was suggested by Lord Nicholl in the case of Attorney General's Reference (No.3 of 2000), [2001] 1 W.L.R 2060. The guidance focused on

whether the police simply presented the defendant with a not out of ordinary opportunity (Martin, 2021). Practitioners highlighted that they must ensure that their CHIS is following the rules. However, a few emphasised that some CHISs do not always stick to them.

Investigators have different perceptions of success. For example, Brookman and Inness (2013) identified that homicide detectives can view the success of investigation in four different ways. The success may be seen in outcome of the case, procedure, the reduction of community impact and in the prevention of crime. Within this research, practitioners expressed the value of CHISs can be seen in the light of outcomes that may be achieved using CHIS, including both detection and prevention of crime. They have provided real-life examples of what they believe the successful outcomes from an interaction with a CHIS may be (See table 2). Nevertheless, any successful outcomes are achieved due to the intelligence derived from CHISs. Therefore, intelligence obtained from a singular contact should be viewed as success. For example, practitioners argued that the County Lines and Gangs Team would not exist if not for the intelligence obtained through CHISs, simply because they would not know the existence of this criminal-network. Due to the recent discovery of this organised criminal network, only recently academics began to explore the developments of county lines in Britain (McLean et al., 2019).

To achieve any of the practitioner suggested outcomes, the information supplied by the CHISs must be analysed into intelligence to inform decision-making process of investigators. This is crucial for the implementation of professional HSM within policing (Crous, 2009). Analytical decision-making is crucial for all policing activities (Ratcliffe, 2004). Information must be gathered through all available sources, both overt and covert, and analysed into an intelligence product which then may inform difficult decisions (Ratcliffe, 2008). A few practitioners highlighted that information obtained through CHISs is then introduced into NIM (James, 2013). Great insight into criminality and direct information provided by a CHIS enhances one's decision-making process under the National Intelligence Model (Ratcliffe, 2008). Depending on the purpose, officers may use four main intelligence products to make difficult decisions regarding the response or resource allocations. These four intelligence products are strategy intelligence, tactical intelligence, subject profile, and problem profile (College of Policing, 2015). Through thematic analyses within the first stage of this research, it was established that information supplied by the CHISs can contribute to all four types of intelligence products. The key reason for this is that CHISs can provide information on most, if not all, criminality within the area. Practitioners suggested that CHISs can supply information about the offenders

and victims, the future and current crimes, hot spots, as well as provide any missing links or pieces to all types of criminal investigations not only throughout specific counties but in the whole United Kingdom (See Chapter 4).

The decisions are also influenced by the Control Strategy the police service or intelligence agency have in place. Strategic control allows the police to monitor and examine goals, activities, and results. A Control Strategy usually consists of the highest threats that need to be tackled (Ratcliffe, 2004). Each police service has different Control Strategy in place. Practitioners suggested that CHISs (within the county researched) supply information on all the Control Strategy Areas. The final phase of this study concentrated upon the Control Strategy areas identifying the value of information supplied against those priorities. The Control Strategy used in this research involved: exploitation, serious violence, abuse, high harm crime, and counter terrorism. Evaluating CHIS productivity according to the Control Strategy will aid HSM and the decision making process under NIM. Terrorism was not utilised in any calculations due to a lack of information on that area, plus on discussion with the practitioners it became evident that information provided in this area is dealt with separately, usually involving multiple agencies. Furthermore, the Control Strategy is child orientated which was not considered within this research. It is a vital part of the Control Strategy as if intelligence is obtained where a child is mentioned it will be put as a top priority. The sixth option of 'Other' was provided for practitioners to circle if the intelligence supplied by a CHIS did not fit any of the priority areas. It is important to mention that the sixth option mainly involved volume crime such as petty theft. A high proportion of contacts made with CHISs who were evaluated in this study, focused on sixth option not aligning with Control Strategy Areas. Nonetheless, other crimes which do not fall into any areas of the control strategy are still important to action should that information be provided.

One of the most significant developments within HSM practices within the police was the establishment of tasking and co-ordinating of CHISs (Crous, 2009; Innes, 2000). Respondents within this research suggested that they can task their CHIS to obtain information they require. If a CHIS has the right access, the CHIS then can obtain any relevant information if such conduct would not jeopardise the CHIS. Practitioners provided numerous examples of what the CHIS may be tasked with including, but not limited to, the model of a vehicle in which a large quantity of drugs will be transported in (See Chapter 4 - Findings). Unlike other means of covert surveillance, a CHIS has an opportunity to ask direct questions (Hewitt, 2010). This ensures that the relevant information can be obtained and decreases the time spent on the

gathering of this information. However, the use of CHIS involves infiltration into the lives of offenders, violating their human right to private life under Article 8 of Human Rights Act 1998. Therefore, the use of this method must be proportionate and necessary for it to be a lawful policing activity. As have been highlighted by Harfield (2009), CHISs can only be deployed for a legitimate purpose. The legitimate purpose for the policing activity, in this instance the use of CHISs, is the prevention of crime and disorder, the protection of human life while minimising damage and injury (College of Policing, 2018). Furthermore, tasking a CHIS is difficult as it must be 'targeted, specific, and focused' (Harfield, 2009 p.46). If a deployment is not specific, it does not comply with the regulatory framework, as it makes the assessment of necessity and proportionality impossible (RIPA, 2000). However, it does not forbid CHISs from providing extra information freely besides the tasked information.

All risks involved with informer handling must be considered before the deployment of CHISs (Billingsley et al., 2009). Law enforcement officers have a duty to protect their human sources and a breach of this duty will negatively impact the police. Practitioners suggested that they spend a high proportion of their time managing CHISs' welfare. Due to the high-risk role that the CHIS has, handlers have a duty of care towards them (Nunan, 2020; Billingsley, 2009). Practitioners revealed that one of their main duties is to ensure the safety and good health of a CHIS. If the safety and the health of a CHIS is jeopardised due to the role they fulfil, handlers must take action to minimise the risks and improve the welfare of the CHIS. In addition, handlers must ensure that their identities and involvement with the police is secret. In the past there have been cases when officers neglected their duty of care towards their CHIS. For example, in the case of Donnelley v Chief Constable of Lincolnshire and Others (2000), an officer disclosed the CHIS's identity during a police interview. As a result, his duty of care have been breached as the identity have been leaked. Further, in the case of Swinney v Chief Constable Northumbria Police (1996), officers left a document in the police car which contained information supplied by a CHIS. The document contained the details on CHIS's identity and the discussed information on a violent criminal. An individual broke into the police car and stole documents, consequently exposing Swinney and her family to the threats of violence and arson attacks. The practitioners demonstrated in their responses that they were keenly aware of the dangers inherent in their work and interaction with CHISs and took time to ensure protection and minimisation of risk before every contact, particularly if face to face. This also fed into dissemination of information where they thought carefully about sanitising intelligence so that the CHIS's identity was not compromised.

5.3 Template

The template was created from thematic analyses conducted from the data gathered by semi-structured interviews. The proposed template was then further evaluated by the practitioners to ensure validity (See Appendix D). Practitioners felt that the proposed template included everything they would need to consider justifying a reward for a CHIS. This suggests that the template covers the main features of CHIS work. The template considers all outcomes suggested by the practitioners (See table 2). This provided the bases for objective analyses of CHIS value, yet for the validity of the template the second stage of this study involved the discussion of proposed template with the practitioners. Practitioners suggested a few changes to the template which again ensured that all relevant data was gathered for the later analyses of CHIS value.

Practitioners expressed their concern about the valuation of intelligence. They suggested that some value cannot be measured. For example, if intelligence did not lead to any other suggested successful outcomes, others would not be able to see the value of that information. Often the background information provided by the CHISs is the most valuable, it could link everything together or provide information on the crucial individual background. In contrast, a CHIS may provide valuable and actionable information. However, it might not fit with the Control Strategy area and therefore will not be considered a priority and therefore not actioned upon. The practitioners highlighted that the information supplied by a CHIS may sometimes be lost within the system due to lack of resources or delayed response. Furthermore, some practitioners highlighted the fact that the information provided by a CHIS could be highly sensitive and may not be safe to be distributed to other teams to act upon it. If disseminating the information provided by a CHIS will jeopardise them, handlers must not distribute it. A practitioner explained this through a clear example, if a CHIS is the only person who knows personal information about an offender such as where he stores the kilograms of drugs, handlers would not be able to act upon this information and disseminate to other teams. This is because the dissemination of this information would put the life of a CHIS into jeopardy risking it to be exposed to other offenders about whom the information have been supplied on.

The template was designed so that the information supplied by a CHIS would be valued even if the information was simply a missing piece to an overall intelligence picture. Practitioners believed that some of the outcomes can be identified easier than others. This is because successful outcomes fall into two different categories, tangible results, and non-tangible results.

Tangible results consisted of the drug seizure, the property recovery, the seizure of offensive weapons including firearms, the cash seizure, the apprehension of an offender, and successful conviction. Non-tangible results suggested by practitioners are crime prevention, the gap intelligence, the safeguarding of persons, and the finding missing people. It is impossible to say which successful result is preferable as all are important. Further to make matters even more difficult, it is almost impossible to put value on non-tangible results. For example, a practitioner highlighted the difficulty in the valuation of safeguarding a person. Nonetheless, the final analyses have considered this, the value of intelligence and the safeguarding of people was included. Importantly, practitioners were concerned about the valuation of prevention. Preventing crime is one of the many goals of policing. However, it is difficult to quantify an absence of something. It is impossible to see whether the measures which have been put in place have prevented the crime from occurring or whether the absence of crime is linked to another reason. This clearly indicates that the current CHIS evaluation is inclined to subjectivity. Therefore, the use of proposed template and analyses of CHIS value could be a very useful tool for AOs, if it was proven to work.

The template further, does not consider that some contacts may focus specifically on the welfare of CHIS. The welfare of a CHIS is one of the top priorities for the handlers. RIPA 2000, highlights that handlers must consider the welfare and safety of CHISs when deployed and after the completed task or involvement (Billingsley, 2009). Furthermore, Human Rights Act 1998 protects all human rights of everyone, including CHISs themselves. The main articles that are incorporated into the handling of CHISs are Article 2 (right to life), Article 5 (the right for liberty and security), Article 6 (the right for a fair trial), Article 8 (the right to respect for private and family life).

5.4 Final analyses of CHISs

The professional management and evaluation of CHIS is important (Crous, 2009). Current intelligence evaluation scheme 3 x 5 x 2 is based upon the professional judgements of handlers (College of Policing, 2022b). This judgement is subjective and is broad. Therefore there is a need for further development of professional practices in line with HSM framework to evaluate CHISs in an objective manner (Crous, 2009). This research based the resources calculations on Stockdale et al. (1999) suggested costs. These costs included: the employee costs, the running costs, and other costs. This method ensured that the costs considered by the Audit Commission (1993) and recommended costs stated by Dinnighan and Norris (1999) were acknowledged

within this research. An average time for planning and preparing for the contact and average time for checks and dissemination of intelligence was calculated. Both could be more accurate if the police service or other agencies simply kept track of exact time spent on tasks. This would make calculation more accurate overall. Average time for background research, planning and report dissemination ensured that CHISs were assessed equally. For this study, exact time spent on the contact was known, allowing analysis of each interaction with CHISs to be objective and fair.

CHISs are rewarded for the output they have produced either through reward payments or missed opportunity payments. The research was able to obtain data on overall award spent over three-month period on each individual CHIS. Interestingly, CHISs can sometimes be paid prior to obtaining intelligence. In addition, not only reward money was included into this sum. At times, the police tend to pay CHISs to keep them on even if on that contact they did not obtain any outputs. The research had considered it and split the costs equally among the contacts which had any type of output present. For all other calculations the Detective Constable hourly rate of £19.71 was used. This is because the data was not supplied regarding who was involved. Therefore, with knowledge of exact numbers and ranks of officers involved, agencies would be able to further enhance these analyses. The costs then would be summed up to get an overall input that went into an interaction with a CHIS.

The practitioners stated that it would be difficult to put value on certain successful outcomes, further indicating that all outcomes should be seen and valued as good as another. Thus, to ensure outcomes were viewed on equal terms, whether it is a tangible outcome or non-tangible outcome, the calculation of outputs was based-upon Harm Linked Outcomes. CHISs are at most value when they supply information on criminality that causes the most harm to society. Hence, calculations of outputs were based upon the Crime Harm Rate proposed by Sherman (2020), although Sherman's Crime Harm Index and Crime Harm Rate focus upon conviction, rather than an assessment of the real harm caused by that crime. That said, this is the closest anyone has come to looking at crime as harm caused to the victims further acknowledging the fact that crimes should be distinguished due to their seriousness. The difference between harm caused by murder and theft must be acknowledged. To obtain a CHIR number, overall Crime Harm Index scores must be calculated for each crime within the area. The Control strategy of the police service was utilised to see whether CHISs provided intelligence surrounding the Control Strategy. To calculate the average sentence days and the number of crimes within each of the Control strategy area, an expert was used (a senior police officer with expertise in this

area) to ensure the crimes were put into the right Control Strategy. This has reduced the level of subjectivity of categorising crimes into each Control Strategy Area.

5.5 Limitations

This research has a few limitations. One of the key limitations is a small number of respondents within the qualitative stage of this study. The area of CHISs management does not have many practitioners and therefore influenced the sample size. The sample within qualitative research depends on the research itself, thus the number of research participants is circumstantial (Boddy, 2016; Sandelowski, 1995). Historically, the police have been reluctant in the discussion of CHIS-based system (Billingsley et al., 2001). Therefore, it is difficult to establish the appropriate number of research participants for this type of study. Gathering a sample size have been also influenced by COVID-19, research participants had to adapt to working from home, as well as look after their family members. Thus, influencing the willingness of practitioners to participate within this research, and creating significant difficulties in the organisation of semi-structured interviews. COVID-19 has impacted research communities greatly, slowing the progress due to the need for adaption to remote working and the change within research methodologies to follow government restrictions (Omary et al., 2020; Saini et al., 2020).

Another major limitation to this study is that the data for the analyses of CHISs was gathered by one of the practitioners within the police service due to sensitive nature of the information. Therefore, the accuracy of the information gathered through utilising the proposed template is not guaranteed. Furthermore, it was difficult and time consuming to gather the data due to the need to search different databases for the information needed to analyse the efficacy of CHISs. This may mean that the police service may not be willing to apply this methodology due to the time constraints and the need to wait whether any other successful outcomes will be achieved due to the information supplied.

Moreover, the data obtained was measured over a three-month period, thus CHISs may have been paid for the information in that period for the information given before the evaluated three months. The expert has also mentioned that some CHISs are paid regularly not for the intelligence they supply but to simply keep them interested in the role, in the hopes to gain valuable information in time. This research had only access to an overall reward spent on a said CHIS for the whole three-month period. Thus, within the final analyses this research had to

calculate an average amount spent on each contact where an intelligence was provided by a CHIS.

Additionally, the proposed template does not consider the assessment process and whether the contacts focused on assessing CHIS's suitability for the role. The first few contacts may be focused specifically on the assessment process. To elaborate, the purpose of these meetings would not be to obtain any suggested outputs, but to assess the suitability of a CHIS and form a relationship. Therefore, some of the initial contacts within the data analysed do not have any outputs. These initial contacts are not valuable output have been obtained. Yet the handler had established a trusting relationship with a CHIS and ensured their suitability for the role. This must be considered when viewing the data and the analyses of a CHISs.

Equally important, final analyses within this research have been based upon average calculations. Average calculations were used to find out how long the handlers spent on the planning and preparing, the time spent on the dissemination of intelligence reports, and within calculation of CHIR for each Control Strategy Area. Furthermore, physical value and outcome valuation needed to be classed before any further analyses. Physical value was especially hard to classify, for instance in this research, a top end value was provided as £50,000+. This valuation fits police services as only in rare circumstances a CHIS provides information which leads to an output of higher than £50,000 of physical value. If such method were to be used by other agencies which use CHIS-based tactics to gather intelligence, the valuation of physical value would have to be extended or altered. For instance, if an agency or other department often paid significantly higher sums, they could adjust the classification of value. Further, classification of an outcome was simply out in order of severity, leaving the highest possible outcome court conviction. Agencies may conduct more specific analyses if they would use exact time resources spent on obtaining outputs and took a closer look at valuation.

5.6 Summary

In summary, this research has explored the views and experiences of practitioners who handle CHISs and the information supplied by them. Practitioners within this study believe that CHISs are a valuable policing tool. This is due to their access into criminalities, the insight to the lives of offenders, and its proactive features. However, there is a lack of research within this area due to its sensitivity and secrecy and therefore more research must be done. Nonetheless, any research within this area will encounter similar challenges to this research. Any research undertaken within covert policing area will be hindered by issues involving the protection of

handler's and CHIS's identities, as well as the confidentiality of policing methodologies. Practitioners suggested that CHISs are a proactive tool of policing and can be used to prevent or disrupt crimes. However, the deployment of CHISs must be necessary and targeted for it to be legally authorised (Harfield, 2009). Practitioners suggested several successful outcomes that need to be considered within the evaluation of CHISs. These outcomes include the seizure of drugs, the recovery of property, seizure of offensive weapons and firearms, seizure of money, the prevention of crime, the safeguarding of people, finding missing persons, the arrests, the prosecution, and the intelligence. The template considers all suggested successful outcomes. Additionally, the evaluation of CHISs must consider the resources spent on managing the CHIS and the information supplied. This research considers three major areas costing areas which were set out by Stockdale et al. (1999). These areas include employee costs, running costs, and any other costs (e.g., rewards). Furthermore, final analyses primarily focused on whether the CHISs supplied information on and contributed to the successful outcomes in any of the Control Strategy Areas. Most contacts made with CHISs focused on the information outside of the police service's Control Strategy. This means the practice must be improved for it to be fully efficient. The third stage of this study proposed a new methodology for the evaluation of CHISs efficacy. Using this methodology, the police service will be able to conduct objective analyses of CHISs which may contribute to the decision of whether the CHIS should continue in the role of the fully registered CHIS. Nonetheless, there are certain limitations to this research and the proposed template, and methodology which may be further improved by a national scale study with a larger sample size.

Conclusion and Recommendations

6.1 Recommendations for the police to improve analysis of CHIS value

1. The exact time spent on planning and preparing, the time spent checking and disseminating intelligence reports, and the exact number of officers involved could be recorded and used as the bases of input analyses
2. Different ranks of police officers involved within the management of CHIS should be included with their exact hourly pay rate and time spent within input calculations
3. The Physical value table may need to be altered to fit other intelligence agencies; this is because high policing may recover higher physical value compared to low policing agencies
4. Practitioners may want to further include a multiplier when intelligence is focusing on children. Children are of highest priority and the information surrounding a child in need or in danger is look upon as more valuable than any other piece of information. Perhaps a box maybe added into the template covering this matter.
5. The template should be reviewed regularly to ensure it remains relevant to changing context in crime and intelligence collections.

6.2 Recommendations for further research

1. Further analyses should be conducted to explore the difference between the calculated HLO/£ scores and AOs' views on each CHIS
2. Analyses of CHISs could be undertaken nationally with the focus on each police force and their Controls strategy areas. This will enhance the template further for it to be relevant more widely
3. Discuss the template with authorising officers in other police services to see whether it can be used as a tool to objectively measure CHIS value over time
4. Further research into practitioners' views on the outcomes that may be achieved through the use of CHIS
5. Further research into handling a CHIS, emphasising the time spent planning and preparing, the length of the contacts etc.

6. Further research into efficiency, and costs relevant to managing CHIS intelligence
7. Further research to examine small nuances within the template such as including a multiplier for the intelligence supplied which involves children
8. Develop a clear methodology for the evaluation of CHISs for clear decision-making
9. Develop a universal measurement of CHIS value which is not relying on Control Strategies and ,ay be applied internationally.

The definition of a CHIS focuses on the fact that a CHIS is someone who is closely connected to criminality and offenders yet is willing to supply information for personal advantage (Rapp, 1989). Some cases, such as the case of Donald and Cressey (1993), have shown how CHIS-based system may be exploited for corrupted means. Nonetheless, a substantial effort has gone into ensuring the law, the rules and ethics are upheld by practitioners. This is because CHISs are a vital tool for policing through which practitioners may achieve successful outcomes. As one of the oldest intelligence gathering methods, information supplied by CHISs is fundamentally important for both low and high policing (Hewitt, 2010; Brodeur, 2007; Brodeur, 2010). CHISs may enhance intelligence and decision-making within all policing activities. HSM particularly focusing on improving the professional practice of human sources within policing (Crous, 2009). Implementing practices under the HSM framework will increase the knowledge of criminality within the communities as well as develop further strategic intelligence, tactical intelligence, targets profile, and problem profiles (Crous, 2009; College of Policing, 2015; Ratcliffe, 2008).

To achieve professional practices under the HSM framework, practitioners' views and values must be explored. This research has explored practitioners' views on the value of CHISs within the first stage of this study, answering the first question which was identified within the literature review (what are the practitioner views on the value of CHISs and how it may be measured?). The knowledge of the value clarified why CHIS are being used and established the factors upon which analysis of the value of CHIS was undertaken. Although tasking and coordination of CHIS is one of the most significant developments within the HSM framework, it is almost impossible to properly direct a CHIS (Crous, 2009; Innes, 2000; Hewitt, 2010). The deployment of a CHIS must be 'targeted, specific, and focused' (Harfield, 2009 p.46). If the deployment is not specific, it is not compliant with the regulatory framework under RIPA 2000. However, CHISs may provide extra information if they wish (Harfield, 2009).

To establish the fundamental bases for the analysis of CHIS value, this research examined research participants' views on successful outcomes. Research practitioners suggested that several outcomes may be achieved through the use of CHIS. These outcomes include arrests, intelligence, seizure of drugs, recovery of property, seizure of offensive weapons and firearms, recovery of money, safeguarding of people, locating missing persons, and prosecution (see Table 2). The responses observed within this study have supported the outcomes identified by Clark (2001). Through the examination of practitioner views, this thesis established a template which may be used to collect data for the examination of CHISs productivity. Practitioners were able to provide feedback on the proposed template improving its validity and reliability. Practitioners believed that the first initial draft template was good and detailed. However, it required development based upon their views. Practitioners believed that it would be impossible to measure the intelligence gained from the use of CHISs, preventions achieved, and measure the value of people safeguarded. This research attempted to overcome the issue of valuation within the third stage of this research. This has answered the second research question which was identified within the literature review (what are practitioner views on the nature and development of a template for measurement?).

One of the primary consideration this research took was the resources spent on the handling of CHISs on one contact basis. CHISs are considered as one of the most efficient policing tools (Audit Commission, 1993; HMICFRS, 1999; Billingsley, 2009). However, for the CHIS to be efficient and valuable they must be professionally handled under the HSM framework focusing on all policing priority areas (Crous, 2009). Audit Commission (1993) and HMICFRS (1999) have based their judgement only on reward paid out to CHISs without considering other costs spend on the handing of CHIS. This research based the considerations of resources on costs suggested by Stockdale et al. (1999). These costs included employee costs, running costs, and other costs. It is important to mention that all resources related calculations were based upon Detective Constable hourly rate of £19.71 which was provided by the police service.

A lot of resources go into handling a CHIS, specifically when it comes to the recruitment and the assessment period (Dunnighan and Norris, 1999). Practitioners must highly rely upon their intuition when recruiting a CHIS (Dabney and Tewksbury, 2016). If a potential recruit is willing to cooperate, they would have to go through the assessment process which will show whether they are suitable for the role and will comply with the law. A handlers' role relies upon good research, risk assessments and the dissemination of intelligence (Billingsley, 2009).

A good deal of time goes into planning and preparing for each contact with the CHIS, whether by telephone or face-to-face. All the risks must be carefully thought through and prepared for. Time for planning and preparing for telephone contact (2h) is a lot lower compared to the time spent planning and preparing for a physical meeting (8h). Therefore, resources spent planning and preparing for a phone contact are much lower compared to a physical contact. Research participants within this study suggested that the change in the timing for planning and preparing is due the difference in the risks involved within that contact. It is safer and quicker to call a CHIS rather than meet up in person. However, it has been identified within the data that the number of intelligence reports and further outcomes achieved is a lot higher after a physical contact compared to a phone contact.

Respondents have further described the lengths of contacts. The length of the contact varies greatly for all sorts of different reasons. Practitioners suggested that the timing of the contact primarily relies upon the purpose of the contact and on who the CHIS is. However, some internal and external circumstances may also influence the length of the contact. As was mentioned above the risks differ between a phone contact a physical meeting. Therefore, the number of handlers involved highly differs in each contact. If a phone call can be made by only one handler, minimum of two handlers (main handler and co-handler) must be present during a physical contact. However, during some physical contacts, handlers may also have a cover team in place for the safety of a CHIS and the handlers present at the meeting. To establish average resources spent on handling of CHIS was important. This is because it became the bases for the calculation of resources spent on each contact with a CHIS.

This research has also considered other costs which may be spent on the handling of CHISs, these costs include the reward payment and missed opportunity payments. This research obtained data only on overall other costs spent on each of the thirty CHIS within the final analyses of CHIS value. This was important to consider as it is still police resources which were spent to obtain relevant information.

The final stage of this study primarily focused on the quantitative method. Within this stage the template was utilised to gather the data on thirty CHISs over a three-month period. The analyses were fundamentally based-upon Harm Linked Outcomes in relation to Control Strategy. This research examined all thirty CHISs on each individual contact basis and then each CHIS have been given an overall value. The analyses have shown that none of the CHISs evaluated scored higher than 20% of overall productivity in relation to the Control Strategy.

The most productive CHIS is a CHIS 8 with the productivity score of 15.19%. Furthermore, almost one third of CHISs evaluated did not reach the marginal threshold of 0.6%. Marginal HLO/£ was calculated to draw the line of when a CHIS is valuable according to information supplied and outcomes achieved. Nonetheless, twenty-one of CHISs brought value to policing activities in relation to Control Strategy. This answers the third question which has been identified within the literature review (using the template, how can the value of CHIS be measured?).

The establishment of the template and proposed analyses of CHIS value fits with HSM framework focusing on the priorities set out within Control Strategy of the police service.

References

Adam J. and Adam J. C. (1906), *Criminal Investigation: a practical handbook*. Available from: https://openlibrary.org/books/OL7234663M/Criminal_investigation

Adam, A. (2015). *A history of forensic science: British beginnings in the twentieth century*. London: Routledge.

Arpin, J. R. (2006), Her Majesty's Spymaster: Elizabeth I, Sir Francis Walsingham, and the Birth of Modern Espionage. *Naval War College Review, 59*(3), 20.

Audit Commission (1993), *Helping with Enquiries: Tackling Crime Effectively: Management handbook*, Audit Commission, London.

BBC (2004), *Raton a rat to halt drug use*. Available at: http://news.bbc.co.uk/1/hi/england/kent/3745561.stm

Bean, P. and Billingsley, R. (2001), 'Drugs, crime and informers', In Billingsley, R., Menitz, T., and Bean, P. (Eds.), *Informers: Policing, Policy, Practice*. Cullompton UK: Willan Publishing, pp. 25-37.

Billingsley R. (2001), 'Informers' Careers: Motivations and Change', In *Informers: Policing, Policy, Practice*. Cullompton UK: Willan Publishing, pp.81-97.

Billingsley R. (2003), 'The Police CHIS/Handler Relationship: Is it Really Unique?', *International Journal of Police Science and Management*, 6(2), pp.50-62.

Billingsley R. (2004), 'Process Deviance and the Use of CHISs: The Solution', *Police Research and Management*, 6(2), pp.67-87.

Birtles [1969] 1 WLR 1047.

Bloom R. M. (2002), *Ratting: The Use and Abuse of Informants in the American Justice System*, London: Greenwood Publishing Group, p.5.

Brain J. (2021), *Bow Street Runners*. Available at: https://www.historic-uk.com/HistoryUK/HistoryofBritain/Bow-Street-Runners/

Brandon, S. E. (2014). Towards a science of interrogation. *Applied Cognitive Psychology*, *28*(6), pp. 945–946.

Bridges L. (1999), 'The Lawrence Inquiry – incompetence, corruption and institutional racism', *Journal of Law and Society*, 26(3), pp.292-322.

Brodeur, J. P. (2010). *The policing web*. Oxford: Oxford University Press.

Brookman F. and Innes M. (2013), 'The problem of Success: What is a 'good' homicide investigation', *Policing and Society*, 23(3), pp.292-310.

Brown M. (1985), 'Criminal Informants: some observation on use, abuse and control', *Journal of Police Science and Administration* (USA), 13(3), pp.251-256.

Butterfield, N. (2003). *Review of criminal investigations and prosecutions conducted by HM customs and excise*. HM Treasury.

Canterbury Christ Church University (2019), *Research and Enterprise Integrity Framework*. Available at: https://www.canterbury.ac.uk/research-and-consultancy/documents/Research-and-Enterprise-Integrity-Framework-v2.pdf

Carruthers J. (1990). A Rationale for the Use of Semi-structured Interviews. *Journal of Educational Administration,* 28(1).

Cicourel A. (1964), *Method and Measurement in Sociology*, New York: Free Press.

Clark R. (2001), 'CHISs and corruption', in Billingsley R., Nemitz T., and Bean P. (eds.) *Informers: Policing, Policy, Practice*, Cullompton UK: Willan Publishing, pp. 38-49.

Clarke C. and Milne R. (2001), *National evaluation of the PEACE investigative interviewing course. Police Research Award Scheme*. London UK: Home Office.

Clarke, C., & Milne, R. (2016), 'Interviewing suspects in England and Wales: A National Evaluation of PEACE interviewing: One decade later.' In D. Walsh, G. Oxburgh, A. Redlich, and T. Mykleburst (eds.), *International developments and practices in investigative interviewing and interrogation*, London UK: Routledge.

Coke E. (1797), *The Third Part of the Institutes of the Laws of England*, p.194. Available at: https://upload.wikimedia.org/wikipedia/commons/8/8a/Edward_Coke%2C_The_Third_Part_of_the_Institutes_of_the_Laws_of_England_%281797%29.pdf

College of Policing (2015), *Intelligence Management.* Available from: https://www.app.college.police.uk/app-content/intelligence-management/intelligence-products/

College of Policing (2018), *Operations*. Available from: https://www.app.college.police.uk/app-content/operations/operational-planning/core-principles/

College of Policing (2022a), *CHIS Authorising Officer*. Available from: https://profdev.college.police.uk/professional-profile/chis-authorising-officer/

College of Policing (2022b), *Intelligence Management.* Available from: https://www.app.college.police.uk/app-content/intelligence-management/intelligence-report/

College of Policing (2022c), *CHIS Controller*. Available from: https://profdev.college.police.uk/professional-profile/chis-controller/

Collison, M. (1995), *Police, Drugs and Community*. London: Free Association Books

Cooper P. and Murphy J. (1997), 'Ethical approaches for police officers when working with informants in the development of criminal intelligence in the UK', *Journal of Social Policy,* 26(1), pp.1-20.

Coughlan M., Cronin P. and Frances R. (2013), 'Survey research: Process and limitations', *International Journal of Therapy and Rehabilitation,* 16(1), pp.9-15.

Cowley R. (2011) *A History of the British Police: from its earliest beginnings to the present day*, Gloucestershire: The History Press.

Creswell, J. W. and Poth C. N. (2016), *Qualitative inquiry and research design: Choosing among five approaches.* Sage publications.

Creswell, J.W., (1999), 'Mixed-method research: Introduction and application'. In *Handbook of educational policy*, Academic Press, pp.455-472.

Cupchik G. (2001). Constructivist realism: An ontology that encompasses positivist and constructivist approaches to the social sciences. *Forum for Qualitative Social Research,* 2(1).

Dabney D. A. and Tewksbury R. (2016). *Speaking truth to power: Confidential informants and police investigations*. University of California Press.

Data and Intelligence Sources (2021), *Intelligence Management 3 x 5 x 2.* Available from: https://www.local.gov.uk/sites/default/files/documents/Intelligence%20Management%20Training.pdf

Dean D. (2002), Law-Making and Society in Late Elizabeth England 1584-1601, Cambridge: Cambridge University Press, pp. 204-207.

Deininger R. (1977), 'Using informants and co-operative witnesses', *Law and Order (USA)*, July, pp.64-70.

Denzin N. K. and Lincoln Y. S. (2011), The SAGE handbook of Qualitative Research, London: Sage.

Donnelley v Chief Constable of Lincolnshire and Others [2000] High Court (Queens Bench Division)

Donnelly R. C. (1951), 'Judicial Control of Informants, Spies, Stool Pigeons, and Agents Provocateurs', *Yale Law Journal*, 60(7).

Dunnighan C. and Norris C. (1996), 'A risky business: the recruitment and running of CHISs by English police officers', *Police studies,* 19(2), pp.1-25

Dunnighan C. and Norris C. (1999), 'The detective, he snout and he Audit Commission: the real costs in using informants', *Howard Journal,* 38(1), pp.67-86.

Eck J. E. (1992), What Works in Policing, Criminal Investigation, Anderson, Cincinnati, pp.19-34.

Elton G. R. (1954), 'Informing for Profit: A Sidelight on Tudor Methods of Law-Enforcement', *Cambridge Historical Journal*, 11(2).

Emsley C. (1979), 'The Home Office and Its Sources of Information and Investigation, 1791-1801', *English Historical Review*, 94(372).

Ericson R. (1993), *Making Crime: A study of detective work* (2nd edition). Toronto: Butterworth.

Evans R. (2020), *Met faces legal action over spies' use of dead children's identities.* Available at: https://www.theguardian.com/uk-news/2020/dec/07/met-police-legal-action-spies-use-dead-childrens-identities

Fielding H. (1751) *Henry Fielding, founder of the Bow Street Runners, describes London's tangled streets as the perfect hiding place for criminals, 1751*. British Library. Available from: https://www.bl.uk/collection-items/henry-fielding-founder-of-the-bow-street-runners-describes-londons-tangled-streets

Fielding H. (1985) *Henry Fielding: Justice Observed,* London: Rowman and Littlefield.

Fisher Sir H. (1977), Report of an Inquiry by Hon. Sir Henry Fisher into the circumstances leading to the trial of three persons on charges arising out of the death of Maxwell Confait and the Fire at 27 Doggett Road, London SE6. London: Her Majesty's Stationary Office. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228759/0090.pdf

Fontana A. and Frey J. H. (2005), 'The interview'. *The Sage handbook of qualitative research*, *3*, pp. 695-727.
Fox N.J. (2008), Post-positivism. *The SAGE encyclopedia of qualitative research methods*, *2*, pp.659-664.

Francis P. (2020), Peter Francis: Opening statement of Undercover Policing Inquiry. Available from: https://www.ucpi.org.uk/wp-content/uploads/2020/11/20201029-Opening_Statement-Peter_Francis.pdf

Gantzer O. (2020), Thames Valley Police spend more than £700,000 on informants in five years. Available from: https://www.readingchronicle.co.uk/news/18198582.thames-valley-police-spend-700-000-informants-five-years/

Goodman-Delahunty J., Martschuk N. and Dhami, M.K. (2014), 'Interviewing high value detainees: Securing cooperation and disclosures', *Applied Cognitive Psychology*, 28(6), pp.883–897.

Graham C. (2020), *Revealed: The £558,000 cost of paying police informants*. Available from: https://www.wigantoday.net/news/crime/revealed-ps558000-cost-paying-police-informants-1394625

Greaves R. L. (1992), *Deliver us from Evil: The Radical Underground in Britain, 1660-1663*, Oxford: Oxford University Press, p.14.

Greene J. C., Caracelli V. J. and Graham W. F. (1989), 'Toward a conceptual Framework for mixed-methods evaluation designs', *Educational Evaluation and Policy Analysis*, 11(3), pp.255-274.

Greenwood, P., Chaiken, J. and Petersilia, J. (1977) *The Criminal Investigation Process*. Lexington: D.C. Heath.

Greer S. (1995), 'Towards a sociological model of the police informant', *British Journal of Sociology*, 46 (3) pp. 509-527.

Guba E. S. and Lincoln Y. S. (1989), *Fourth generation evaluation*, CA: Sage.

Harney M. and Cross J. (1968), *The CHIS in Law Enforcement*, Illinois (USA): Thomas.

Haynes A. (2002), *The Elizabethan Secret Services*, London: Sutton Publishing.

Her Majesty's Inspector of Constabulary and Fire and Rescue Services (HMICFRS) (1999), *Police integrity: Securing and Maintaining Public Confidence*, Home Office. Available at: https://www.justiceinspectorates.gov.uk/hmicfrs/media/police-integrity-19990601.pdf

Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services (HMICFRS) (2017), PEEL: Police legitimacy 2017: a national overview. Available from: https://www.justiceinspectorates.gov.uk/hmicfrs/wp-content/uploads/peel-police-legitimacy-2017-1.pdf

Hirsch C. (2002), 'Policing Undercover Agents in the United Kingdom: Whether the Regulation of Investigatory Powers Act Complies with Regional Human Rights Obligations', *Fordham International Law Journal*, 25(2), pp.1282-1334.

Holmes P. (2004), 'Tyrrell, Anthony (1552-1615)', in Matthew H. C. G. and Brian H. (eds), *Oxford Dictionary of National Biography*, Oxford: Oxford University Press.

Home Office (2011), Human Intelligence Sources: Criminal Conduct Authorisation Process factsheet, available at: https://www.gov.uk/government/publications/covert-human-intelligence-sources-draft-code-of-practice/covert-human-intelligence-sources-criminal-conduct-authorisation-process-factsheet-accessible-version#:~:text=The%20draft%20CHIS%20Code%20of,potential%20benefit%20to%20the%20public

Human Rights Act 1998 Schedule 1 (The Articles). Available from: https://www.legislation.gov.uk/ukpga/1998/42/schedule/1

In J. (2017) 'Introduction of a pilot study'. *Korean journal of anesthesiology*, *70*(6), p.601.

Innes M. (2000), 'Professionalizing the role of the police informant: The British experience', *Policing and Society: An International Journal*, 9(4), pp.356-383.

Innes M. (2000), 'Professionalizing the Role of the Police Informant: The British Experience

IPCO (2020), Annual Report of the Investigatory Powers Commissioner 2020, Available from: https://ipco-wpmedia-prod-s3.s3.eu-west-2.amazonaws.com/IPCO-Annual-Report-2020_Web-Accessible-version.pdf

James A. (2013), Examining Intelligence-Led Polcing: Developments in Research, *Policy and Practice*, London: Palgrave Machillan.

Johnson C. (1734), *A General History of the Lives and Adventures of the Most Famous Highwaymen, Murderers, Street-Robbers*. Available at https://www.bl.uk/collection-items/a-general-history-of-the-lives-and-adventures-of-the-most-famous-highwaymen-murderers-street-robbers

Johnson R. B., Onwuegbuzie A. J. and Turner L. A. (2007), 'Toward a definition of mixed methods research', *Journal of Mixed Methods Research,* 1(2), pp.112-133.

Kreiling, F. C. (1968), Leibniz. *Scientific American*, *218*(5), pp.94-101.

Lieberman, B. (2007) Ethical issues in the use of confidential informants for narcotic operations. *The Police Chief*, 74(6), 1–5

Lowe, D (2021) *The Covert Human an Intelligence Source (Criminal Conduct) Act 2021: Making Lawful Criminal Conduct.* The Expert Witness.

Luscombe, A. and Walby, K. (2015). High policing and access to information, *Police Practice and Research, 16*(6), pp.485-498.

Maguire M. (2008), Crime investigation and crime control, in: T. Newburn, (ed.), *Handbook of policing*, Devon: Willan.

Maguire, M. and Norris, C. (1992), The Conduct and Supervision of Criminal Investigations. *The Royal Commission on Criminal Justice, research study no. 5*. London: HMSO.

Manning, P. (1980), The Narc 's Game: Organisational and informational limits on drug law enforcement, Cambridge: MIT Press.

Manning, P. (1980), The Narc 's Game: Organisational and informational limits on drug law enforcement, Cambridge: MIT Press.

Marx G. T. (1974), 'Thoughts on a Neglected Category of Social Movement Participant: The Agent Provocaeur and the Informants', *American Journal of Sociology*, 80, Issue 2, pp. 405.

Marx G. T. (1992), Undercover: Police Surveillance in America, Barkley: University of California Press, pp. 220-221.

Marx G. T. (1992), Undercover: Police Surveillance in America. University of California Press. Berkeley, p. 17.

Mathiesen T. (1997), 'The Viewer Society: Michel Foucault's "Panopticon" revisited', *Theoretical Criminology*, 1(2), pp. 215-235.

McLean, R., Robinson, G. and Densley, J.A., (2019), *County lines: Criminal networks and evolving drug markets in Britain*. Springer Nature.

Moffett, L., Oxburgh, G., Dresser, P., Watson, S., & Gabbert, F. (2021), Inside the Shadows: A survey of UK HUMINT practitioners examining their considerations when handling a CHIS (CHIS). *Psychiatry, Psychology and Law*.

Morris B. (2006), History of criminal investigation, in T. Newburn, T. Williamson and A. Wright (ed.) *Handbook of criminal Investigation*.

Morse Jr. J. T. (1877), *The Turf Frauds and the Detectives*, Am. L. Rev., 12, p.430.

Moston S. and Engelberg T. (2011), The effects of evidence on the outcome of interviews with criminal suspects. *Police Practice and Research*, 12(6), pp. 518–526.

Mullings, B., (1999), Insider or outsider, both or neither: some dilemmas of interviewing in a cross-cultural setting. *Geoforum*, *30*(4), pp.337-350.

Neiman, S. (1994). *The unity of reason: rereading Kant*.

Newburn T. (2012), Handbook of criminal investigation: Covert Human Intelligence Sources (Informants and undercover police), 1st edition, Routledge, pp.432.

Nincic, Z. (2015), *Undercover investigator in the function of proving organized crime acts.*

Nunan J., Stanier I., Milne R., Shawyer A. & Walsh D. (2020), Eliciting human intelligence: police source handlers' perceptions and experiences of rapport during covert human intelligence sources (CHIS) interactions, *Psychiatry, Psychology and Law*, 27:4, pp.511-537.

Nunan, J., Stanier, I., Milne, R., Shawyer, A., & Walsh, D. (2020a). Eliciting human intelligence: police source handlers' perceptions and experiences of rapport during CHISs (CHIS) interactions. *Psychiatry, psychology and law*, *27*(4), pp.511-537.

Nunan, J., Stanier, I., Milne, R., Shawyer, A., & Walsh, D. (2020b). Source Handler perceptions of the interviewing processes employed with informants. *Journal of Policing, Intelligence and Counter Terrorism*, *15*(3), pp.244–262.

Nunan, J., Stanier, I., Milne, R., Shawyer, A., & Walsh, D. (2020c). Source Handler telephone interactions with covert human. *Applied Cognitive Psychology*, *34*(6), pp.1473–1484.

Office of Surveillance Commissioner: Annual Report, (2017), p.14 Available at: https://ipco-wpmedia-prod-s3.s3.eu-west-2.amazonaws.com/OSC-Annual-Report-2016-17.pdf

O'Hara C. (1976), Fundamentals of Criminal Investigation, Springfield, Scot, Illinois (USA): Foresman and Co, pp. 160-61.

Office for National Statistics (2021), Crime in England and Wales: Police Force Area data tables. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/datasets/policeforceareadatatables
Office for National Statistics (2021), *Crime in England and Wales: Police Force Area data tables*. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/datasets/policeforceareadatatables
Office of Surveillance Commissioners (2004), *Annual Report 2003-2004, HC 668*, London: TSO.

Patel B. (2021), *Police chiefs 'encouraged or tolerated' undercover officers having sexual relationships with activists they spied on for decades, tribunal hears.* Available from: https://www.dailymail.co.uk/news/article-9491833/Police-encouraged-tolerated-undercover-officers-having-sexual-relationships-activists.html

Phillips Sir C. (1981), *Report of the Royal Commission on Criminal Procedure*, London: HMSO.

Phillips, D. (1977), *Crime and Authority in Victorian England: The Black County*, 1835-60. Croom-Helm, London.

Police and Criminal Evidence Act 1984 s78. Available from: https://www.legislation.gov.uk/ukpga/1984/60/section/78

Police and Criminal Evidence Act 1984 s82(3). Available from: https://www.legislation.gov.uk/ukpga/1984/60/section/82

Protection of Freedoms Act (2012), Changes to provisions under the Regulation of Investigatory Powers Act 2000 (RIPA), 2012, p.5 Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/118173/local-authority-england-wales.pdf

R v Donald [1997] 2 WLUK 356

R v Denton [2002] EWCA Crim 272.

R v Police Complaints Authority ex parte Akenzua, [1999] Lexis Citation 4813

Rapp B. (1989), *Deep Cover: Police Intelligence Operations*, Paladin Press, Colorado (USA), p33.

Reese J. (1980), 'Motivations of Criminal Informants', *FBI Law enforcement bulletin*, May: 23-7.

Regulation of Investigatory Powers Act 2000 Part II s8. Available at: https://www.legislation.gov.uk/ukpga/2000/23/section/26

Regulation of Investigatory Powers Act 2000 s27. Available from: https://www.legislation.gov.uk/ukpga/2000/23/section/27

Reiner R. (2010), *The Politics of the Police*, 4th edition, Oxford: Oxford University Press.

Reiner R. and Spencer S. (eds) (1993), Accountable Policing: Effectiveness, Empowerment and Equity, *Institute for Public Policy Research*, London.

Reiner, R. (1992), The Politics of the Police (2nd edition). London: Harvester Wheatsheaf.

Reynolds E. A. (1998), *Before the Bobbies: The Night Watch and Police Reform in Metropolitan London, 1720-1830*, London: Macmillan Press Ltd, pp. 107-108.

Routledge S. H. (2001), *Imperial Inquisitions: Prosecutors and Informants from Tiberius to Domitian*, London: Routledge, p.4.

Russano, M.B., Narchet, F.M., Kleinman, S.M., & Meissner, C.A. (2014). Structured interviews of experienced HUMINT interrogators, *Applied Cognitive Psychology*, 28(6), pp.847–859.

Samuel E. (1977), *The Vidocq Dossier: The Story of the World's First Detective*, 1st edition, Houghton Mifflin, Boston.
Sanders, A., & Young, R. (2012). 'Police powers', In Newburn T., *Handbook of policing* (2nd ed) Willan, pp.309-340.

Selltiz C., Jahoda M., Deutsch M. and Cook S. (1964), Research Methods in Social Relations, Holt, New York: Rinehart and Winston.

Semel, M.D. (2012), *Military interrogations: Best practices and beliefs*. New York, NY: City University of New York.

Sentamu, Blakey and Nove (2002), *The Review of Investigation and Prosecution Arising from the Murder of Damilola Taylor*. Available from: http://image.guardian.co.uk/sys-files/Guardian/documents/2002/12/09/damilola.pdf

Sheldon R. M. (2005), Intelligence Activities in Ancient Rome: Trust in the Gods but Verify. London: Routledge, p.152.

Sherman L. W. (2020), How to Count Crime: the Cambridge Harm Index Consensus, *Cambridge Journal of Evidence-Based Policing*, 4(1-2), pp.1-14.

Skolnick, J. (1966), Justice Without Trial. New York: Wiley.

Smith J. (1989). *The nature of social and educational inquiry: Empiricism versus interpretation*. Norwood, New York: Ablex.

Stanier, I. and Nunan, J. (2021), The impact of COVID-19 on UK informant use and management. *Policing and Society*, pp.1-18.

Stove R. J. (2003), *The Unsleeping Eye: Secret Police and Their Victims*, San Francisco (USA): Encounter Books, pp.28-32.

Swinney v Chief Constable Northumbria Police [1996] 3 All ER 449

Tashakkori A. and Teddlie C. (1998), *Mixed methodology: Combining qualitative and quantitative approaches*, Sage.

Tong, S. and O'Neill, M. (2019) Professionalizing criminal investigation: an examination of an early attempt to support specialization in criminal investigation. *Policing: A Journal of Policy and Practice*. pp. 1-12.

Undercover Policing Inquiry (2021), Available at: https://www.ucpi.org.uk

Urban M. (1992), *Big Boys' Rules: The Bestselling Story of the SAS and the Secret Struggle against the IRA*, London: Faber and Faber Ltd, p. 92.

Vrij A. and Granhag P. A. (2014), Eliciting information and detecting lies in an intelligence interview: An overview of recent research, *Applied Cognitive Psychology*, *28*(6), pp.936–944.

Walsh D. and Bull R. (2012), Examining rapport in investigative interviews with suspects: Does its building and maintenance work? *Journal of Police and Criminal Psychology*, 27(1), pp.73–84.

Ward S. and Boyd M. (2020), 'Police across the UK pay undercover informants more than £13million in five years'. Available from: https://www.mirror.co.uk/news/uk-news/police-across-uk-pay-undercover-21387925

Watson K. (2004), *Poisoned Lives*, London: Hambledon.

Weaver M. (2017), *UK police forces paid informants £20m over past five years*. Available from: https://www.theguardian.com/uk-news/2017/feb/08/police-chiefs-20m-paid-informants-cost-effective

Whitaker Q (2001), 'Surveillance and CHISs under the Regulation of Investigatory powers Act 2000' in Starmer K., Strange M. and Whitaker Q *Criminal Justice, Police Powers and Human Rights*, London: Blackstone, pp. 63-73.

Whiting L. S. (2008), Semi-structured interviews: guidance for novice researchers. *Nursing Standard (through 2013)*, *22*(23), p.35.

Williamson T. and Bagshaw P. (2001), 'The ethics of CHIS handling' in Billingsley R., Nemitz T. and Bean P., *Informers: Policing, Policy, Practice, C*ullompton: Willan Publishing, pp.50-66.

Wood D., Ball K., Lyon D. Norris C. and Raab C. (2006), A report on the surveillance society. Surveillance Studies Network, UK.

Appendices

Appendix A: Consent Form.

Canterbury Christ Church University

CONSENT FORM

Title of Project: How valuable are Covert Human Intelligence Sources (informers) to policing?

Name of Researcher: ***Principal Investigator:*** Miss Kristine Grzibovska
Supervisor: Dr Martin O'Neill

Contact details:

Address:
North Holmes Road
Canterbury
Kent
CT1 1QU

Tel: +44 (0) 01227 921874

Email: kg316@canterbury.ac.uk

Please initial box

1. I confirm that I have read and understand the participant information for the above project and have had the opportunity to ask questions.	
2. (If applicable) I confirm that I agree to any audio recording.	
3. I understand that any personal information that I provide to the researchers will be kept strictly confidential and in line with the University Research Privacy Notice	
4. I understand that my participation is voluntary and that I am free to withdraw my participation at any time, without giving a reason.	
5. I agree to take part in the above project.	

Name of Participant:	Date:	Signature:
Name of person taking consent *(if different from researcher)*	Date:	Signature:
Researcher: Kristine Grzibovska	Date:	Signature:

Copies: 1 for participant
1 for researcher

Appendix B: Semi-structured interview participant information sheet

Canterbury Christ Church University

How valuable are Covert Human Intelligence Sources (Informers) to policing?

PARTICIPANT INFORMATION

A research study is being conducted at Canterbury Christ Church University (CCCU) by Kristine Grzibovska with support of a supervisor Dr Martin O'Neill.

Please refer to our Research Privacy Notice for more information on how we will use and store your personal data.

Background

The research into Covert Human Intelligence Sources (CHISs) is rare, most research on CHISs primarily focuses on the legal regulations or ethical complications (Gill, 2009; Atkinson, 2019). The evidence of informers at criminal trial questions the integrity of criminal justice system and the fairness for both defendants and informers. One must establish whether the use of CHISs is worth the risk and resources spent. A substantial amount of literature emphasises on the importance of the use of Covert Human Intelligence Sources highlighting that almost one third of investigations involve the use of covert investigative methods (Billingsley et al. 2013). Some reports, such as Audit Commission 1993, encourage the use of CHISs and claim that Covert Human Intelligence Sources are the most cost-effective tool within policing. The main aim of this research is to conduct an inquiry into the value of Covert Human Intelligence Sources. The term 'value' has multiple definitions, some may interpret it as in sum of money, others as importance, effectiveness or usefulness of something. The purpose of obtaining practitioners perspectives is to establish average value of CHISs, to understand what a successful outcome of an interaction is with a CHIS, and to create a template of how Covert Human Intelligence Sources may be measured.

- Atkinson C. (2019), 'Mind the grass! Exploring the assessment of informant coverage in policing and law enforcement'. *Journal of Policing, Intelligence and Counter Terrorism*. Volume 14(1). Pp.1-19.
- Audit Commission, Report (1996), *Helping with Enquiries: tackling crime effectively*. HMSO. London
- Billingsley R. Nemitz T. and Bean P. (eds) (2013), *Informers: Policing, Policy, Practice*. Roughledge
- Gill P. (2009), 'Security Intelligence and Human Rights: Illuminating the 'Heart of Darkness'?'. *Intelligence and National Security*. Volume 24(1). Pp.78-102.

What will you be required to do?

Participants in this study will be required to *undertake a semi-structured interview focusing on the subject area in question so that their views are heard and are included in the study of the CHISs value.*

To participate in this research you must:

- be working in the intelligence role either managing Covert Human Intelligence Sources, supervising or managing those that do, or as an analyst for intelligence purposes.

Procedures

You will be asked to *sign a consent form before participating within the study agreeing to participate in an interview through online services (Zoom) due to the current COVID-19 restrictions. The time and date should be agreed by both parties through an email. The interview will be audio recorded for the purposes of transcription and will consist of number of questions designed to answer the research question. The interview should only be about 30-45 minutes.*

Feedback

You will be verbally de-briefed after the interview and should you wish to you can receive a summary of research findings by email. In addition, you will be provided with information where to find the finished product of the Master thesis.

Confidentiality and Data Protection

The following categories of personal data (as defined by the General Data Protection Regulation (GDPR)) will be processed:

- *Ethnicity*
- *Gender*
- *Age*
- *History of employment (length of service, years working with informers/intelligence)*

We have identified that the legitimate interest in processing the personal data is:

- Processing of personal data is necessary for the purpose of findings representation (Age, gender, ethnicity). Personal data will not be published or disclosed to any third party. Research will be carefully sanitised before any dissemination of the results.

Data can only be accessed by, or shared with:

- *The data will only be accessed by the principal researcher (Kristine Grzibovska) and supervisor (Dr Martin O'Neill).*

The identified period for the retention of personal data for this project:

- *At the end of the research, personal data will be held by Dr Martin O'Neill for a period of six years for the purposes of improvement and possibility of further research.*

If you would like to obtain further information related to how your personal data is processed for this project please contact [redacted]

You can read further information regarding how the University processes your personal data for research purposes at the following link: Research Privacy Notice - https://www.canterbury.ac.uk/university-solicitors-office/data-protection/privacy-notices/privacy-notices.aspx

Dissemination of results

Findings of this research will be put in the form of Master thesis for examination purposes, as well as a summary report specifically for [redacted]

Process for withdrawing consent to participate

You are free to withdraw your consent to participate in this research project at any time without having to give any reason. To do this *email to* [redacted] *After emailing to withdraw your consent, principal researcher (Kristine Grzibovska) will permanently delete your personal data and any semi-structured interview findings.*

Appendix C: Semi-structured interview questions.

Semi Structured interview questions.

Introduction: Time and date. Thank you for participating in this study. Can I just clarify whether you have received the participant information sheet and whether you have signed the consent form.

(Response)

Just to remind you, participation is completely voluntary so you can withdraw your consent at any point during this interview.

(Response)

Demographic questions about the participants:

1. Gender
2. Age
3. Ethnicity
4. Length of Service
5. Working with CHISs or not
6. How many years working with CHISs

Main research questions:

1. What, in your opinion, is the value of CHISs?
2. What are potential outcomes of an interaction with a CHIS?
3. Could you provide 3 examples of successful use of CHISs, without providing any sensitive information.
4. Are there any other outcomes that could demonstrate a success of a CHIS?
5. In what ways it is not possible to measure the value of a CHIS?
6. What would be the best way to measure the value?
7. How long does it take you to register a CHIS?
8. How long does it take to plan and prepare an interaction with a CHIS?
9. How many officers are involved when interaction with a CHIS is occurring?
10. How long does the meeting usually lasts?
11. How many times would you say you interact with one specific CHIS over a week?
12. In your view are there any ethical issues in the use of CHISs?
13. How has your interaction changed during COVID?

Appendix D: Draft template

DRAFT TEMPLATE FOR DATA ABSTRACTION FROM CHIS FILES

Please Review each CHIS File and Complete the Following Template.

The template provided begins with a few general questions about the CHIS, including overall number of meetings held. Please answer these questions first.

The template then asks you to answer questions based upon each meeting. You will see that there is space initially to answer questions about 20 meetings. If more than 20 meetings occurred, please copy and paste the template onto a new page and continue to fill them in

General questions

This section asks some very brief general questions about the CHIS file you are reviewing. Please circle the relevant answers, when provided with a choice (i.e. male, female; yes, no), and also answer all questions.

Gender of a CHIS: Male Female Other (please specify): ……..

CHIS Type: Adult / Juvenile

Does the CHIS have a criminal record? Yes / No

Number of meetings held (by whatever medium):…….

Please now go to the template provided on the following page and fill out the data required for each meeting. You will see that there are columns of 5 meetings and there are a number of questions to answer about each meeting (all the same questions for each column). In the columns on the left-hand side, there are some titles that are starred, either *, ** or ***. The key to these stars are provided below the template form on each separate page to assist you with your answers. For instance, one question asks for meeting format and a * indicates that below under * there is a key to code this answer. Below the template next to * there is a choice of: 1. Face to face, 2. Phone call, and 3. Online meeting. You then need to return to the question and circle the relevant number for each meeting.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Information Grading					
Intelligence Sheet	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
Contact Sheet	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
*Meeting Format	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Targeted intelligence	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
**Crime seriousness	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
***Crime Type	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Crime prevented	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
No. of crimes reported in meeting					
No. of offenders reported on					
Number of Arrests as a result of information					
Recovered property value					
Street value of firearms recovered					
Street value of other offensive weapons recovered					
Street value of drugs seized					
No. of people safeguarded					
No. of Missing persons found					
****Outcome	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

***Meeting Format** 1 – Physical face to face meeting; 2 – Phone call; 3 – Online meeting

****Crime seriousness** 1 – PIP1: Volume Crime 2 – PIP2: Serious and Complex crime 3 – PIP3: Major crime and serious and organised crime, terrorism 4 – PIP4: Cross border serious/major/terrorism investigations

*** **Crime Type:** 1 -Property Crime; 2. Violent Crime, 3. Drugs; 4. Sexual Offences, 5. Terrorism

****Outcome** 1 - Court Conviction, 2 – Caution 3 – Reprimand 4 – No further action 5 – other disposal

Appendix E:Participant information sheet for the second phase

How valuable are Covert Human Intelligence Sources (Informers) to policing?

PARTICIPANT INFORMATION

A research study is being conducted at Canterbury Christ Church University (CCCU) by Kristine Grzibovska with support of a supervisor Dr Martin O'Neill.

Please refer to our Research Privacy Notice for more information on how we will use and store your personal data.

Background

The research into Covert Human Intelligence Sources (CHISs) is rare, most research on CHISs primarily focuses on the legal regulations or ethical complications (Gill, 2009; Atkinson, 2019). The evidence of informers at criminal trial questions the integrity of criminal justice system and the fairness for both defendants and informers. One must establish whether the use of CHISs is worth the risk and resources spent. A substantial amount of literature emphasises on the importance of the use of Covert Human Intelligence Sources highlighting that almost one third of investigations involve the use of covert investigative methods (Billingsley et al. 2013). Some reports, such as Audit Commission 1993, encourage the use of CHISs and claim that Covert Human Intelligence Sources are the most cost-effective tool within policing. The main aim of this research is to conduct an inquiry into the value of Covert Human Intelligence Sources. The most recent research into the economic evaluation methods (which could be applied to policing activity) was undertaken by Stockdale, Whitehead and Gresham on behalf of the Home Office in 1999. They highlighted that if outputs and outcomes are difficult to define and measure, the economic evaluation is not possible.

- Atkinson C. (2019), 'Mind the grass! Exploring the assessment of informant coverage in policing and law enforcement'. *Journal of Policing, Intelligence and Counter Terrorism*. Volume 14(1). Pp.1-19.
- Audit Commission, Report (1996), *Helping with Enquiries: tackling crime effectively*. HMSO. London
- Billingsley R. Nemitz T. and Bean P. (eds) (2013), *Informers: Policing, Policy, Practice*. Routledge
- Gill P. (2009), 'Security Intelligence and Human Rights: Illuminating the 'Heart of Darkness'?'. *Intelligence and National Security*. Volume 24(1). Pp.78-102.
- Stockdale J. E., Whitehead C. M. E. and Gresham P. J. (1999), 'Applying Economic Evaluation to Policing Activity'. *Policing & Reducing Crime*. Volume 103. Home Office. London.

What will you be required to do?

Participants in this study will be required to *participate within focus group interview focusing on the discussion of the template for the purposes of getting feedback and improving the template before any economic analyses take place.*

To participate in this research you must:

- be working in the intelligence role either managing Covert Human Intelligence Sources, supervising or managing those that do, or as an analyst for intelligence purposes.

Procedures

You will be asked to *sign a consent form before participating within the study agreeing to participate in a focus group interview through online services such as Teams or Zoom due to the current COVID-19 restrictions. The time and date should be agreed by all parties through an email.*

Feedback

You will be verbally de-briefed after the focus group interview and should you wish to you can receive a summary of research findings by email. In addition, you will be provided with information where to find the finished product of the Master thesis.

Confidentiality and Data Protection

The following categories of personal data (as defined by the General Data Protection Regulation (GDPR)) will be processed:

- *Ethnicity*
- *Gender*
- *Age*
- *History of employment (length of service, years working with informers/intelligence)*

We have identified that the legitimate interest in processing the personal data is:

- Processing of personal data is necessary for the purpose of consent (first name and last name), contact with the participant (Email address), and findings representation (Age, gender, ethnicity). Personal data will not be published or disclosed to any third party. Research will be carefully sanitised before any dissemination of the results.

Data can only be accessed by, or shared with:

- *The data will only be accessed by the principal researcher (Kristine Grzibovska) and supervisor (Dr Martin O'Neill).*

The identified period for the retention of personal data for this project:

- *At the end of the research, personal data will be held by Dr Martin O'Neill for a period of six years for the purposes of improvement and possibility of further research.*

If you would like to obtain further information related to how your personal data is processed for this project please contact [redacted]

You can read further information regarding how the University processes your personal data for research purposes at the following link: Research Privacy Notice - https://www.canterbury.ac.uk/university-solicitors-office/data-protection/privacy-notices/privacy-notices.aspx

Dissemination of results

Findings of this research will be put in the form of Master thesis for examination purposes, as well as a summary report specifically for [redacted]

Process for withdrawing consent to participate

You are free to withdraw your consent to participate in this research project at any time without having to give a reason. To do this *email to* [redacted] *After emailing to withdraw your consent, principal researcher (Kristine Grzibovska) will permanently delete your personal data.*

You may read further information on your rights relating to your personal data at the following link: Research Privacy Notice - https://www.canterbury.ac.uk/university-solicitors-office/data-protection/privacy-notices/privacy-notices.aspx

Any questions?

[redacted]

Appendix F: Second phase: semi-structured interview questions

(The template will be provided within the forum for the participants to see.)

Introduction: The aim of this semi-structured interview is to discuss the template formulated by the researcher according to the intelligence gathered from the first stage within this study with practitioners.

Are you still happy to consent to participation within this study?

(Response)

Just to remind you, you can withdraw your consent at any point during this focus group.

(Response)

Main focus group questions:

1. What are your thoughts on the template?
2. What was missed from the template?
3. In what ways the template will not be able to assess the value of CHISs?
4. How can measurement of the value within these areas achieved?
5. Are there any other ways to approach the value that would be better?
6. Is there anything that we had not touched on that you would like me to know?

Appendix G: Final Template

TEMPLATE FOR DATA ABSTRACTION FROM CHIS FILES

Please Review each CHIS File and Complete the Following Template.

The template provided begins with a few general questions about the CHIS, including overall number of contacts held. Please answer these questions first.

The template then asks you to answer questions based upon each contact. You will see that there is space initially to answer questions about 20 contacts. If more than 20 contacts occurred, please copy and paste the template onto a new page and continue to fill them in.

General questions

This section asks some very brief general questions about the CHIS file you are reviewing. Please circle the relevant answers, when provided with a choice (i.e. male, female; yes, no), and also answer all questions.

CHIS Type: Adult / Juvenile

Number of contacts held (by whatever medium):…….

Please now go to the template provided on the following page and fill out the data required for each contact. You will see that there are columns of 5 contacts and there are a number of questions to answer about each contact (all the same questions for each column). In the columns on the left-hand side, there are some titles that are starred, either *, ** or ***. The key to these stars are provided below the template form on each separate page to assist you with your answers. For instance, one question asks for contact format and a * indicates that below under * there is a key to code this answer. Below the template next to * there is a choice of: 1. Face to face, 2. Phone call. You then need to return to the question and circle the relevant number for each contact.

	Contact 1	Contact 2	Contact 3	Contact 4	Contact 5
Information grading					
No. of intelligence reports					
*Meeting Format	1 2	1 2	1 2	1 2	1 2
Targeted intelligence (targets)	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
No. of tasked intelligence					
**Crime seriousness	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
***Crime Type	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6
Crime prevented/disrupted	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
No. of crimes discussed					
No. of offenders discussed					
No. of victims discussed					
No. of Arrests					
Street value of property recovered					
No. of firearms recovered					
No. of offensive weapons recovered					
Street value of drugs seized					
Amount of money seized					
No. of people safeguarded					
No. of Missing persons found					
****Outcome	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
No. of missed opportunities					
Overall costs of running the CHIS (Total number of awards, time spent with officers etc)					

***Meeting Format** 1 – Physical face to face meeting; 2 – Phone call

****Crime seriousness** 1 – PIP1: Volume Crime 2 – PIP2: Serious and Complex crime 3 – PIP3: Major crime and serious and organised crime, terrorism 4 – PIP4: Cross border serious/major/terrorism investigations

*** **Crime Type:** ***1 -Exploitation*** (Cuckooing and criminal exploitation, organised immigration crime, modern slavery and human trafficking); ***2. Serious violence*** (knife and gun crime, aggravated burglary and robbery, rape and serious sexual assault), ***3. Abuse*** (Adult abuse, domestic abuse, child abuse); ***4. High harm crime*** (burglary residential, hate crime, fraud and cyber crime), ***5. Counter terrorism*** (extremist travel, potential lone actors, right wing terrorism); 6 Other.

****Outcome** 1 - Court Conviction, 2 – Caution 3 – Reprimand 4 – No further action 5 – other disposal

Appendix H: CHI scores for fines and community service orders

Penalty	Median amount	Days	Calculation
Band A Fine	£60	7	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.
Band B Fine	£120	14	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.
Band C Fine	£180	21	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.
Band D Fine	£300	34	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.
Band E Fine	£480	55	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.
Band F Fine	£720	83	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.

Calculating sentence days (rounded up to the nearest full day) for non-custodial offences. (For the purposes of CHIR).

Calculating sentence days (rounded up to the nearest full day) for non-custodial offences. (For the purposes of CHIR).

Penalty	Median hours of unpaid work	Days	Calculation
Low level community service	40 hours	5	Number of hours needed to work to complete the UPWR at 8

			hours per day, rounded to the nearest whole day
Medium community service	80 hours	10	Number of hours needed to work to complete the UPWR at 8 hours per day, rounded to the nearest whole day
High community service	150 hours	19	Number of hours needed to work to complete the UPWR at 8 hours per day, rounded to the nearest whole day
Fixed penalty notice	£30	3	Number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, rounded up to the nearest whole day – based on working an 8 hour day.

Appendix I: Initial Ethics Approval and amendments

Ethics ETH2021-0149: Miss Kristina Grzibovska : Decision

Sent on **10 Mar 2021** by [redacted] Download as PDF...

Miss Kristina Grzibovska

School Of Law, Policing And Social Sciences

Faculty of Science, Engineering and Social Sciences

10th March 2021

Dear Kristina

Confirmation of ethics approval: What is the value of Covert Human Intelligence Sources to policing?

Your ethics application complies fully with the requirements for ethical and governance review, as set out in this University's Research Ethics and Governance Procedures, and has been approved.

You are reminded that it is your responsibility to follow, as appropriate, the policies and procedures set out in the Research Governance Framework and any relevant academic or professional guidelines.

Any significant change in the question, design or conduct of the study over its course will require an amendment application, and may require a new application for ethics approval.

It is a condition of approval that you **must** inform ethics@canterbury.ac.uk once your research has completed.

Wishing you every success with your research.

On behalf of

Faculty of Science, Engineering and Social Sciences Ethics Panel

[redacted]

Ethics ETH2122-0002: Miss Kristina Grzibovska : Decision

Sent on **06 Aug 2021** by [redacted] Download as PDF...

Miss Kristina Grzibovska

School Of Law, Policing And Social Sciences

Faculty of Science, Engineering and Social Sciences

6th August 2021

Dear Kristina

Confirmation of project amendment ethics approval: What is the value of Covert Human Intelligence Sources to policing?

Your application to amend your research project has been reviewed and approved.

You are reminded that it is your responsibility to follow, as appropriate, the policies and procedures set out in the Research and Enterprise Integrity Governance Framework and any relevant academic or professional guidelines.

Any further significant change in the question, design or conduct of the study over its course will require an amendment application, and may require a new application for ethics review.

It is a condition of approval that you **must** inform Canterbury once your research has completed.

Wishing you continued success with your research.

On behalf of

Faculty of Science, Engineering and Social Sciences Ethics Panel

[redacted]

Appendix I: Data Sharing Agreement

Canterbury Christ Church University

Information agreement and data protection statement between Kristine Grzibovska (MSc Researcher, Social and Applied Sciences, Canterbury Christ Church University) and [redacted]

The purpose of this document is to outline the roles and responsibilities of parties involved in this research and to outline the data protection and data security arrangements to protect the personal data of those participating in research with Canterbury Christ Church University.

Project Title:

Working title: How valuable are Covert Human Intelligence Sources' (informers) to policing?

Principle Researcher:

Kristine Grzibovska

Research Supervisor(s):

Dr Martin O'Neill and Professor Steve Tong

Data Subjects:

Officers working in the intelligence role either managing Covert Human Intelligence Sources, supervising or managing those that do, and officers who work as analysts for intelligence purposes.

Data Controller:

Canterbury Christ Church University

Data Processor:

Kristine Grzibovska

Data Protection Officer:

Robert Melville
Assistant University Secretary
Canterbury Christ Church University
Rochester House
St George's Place
Canterbury
CT1 1UT

E-mail: dp.officer@canterbury.ac.uk
Telephone: 01227 767700

Legal Basis of data collection:

Legitimate interests

Methodology:

The research will be based of consequential mixed method approach to explore the value of Covert Human Intelligence Sources in-depth.

Phase 1

The first phase of this research will focus on practitioners' views on the value of Covert Human Intelligence Sources and how it can be measured. This will be done through semi-structured interviews with officers working in the intelligence role either managing Covert Human Intelligence Sources, supervising or managing those that do, and officers who work as analysts for intelligence purposes. Participants will be recruited on voluntary basis. Those who agree will be required to answer a set of questions within semi-structured interviews. (It is important to mention that at any point participants will be able to withdraw consent by emailing the principal researcher. When withdrawal of consent is received, all data collected will be permanently deleted). Interviews will be audio recorded on an encrypted audio device. Recordings will be immediately uploaded onto secure computer system at Canterbury Christ Church University. The physical recording will be then destroyed. Data analyses of semi-structured interviews will be conducted through thematic analyses using NVivo software program with the anonymity of participant identities.

Phase 2

Data analyses of semi-structured interviews from phase one will be used for the creation of a template. This template will focus on the value of Covert Human Intelligence Sources based upon participants' perspectives. (No sensitive or personal data will be used in this research). The template then will be discussed with practitioners through the use of focus group.

Phase 3

The created template will then be utilised within the final stage of this research. The 'gatekeeper' will be asked to either disclose internal reports on staff costing, running costs, and any other costs that were involved in Covert Human Intelligence Sources based cases, and also asked to complete the survey, which would focus on value and costs. This last stage will focus on Covert Human Intelligence Sources' over 3-year time period. (The researcher will not have any direct access to any sensitive information). The analyses of this will allow consideration of whether Covert Human Intelligence Sources were, specifically in the 3-year period analysed, of value or not, and will also assist in further developing the template. All data and personal information will be stored securely within CCCU premises in accordance with the *General Data Protection Regulations (GDPR)* and the Data Protection Act 2018. Research will be carefully sanitised and discussed with Kent Police before any data dissemination.

Details of Data Security and Data Handling to ensure GDPR Compliance:

- Informed consent will be gained from all participants via an information sheet which participants can retain and the signed consent forms,
- The Academic tutor has completed e-learning on GDPR.
- If there will be the need for disclosure of sensitive information to Data Processor(s) i.e. primary researcher(s) (Kristine Grzibovska) will be security vetted by [redacted] prior to receiving access.
- Force will be provided with details of Data Protection Policies.
- CCCU will be the only agency outside of [redacted] to receive the information, and only principal researcher (Kristine Grzibovska) and the staff from within CCCU's Social and Applied Sciences who are actively involved in the research shall have access to the information.

- Information received i.e. interview transcripts, interview recordings and participant details will be stored in an independent encrypted database (CCCU systems only) with password protection and access restricted to the named researchers only.
- The data will be stored for six years so to be in compliance with GDPR regulations, when the researcher has left the university after completing their degree all material is handed over to the supervisor Martin O'Neill until the six years has passed, for the purposes of follow up research with participants.
- If electronic data needs to be physically transported between locations encrypted USB sticks provided by the University will be used – However, this is unlikely to occur as it will only be used on CCCU computers.
- Consent forms which contain names and contact details to be collected and transported separately from completed transcripts. This is again unlikely as interviews will be online in the majority of cases.

- Consent forms will be coded upon retrieval to allow any data subject to withdraw their data at any time (GDPR requirement)
- Consent forms to be stored separately from any other data.
- No attempt will be made to match consent forms to transcripts to ensure that raw data is suitably anonymised (with right to withdraw data accepted as above).
- No attempt will be made to identify individual participants from demographic data.
- The identity of subjects taking part in interviews will be kept strictly confidential.
- Only general trends will be reported in any writing.
- Recordings of interviews will be deleted once they have been transcribed to avoid voice-identification.
- The physical data will be stored until successful completion of the work and only anonymised responses will be stored for future use, if deemed necessary.
- University data protection policies will be strictly complied with.

Signed – Principle Researcher

Name: Kristine Grzibovska

Date: 23/02/2021

Appendix K: Average CHI scores for the Control Strategy Areas

Exploitation

1. Controlling prostitution for gain – 365
2. Causing or inciting the sexual exploitation of a child – 365
3. Attempt: causing or inciting the sexual exploitation of a child - 365
4. Arranging or facilitative of commission of a child offence – 183
5. Attempt: arranging or facilitating of commission of child sex offence = 183
6. Knowingly hold another person in slavery/servitude – 730
7. Human trafficking – 730
8. Apparatus designed or adapted for the making of false identity documents – 730
9. Assisting unlawful immigration – 730
10. Help asylum seeker to re-enter the UK - 730

Exploitation = 511

Serious Violence

1. Homicide – 5475
2. Attempted murder – victim 1 and over – 3285
3. Endangering life – administrating poison as to endanger life - 3285
4. Violence with injury - 357
5. Violence without injury - 182
6. Import prohibited weapons/ ammunition with intent to evade prohibition/restriction – 2920
7. Manufacture weapon/ammunition specified in section 5 (1) of the Firearms Act 1968 – 2190
8. Possession of firearm with intent to endanger life – 1825
9. Possessing firearm or imitation firearm with intent to cause fear of violence 1825
10. Carrying loaded firearm or any other firearm (whether loaded or not) together with ammunition suitable for use in that firearm in a public place etc – 730
11. Threaten with an offensive weapon on school premisses – 548
12. Threaten with a blade or sharply pointed article on school premises – 548
13. Possessing or distributing prohibited weapons designed for discharge of noxious substances – 365
14. Possessing or distributing prohibited weapons – 365
15. Threaten with an offensive weapon in public place – 183
16. Threaten with a blade or sharply pointed article in a public place – 183
17. Carrying a loaded or unloaded or imitation firearm or air weapon in a public place – 17
18. Endangering life – making, possessing or controlling explosive substance with intent to endanger life – 2920
19. Endangering life – use of noxious substances or things to cause harm and intimidate – 2190
20. Endangering life – causing explosions, sending explosive substance or throwing corrosive fluids with intent to do grievous bodily harm - 2190
21. Possessing a firearm whilst committing or being arrested for indictable offence s18 Firearm At 1968 – 1825
22. Possessing firearm with intent to resist arrest – 1825
23. Possessing air weapon or imitation with intent to commit indictable offence - 1825
24. Robbery – 365

25. Rape of a child under 13 – 2920
26. Rape of a female/male under 16 – 2555
27. Sexual activity with a child family member – 2555
28. Rape of persons aged 16 or over – 1825
29. Aggravated burglary – 730

Serious Violence = 1,655

Abuse

1. Violence with injury - 357
2. Violence without injury - 183
3. Stalking and harassment – 252
4. Causing or inciting a child under 13 to engage in sexual activity by an offender under 18 years of age – penetration – 1460
5. Sexual activity with a child family member – victim aged 13 – 17 – offender 18 and over – 1278
6. Assault on persons by penetration – 730
7. Sexual activity with a child under 13 by an offender under 18 years of age – no penetration – 730
8. Causing a person to engage in sexual activity without consent – 730
9. Administering a substance with intent – 730
10. Trespassing with intent to commit sexual offence – 730
11. Take/make/distribute indecent photographs of children – 548
12. Meeting a child following sexual grooming (offender aged 18+ and victim 16 or under) – 548
13. Sexual activity with a child under 16 by penetration – offender under 18 – 365
14. Causing or inciting a child under 16 to engage in sexual activity by penetration – offender 18 or over – 365
15. Sexual activity with a child under 16 by penetration – offender 18 or over – 365
16. Causing or inciting a child under 16 to engage in sexual activity by penetration – offender 18 or over – 365
17. Sexual activity with a person with a mental disorder impending choice – 183
18. Arranging or facilitating the commission of a child sex offence – 183
19. Abuse of trust: sexual activity with a child under 13 – offender 18 and over – 183
20. Abuse of trust: causing or inciting a child to engage in sexual activity – victim under 13 offender 18 or over – 183
21. Abuse of trust: causing a child to watch a sexual activity – victim under 13 offender 18 and over – 183
22. Sexual assault on child under 13 – 183
23. Sexual assault on individual – 28
24. Causing a person to engage in sexual activity without consent – no penetration – 28
25. Sex with an adult relative penetration (offender aged 16 or over relative aged 18+) – 28
26. Engaging in sexual activity in the presence of a child under 13 by an offender over 18 – 10
27. Engaging in sexual activity in the presence of a child under 13 by an offender over 18 – 10
28. Engaging in sexual activity in the presence of a child under 16 – offender aged 18 and over – 10
29. Causing a child under 16 to watch a sexual act – offender under 18 - 10
30. Causing a child under 16 to watch a sexual act – offender 18 and over – 10

31. Engage in sexual communication with a child aged under 13 – 10
32. Coercive Behaviour – 252
33. Causing or allowing the death of a child or vulnerable adult - 730

Abuse = 362

High Harm Crime

1. Residential burglary – 10
2. Production or being concerned in production of a controlled drug – Class A – 548
3. Production or being concerned in production of controlled drug – Class B – 548
4. Supplying or offering to supply a controlled drug – Class A – 548
5. Possession of controlled drug with intent to supply – Class A – 548
6. Permitting premisses to be used for unlawful purposes – Class A – 14
7. Supplying or offering to supply a controlled drug – Class B – 5
8. Supplying or offering to supply a controlled drug – Class C – 5
9. Supplying or offering to supply a controlled drug – Class Unspecified – 5
10. Possession of controlled drug with intent to supply – Class B – 5
11. Possession of controlled drug with intent to supply – Class C – 5
12. Possession of controlled drug with intent to supply – Class Unspecified – 5
13. Having possession of a controlled drug – Class A – 21
14. Having possession of a controlled drug – Class B – 14
15. Having possession of a controlled drug – Class C – 5
16. Having possession of a controlled drug – Class Unspecified - 5
17. Racially or religiously aggravated infecting grievous bodily harm without intent – 357
18. Racially or religiously aggravated assault or assault occasioning actual bodily harm – 19
19. Racially or religiously aggravated common assault or beating – 10
20. Racially or religiously aggravated harassment or stalking without violence – 10
21. Racially or religiously aggravated harassment or stalking with fear of violence – 10
22. Racially or religiously aggravated fear or provocation of violence – 10
23. Fraud (including computer enabled) – 730

High Harm Crime = 149

Terrorism

1. Homicide – 5475
2. Conspiracy to murder – soliciting to commenting murder – 5475
3. Attempted murder – victim 1 and over – 3285
4. Endangering life – administrating poison with intention to endanger life – 3285
5. Endangering life – making, possessing or controlling explosive substance with intent to endanger life - 2920
6. Endangering life – use of noxious substances or things to cause harm and intimidate – 2190
7. Endangering life – causing explosions, sending explosive substance or throwing corrosive fluids with intent to do grievous bodily harm – 2190
8. Manufacture or possession of explosives under suspicious circumstances – 1460
9. Arson endangering life – 365
10. Criminal Damage endangering life – 365
11. Import prohibited weapons/ammunition with intent to evade prohibition/restriction – 2920
12. Manufacture weapon/ammunition specified in section 5 (1) of the Firearms Act 1968 – 2190

13. Possession of firearm with intent to endanger life – 1825
14. Possessing firearm or imitation firearm with intent to cause fear of violence – 1825
15. Offences under Terrorism Act 2000 - 5110

Terrorism = 2,725

Other

1. Anti-social behaviour act 2003 – continuing failure to comply with remedial order after conviction under Section 75(9) – 7
2. Breach of Anti-Social Behaviour Order – 7
3. Breach of Restraining Order issues on acquittal -5
4. Public nuisance – 7
5. Arson not endangering life – 8
6. Other criminal damage to a building £5,000 and over – 14
7. Criminal damage to a building under £5,000 – 7
8. Other criminal damage to a vehicle under £5,000 – 7
9. Other criminal damage to other under £5,000 – 7
10. Vehicle offences – 14
11. Theft from persons – 2
12. Bicycle theft – 10
13. Shoplifting – 5
14. Other theft – 5
15. Non- residential burglary - 10

Other = 8

CHIR calculation

Force priorities	No. of crimes (June 2021)	Crime Harm Index (sentence days)	Crime Harm Index Score (for the county)	County's population (June 2021)	Crime Harm Rate
Exploitation	85,948	511	43,919,428	1,589,100	27.6
Serious Violence	94,923	1,655	157,097,565	1,589,100	98.9
Abuse	85,891	363	31,178,433	1,589,100	19.6
High Harm Crime	61,485	149	9,161,265	1,589,100	5.8
Terrorism	Unknown	2,725	Unknown	1,589,100	Unknown
Other (volume crime)	67,277	8	538,216	1,589,100	0.3

Appendix L: How to calculate CHI score

The level of harm caused to victims of murder is higher comparing to harm caused to victims of theft. The minimum sentence for murder is fifteen years, whereas the minimum sentence for theft is Band C fine (for fines and community services CHI scores see Appendix H).

To calculate the CHI for murder, according to Sherman et al.'s (2016) calculations, the number of years must be multiplied by number of days in a year (365 days).

15 x 365 = 5,475

CHI score for murder is 5,475

The CHI score for the fine categories (according to Sherman et al.'s (2016) calculations) must be calculated through the number of hours needed to work at the minimum wage for over 25s (£8.72) to earn the money to pay the fine, this then should be rounded up to the nearest whole day (based on working an 8-hour day).

CHI score for theft is 21

This way it is clear that that murder (5,475) is more severe than theft (21). Moreover, some crime types may have a community order as a minimum sentence. According to Sherman et al.'s (2016) calculations, the CHI number for community orders must be calculated through the number of hours needed to work to complete the community order at 8 hours per day, rounded to the nearest whole day. The same calculations have been done to other types of crime to establish the CHI score for each one (See Appendix J).

Once each crime type is given a CHI number, the number of crimes (for 1 year), in each category, should be multiplied by that score. This would provide a total CHI score for each crime type. An example of how CHI is calculated is provided below:

- 10 possessions of controlled Class A drugs
- 6 Sexual Assaults
- 2 murders
  Total = 18 crimes

The CHI is calculated by multiplying the number in each category by the Sentencing Council of England and Wales 'starting point' as in days of imprisonment as follows:

Crime Type x Guideline CHI Score

- 10 possessions of controlled Class A drugs x 3 days = 30
- 6 Sexual Assaults x 19 days = 114
- 2 murders x 5475 days = 10,950
  Total = 11,094

Table 1 "Categories divided into control strategy areas."

Categories	**Control Strategy Areas**
Sexual exploitation, modern slavery, human trafficking, assisting illegal immigration	Exploitation
Violence against the person, possession of weapons (including firearms), rape and serious sexual abuse, aggravated burglary, robbery	Serious Violence

Violence with injury, violence without injury, stalking and harassment, coercive behaviour, sexual offences, neglect	Abuse
Residential burglary, drug offences, hate crime, fraud, cybercrime.	High Harm Crime
Violence against person (including murder and conspiracy to murder, and endangering life by all means), Arson (endangering life), Criminal Damage (endangering life), possession of weapons (higher offences), offences under Terrorism Act 2000	Terrorism
Anti-Social Behaviour Order, Theft offences, non-residential burglary, Criminal damage (not endangering life), Arson (not endangering life)	Other (Volume Crime)

The table 1, consists of all categories which were considered within further calculations of Crime Harm Index scores. Categorisation of crime was important because it has influenced the final average Crime Harm Index scores. When Crime Harm Index scores for each category of crime were calculated, they then further have been summed up and divided by the number of crime types to receive an average Crime Harm Index for each of the Control Strategy Areas.

For example, to calculate the average score of CHI for Serious Violence, these crimes and sentences were included based upon consultation with the participating police service:

1. Homicide – 5475
2. Attempted murder – victim 1 and over – 3285
3. Endangering life – administrating poison as to endanger life - 3285
4. Violence with injury - 357
5. Violence without injury - 182
6. Import prohibited weapons/ ammunition with intent to evade prohibition/restriction – 2920
7. Manufacture weapon/ammunition specified in section 5 (1) of the Firearms Act 1968 – 2190
8. Possession of firearm with intent to endanger life – 1825
9. Possessing firearm or imitation firearm with intent to cause fear of violence 1825

10. Carrying loaded firearm or any other firearm (whether loaded or not) together with ammunition suitable for use in that firearm in a public place etc – 730
11. Threaten with an offensive weapon on school premisses – 548
12. Threaten with a blade or sharply pointed article on school premises – 548
13. Possessing or distributing prohibited weapons designed for discharge of noxious substances – 365
14. Possessing or distributing prohibited weapons – 365
15. Threaten with an offensive weapon in public place – 183
16. Threaten with a blade or sharply pointed article in a public place – 183
17. Carrying a loaded or unloaded or imitation firearm or air weapon in a public place – 17
18. Endangering life – making, possessing or controlling explosive substance with intent to endanger life – 2920
19. Endangering life – use of noxious substances or things to cause harm and intimidate – 2190
20. Endangering life – causing explosions, sending explosive substance or throwing corrosive fluids with intent to do grievous bodily harm - 2190
21. Possessing a firearm whilst committing or being arrested for indictable offence s18 Firearm At 1968 – 1825
22. Possessing firearm with intent to resist arrest – 1825
23. Possessing air weapon or imitation with intent to commit indictable offence - 1825
24. Robbery – 365
25. Rape of a child under 13 – 2920
26. Rape of a female/male under 16 – 2555
27. Sexual activity with a child family member – 2555
28. Rape of persons aged 16 or over – 1825
29. Aggravated burglary – 730

(total sentence days) 48,008 / 29 (total amount of crimes)

Serious Violence = 1,655

(for average crime harm scores for all of the Control strategy areas above, see Appendix J)

Appendix M: How to calculate CHIR

To calculate the overall contribution, one must multiply the CHIR by the amount of intelligence reports. For example, if after the contact with a CHIS seven intelligence reports were produced focusing on high harm crime, the score would be calculated as follows:

High harm crime CHIR score 4.9 (see Appendix K)

4.9 x 7 (number of intelligence reports related to high harm crime) = 34.3

Appendix N: How to calculate the physical value, value of actions and value of weapons

1. The physical value involving cash recovered, property recovered, and drugs recovered categorised according to pound value (from £0 to £50,000+). Once a number falls in the related category, it must be multiplied by CHIR.

The table below displays the categorisation of physical value for the purposes of further evaluation within this research.

Table 3: 'Categorisation and rating of physical value'

Value	Category
£0 - £10,000	1
£10,001 - £20,000	2
£20,001 - £30,000	3
£30,001 - £40,000	4
£40,001 - £50,000	5
£50,000+	6

The categorisation and rating of physical value allows the research to put valuation on the outcomes which are based upon monetary value. For example, due to the information provided by a CHIS £5,000 of drugs was seized, £15,000 cash recovered, and £3,000 worth of property recovered. Intelligence reported fell under high harm crime. The calculation of the worth of this interaction is below:

Drugs seized - £5,000
Cash recovered - £15,000
Property recovered - £3,000
Total value: 23,000

The total value falls under Category – 2 of table 3

(Category of value) 2 x 4.9 (CHIR score for High Harm crime) =9.8

Total score of Harm Linked Outcome in relation to the physical value = 9.8

2. The value of actions:

To calculate the score for arrests, one must multiply the number of arrests by the CHIR. For example, due to the information provided by a CHIS, 4 arrests are made. Intelligence reported fell under high harm crime.

CHIR for high harm crime – 4.9
No. of Arrests - 4
4 x 4.9 = 19.6
Total score of Harm Linked Outcome in relation to the arrests = 19.6

To calculate the score for an outcome, one must look at the number of the arrests and times it by category according to a type of outcome, further multiplying it by the CHIR. The table below displays the categorisation of potential case outcomes. The categorisation was based upon the sentence severity.

Table 4: 'Categorisation of potential case outcomes based upon the severity of the sentence'

Outcome	Category
No further action	0
Reprimand	1
Caution	2
Other disposal	3
Court conviction	4

The categorisation of potential case outcomes, allowed this research to valuate different outcomes. The categories of all potential outcomes have been considered within further analyses of Harm Linked Outcomes.
For example, due to the information provided by a CHIS court conviction were secured. Intelligence provided focused on high harm crime.

CHIR for high harm crime – 4.9
Outcome category – 4 (Table 4)
4 x 4.9 = 19.6

Total score of Harm Linked Outcome in relation to the severity of the sentence = 19.6

To calculate the score for people safeguarded and missing persons found, one must look at the number of people safeguarded, or missing persons found and multiply it by CHIR.
For example, two people were safeguarded. Intelligence supplied by a CHIS focused on high harm crime.

CHIR for high harm crime – 4.9
People safeguarded - 2
2 x 4.9 = 9.8

Total score of Harm Linked Outcome in relation to the people safeguarded= 9.8

3. The value of weapons

To calculate the score for firearms and for other offensive weapons recovered by the police, one must look at the number of firearms or offensive weapons recovered due to the information supplied by the CHIS and multiply the number by CHIR. For example, due to the information supplied by a CHIS four firearms were seized. Intelligence supplied focused on high harm crime.

CHIR for high harm crime is 4.9
No. of firearms recovered – 4
4 x 4.9 = 19.6
Total score of Harm Linked Outcome in relation to the firearms recovered = 19.6

Similarly, with other offensive weapons, one must multiply the number of offensive weapons recovered with CHIR. For example, 2 knives were recovered, and intelligence obtained focused on high harm crime.

CHIR for high harm crime is 4.9
No. of offensive weapons – 2
2 x 4.9 = 9.8
Total score of Harm Linked Outcome in relation to the offensive weapons recovered = 9.8

Appendix O: How to calculate costs for the management of CHIS

The police service has provided an hourly Detective Constable pay rate which is £19.71. All economic calculations of resources spent were based upon this hourly rate pay. It is important to mention that the costs considered within this study do not include general operational costs such as the cost for the buildings, transport, technology etcetera. The resources considered within this study purely focus upon the management of informers. To calculate operational costs which are research and dissemination of intelligence, the average time taken was provided by the practitioners. Practitioners stated that it takes around 15 minutes to check the report by a supervisor and 15 minutes to disseminate this intelligence report. Therefore, for one intelligence report operational cost would consist of 30 minutes of work.

£19.71/60 minutes = £0.33 per minute

30 minutes x £0.33 = £9.90

Per 1 intelligence report £9.90 is spent.

To calculate the employee costs, one must simply look at the length of the contact and calculate how much have been spent on employees for that contact.

For example, if a contact lasted 12 minutes the calculation would be as follows

£19.71/60 minutes = £0.33 per minute

12 minutes x £0.33 = £3.96

This hypothetical 12-minute contact costed £3.96

Furthermore, it is important to include planning and preparing for any contacts. There are two types of contacts practitioners make with their CHISs. These are phone contacts and physical face-to-face contacts. On average, as stated by practitioners, for the phone call contact they need around two hours for planning and preparing. For physical, face to face contact, practitioners need around eight hours to plan and prepare due to higher risks for both CHISs and officers, and planning and preparing venue, and general CHIS tradecraft matters such as access points, and exit points.

To illustrate:

Planning and Preparing

1. Phone call – two hours

£19.71/60 minutes = £0.33 per minute

120 minutes x £0.33 per minute = £39.60

For a phone contact with a CHIS the force spends approximately £39.60 for planning and preparing stage (one handler)

2. Physical face-to-face meeting – eight hours

£19.71/60 minutes = £0.33 per minute

480 minutes x £0.33 = £158.40

For a face-to-face contact with a CHIS the force approximately spends £158.40 for the planning and preparing stage (per handler).

It is also important to mention that a minimum of two handlers must be present during a face-to-face contact for safety reasons. Therefore, for each physical meeting, both length of contact and planning/preparing, must be multiplied by two to reflect two handlers.

Lastly, to consider all resources spent on CHISs, this research considered rewards given to CHISs for the intelligence. This research was able to obtain overall reward spent on each of the thirty CHISs within the three-month period. Calculations have been done to establish average reward given per intelligence provided. This calculation included diving the overall sum of the reward and diving it by the number of contacts which included valuable outputs.

Appendix P: Marginal HLO/£

A marginal HLO/£ was estimated through minimal outputs and inputs. The minimum CHIR for this data is 0.3 for one intelligence report. Minimum time spent on planning and preparing (PP) is two hours. Minimum length of contact (CL) one minute. Minimum time spent on checks and dissemination (C/D) of intelligence report is 30 minutes. Other costs (OC)(included rewards) lowest estimate paid for 1 intelligence is £1.36. The table below displays the calculation of marginal value.

Table 5: 'Calculation of minimum (marginal) value based upon Harm Linked Outcome vs resources cost'

	Output (HLO)	Input (£)	Equation	HLO/£
Calculations	Intelligence report - 1 CHIR - 0.3 1 x 0.4 = 0.3	PP – 2h (33p per minute) £19.71/60min x 120 min = £39.60 CL – 1 min £19.71/60min x 1 = £0.33 C/D- 30 min £19.71/60min x 30 = £9.90 OC £1.36	0.3 / £51.19	0.006 (0.6%)
Total	HLO 0.3	£51.19		

Or if displayed as efficiency equation $\frac{\boldsymbol{HLO\ 0.3}}{\boldsymbol{£51.19}} = \mathbf{0.006}$

The table 5, provides calculations of minimum value. To obtain Harm Linked Outcome, all outputs (intelligence and other outcomes) must be calculated. To obtain overall cost spent on resources, the time for planning and preparing, the length of the contact, the time spent on checks and dissemination of intelligence, and any other costs including the reward. Marginal HLO/£ - 0.006 (0.6%) of harm linked outcomes comparing to resources spent. This means CHISs who have less than 0.6% of HLO/£ are not efficient according to the costs spent. Anything above 0.6% of HLO/£ is of some value to policing activities. Some results may come above 1.0 (100%), because the intelligence supplied, or successful outcomes achieved overflow and fit within Control Strategy Area.

Appendix Q: CHIS 1 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	PP – 2h **£19.71/60min x 120 = £39.60** CL – 2 min **£19.71/60min x 2= £0.66** C/D - 0 OC – 0	(CHIR – **0)** Intelligence report – **0**	HLO 0 / £40.26	0
2	PP – 2h **£19.71/60min x 120 = £39.60** CL – 9 min **£19.71/60min x 9= £2.97** C/D - 0 OC – 0	(CHIR – **0)** Intelligence report – **0**	HLO 0 / £42.57	0
3	PP – 2h **£19.71/60min x 120 = £39.60** CL – 11 min **£19.71/60min x 11= £3.63** C/D – 30 minutes **£19.71/60min x 30= £9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1	HLO 0.3 / £137.36	0.002 (0.2%)
4	PP – 2h **£19.71/60min x 120 = £39.60** CL – 1 min **£19.71/60min x 1= £0.33** C/D - 0 OC – 0	(CHIR – **0)** Intelligence report – **0**	HLO 0 / £39.93	0
5	PP – 8h (2 handlers) **£19.71/60min x 480min = £158.40 x 2 = £316.80** CL – 33 min (2 handlers)	(CHIR – 0.3) Intelligence report – 5 **5 x 0.3= 1.5** Arrests – 2 **2 x 0.3 = 0.6**	HLO 6 / £472.31	0.01 (1%)

	£19.71/60min x 33= £10.89 x 2= £21.78 C/D – (5 intelligence reports – 30 x 5= 150min) **£19.71/60min x 150=£49.50** OC – **£84.23**	Physical Value class – 3 **3 x 0.3 = 0.9** Offensive weapons – 4 **4 x 0.3= 1.2** Firearms – 2 **2 x 0.3= 0.6** Outcome class – 4 **4 x 0.3= 1.2**		
6	PP – 2h **£19.71/60min x 120 = £39.60** CL – 58 min **£19.71/60min x 58= £19.14** C/D – 1h **£19.71** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 2 2 x 0.3 = 0.6	HLO 0.6 / £162.68	0.004 (0.4%)
7	PP – 2h **£19.71/60min x 120 = £39.60** CL – 10 min **£19.71/60min x 10= £3.30** C/D - 0 OC – 0	CHIR – **0** Intelligence report – **0**	HLO 0 / £42.90	0
8	PP – 8h (2 handlers) **£19.71/60min x 480 = £158.40 x 2= £316.80** CL – 1h 9 min (2 handlers) **£19.71/60min x 69= £22.77 x 2 = £45.54** C/D – (5 x 30min) £19.71/60min x 150= **£49.50** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 5 **5 x 0.3= 1.5** Arrest 1 – 1 **1 x 0.3=0.3** Physical Value class – 1 **1 x 0.3=0.3** Outcome class – 4 **4 x 0.3=1.2**	HLO 3.6 /£496.07	0.007 (0.7%)
9	PP – 2h **£19.71/60min x 120 = £39.60** CL – 8 min **£19.71/60min x 8= £2.64** C/D – (2 x 30min) **£19.71** OC – **£84.23**	(CHIR – 0.3) Intelligence report – 2 **2 x 0.3=0.6**	HLO 0.6 / £146.18	0.004 (0.4%)

10	PP – 2h **£19.71/60min x 120 = £39.60** CL – 10 min **£19.71/60min x 10= £3.30** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3=0.3**	HLO 0.3 / £137.03	0.002 (0.2%)
11	PP – 2h **£19.71/60min x 120 = £39.60** CL – 7 min **£19.71/60min x 7= £2.31** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3= 0.3**	HLO 0.3 / £136.04	0.002 (0.2%)
12	PP – 2h **£19.71/60min x 120 = £39.60** CL – 7 min **£19.71/60min x 7= £2.31** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3= 0.3**	HLO 0.3 / £136.04	0.002 (0.2%)
13	PP – 8h (2 handlers) **£19.71/60min x 480 = £158.40 x 2= £316.80** CL – 75 min (2 handlers) **£19.71/60min x 75= £24.75 x 2= £49.50** C/D – (3 x 30min) **£19.71/60min x 90= £29.70** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 3 **3 x 0.3= 0.9** Arrests 2 **2 x 0.3 = 0.6** Physical value class – 1 **1 x 0.3 = 0.3** Outcome class – 4 **4 x 0.3 = 1.2**	HLO 3 / £480.23	0.006 (0.6%)
14	PP – 2h **£19.71/60min x 120 = £39.60** CL – 11 min **£19.71/60min x 11= £3.63** C/D – 30 min	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3 = 0.3**	HLO 0.3 / £137.36	0.002 (0.2%)

	£9.90 OC – **£84.23**			
15	PP – 8h (2 handlers) **£19.71/60min x 480 x 2= £316.80** CL – 57 min **£19.71/60min x 57 x 2= £37.62** C/D – (3 x 30) **£29.70** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 3 **3 x 0.3=0.9** Arrests – 1 **1 x 0.3= 0.3** Physical value class 1 **1 x 0.3 = 0.3** No. people safeguarded – 1 **1 x 0.3= 0.3** Outcome class -4 **4 x 0.3 = 1.2**	HLO 3 / £468.35	0.006 (0.6%)
16	PP – 2h **£19.71/60min x 120 = £39.60** CL – 18 min **£19.71/60min x 18= £5.94** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3 = 0.3**	HLO 0.3 / £139.67	0.002 (0.2%)
17	PP – 2h **£19.71/60min x 120 = £39.60** CL – 12 min **£19.71/60min x 12= £3.96** C/D – (2 x 30min) **£19.80** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 2 **2 x 0.3 = 0.6**	HLO 0.6 / £147.59	0.004 (0.4%)
18	PP – 2h **£19.71/60min x 120 = £39.60** CL – 8 min **£19.71/60min x 8= £2.64** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3 = 0.3**	HLO 0.3 / £136.37	0.002 (0.2%)
19	PP – 2h **£19.71/60min x 120 = £39.60** CL – 68 min	(CHIR – **0)** Intelligence report – **0**	HLO 0 / £62.04	0

	£19.71/60min x 68= £22.44 C/D - 0 OC – 0			
20	PP – 2h **£19.71/60min x 120 = £39.60** CL – 27 min **£19.71/60min x 27= £8.91** C/D – (4 x 30min) **£39.60** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 4 **4 x 0.3 = 1.2**	HLO 1.2 / £172.34	0.007 (0.7%)
21	PP – 8h (2 handlers) **£19.71/60min x 480 x 2 = £316.80** CL – 46 min (2 handlers) **£19.71/60min x 46 x 2= £30.36** C/D – (5 x 30min) **£49.50** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 5 **5 x 0.3 = 1.5** Arrests - 3 **3 x 0.3 = 0.9** Physical Value class -1 **1 x 0.3 = 0.3** Outcome class - 4 **4 x 0.3 = 1.2**	HLO 3.9 / £480.89	0.008 (0.8%)
22	PP – 2h **£19.71/60min x 120 = £39.60** CL – 2 min **£19.71/60min x 2= £0.66** C/D – (2 x 30min) **£19.80** OC – **£84.23**	(CHIR – 0.3) Intelligence report – 2 **2 x 0.3 = 0.6**	HLO 0.6 / £144.29	0.004 (0.4%)
23	PP – 2h **£19.71/60min x 120 = £39.60** CL – 2 min **£19.71/60min x 4= £1.32** C/D – (3 x 30min) **£29.70** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 3 **3 x 0.3 = 0.9**	HLO 0.9 / £154.85	0.005 (0.5%)
24	PP – 8h (2 handlers) **£19.71/60min x 480 x 2 = £316.80**	(CHIR – **0.3)** Intelligence report – 4	HLO 2.4 / 448.55	0.005 (0.5%)

	CL – 12 min (2 handlers) **£19.71/60min x 12 x 2= £7.92** C/D – (4 x 30 min) **£39.60** OC – **£84.23**	**4 x 0.3 = 1.2** Outcome class – 4 **4 x 0.3 = 1.2**		
25	PP – 2h **£19.71/60min x 120 = £39.60** CL – 163 min **£19.71/60min x 363= £53.79** C/D – (3 x 30 min) **£29.70** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 3 **3 x 0.3 = 0.9**	HLO 0.9 / £207.32	0.004 (0.4%)
26	PP – 2h **£19.71/60min x 120 = £39.60** CL – 9 min **£19.71/60min x 9= £2.97** C/D – (3 x 30min) **£29.70** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 3 **3 x 0.3 = 0.9**	HLO 0.9 / £156.50	0.005 (0.5%)
27	PP – 2h **£19.71/60min x 120 = £39.60** CL – 13 min **£19.71/60min x 13= £4.29** C/D – (2 x 30min) **£19.80** OC – £**84.23**	(CHIR – **0.3)** Intelligence report – 2 **2 x 0.3 = 0.6**	HLO 0.6 / £147.92	0.004 (0.4%)
28	PP – 2h **£19.71/60min x 120 = £39.60** CL – 12 min **£19.71/60min x 12= £3.96** C/D – (4 x 30min) **£39.60** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 4 **4 x 0.3 = 1.2**	HLO 1.2 / £167.39	0.007 (0.7%)
29	PP – 8h (2 handlers)	(CHIR – **0.3)**	HLO 0.6 / £525.77	0.001 (0.1%)

	£19.71/60min x 480 x 2= £316.80 CL – 159 min (2 handlers) **£19.71/60min x 159 x 2= £104.94** C/D – (2 x 30min) **£19.80** OC – **£84.23**	Intelligence report – **2** **2 x 0.3 = 0.6**		
30	PP – 2h **£19.71/60min x 120 = £39.60** CL – 8 min **£19.71/60min x 8= £2.64** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3 = 0.3**	HLO 0.3 / £136.37	0.002 (0.2%)
31	PP – 2h **£19.71/60min x 120 = £39.60** CL – 159 min **£19.71/60min x 159= £52.47** C/D - 0 OC – 0	(CHIR – **0)** Intelligence report – **0**	HLO 0 / £92.07	0
32	PP – 2h **£19.71/60min x 120 = £39.60** CL – 11 min **£19.71/60min x 11= £3.63** C/D – (3 x 30min) **£29.70** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 3 **3 x 0.3 = 0.9**	HLO 0.9 / £157.16	0.006 (0.6%)
33	PP – 2h **£19.71/60min x 120 = £39.60** CL – 32 min **£19.71/60min x 32= £10.56** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 0.3 x 1 = 0.3	HLO 0.3 / £144.29	0.002 (0.2%)
34	PP – 8h (2 handlers)	(CHIR – **0.3)**	HLO 1.8 / £493.43	0.004

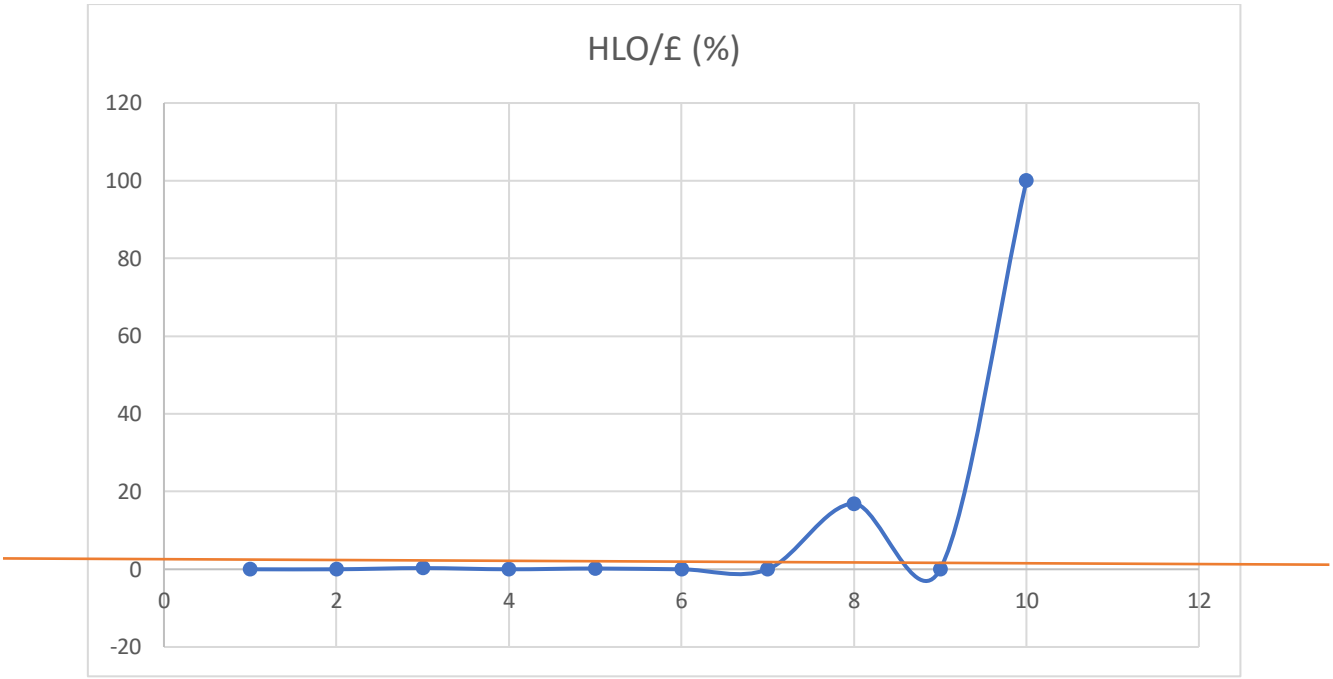
	£19.71/60min x 480 x 2= £316.80 CL – 65 min **£19.71/60min x 65 x 2= £42.90** C/D – (5 x 30 min) **£49.50** OC – **£84.23**	Intelligence report – 5 **5 x 0.3 = 1.5** **Physical value class – 1** **1 x 0.3 = 0.3** **Outcome class - 0**		(0.4%)
35	PP – 2h **£19.71/60min x 120 = £39.60** CL – 2 min **£19.71/60min x 11= £3.63** C/D – (2 x 30min) **£19.80** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 2 **2 x 0.3 = 0.6**	HLO 0.6 / £147.26	0.004 (0.4%)
36	PP – 8h (2 handlers) **£19.71/60min x 480 x 2= £316.80** CL – 123 min **£19.71/60min x 123 x 2= £81.18** C/D – (9 x 30min) **£89.10** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 9 **9 x 0.3 = 2.7** Arrests – 1 **1 x 0.3 = 0.3** People safeguarded – 1 **1 x 0.3 = 0.3** Outcome class – 0	HLO 3.3 / £571.31	0.006 (0.6%)
37	PP – 2h **£19.71/60min x 120 = £39.60** CL – 4 min **£19.71/60min x 4= £1.32** C/D – 30min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 **1 x 0.3 = 0.3**	HLO 0.3 / 135.05	0.002 (0.2%)
38	PP – 2h **£19.71/60min x 120 = £39.60** CL – 17 min **£19.71/60min x 17= £5.61** C/D – (2 x 30min) **£19.80** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 2 **2 x 0.3 = 0.6**	HLO 0.6 / £149.24	0.004 (0.4%)
39	PP – 2h	(CHIR – **0)**	HLO 0 / £40.24	0

	£19.71/60min x 120 = £39.60 CL – 2 min **£19.71/60min x 2= £0.66** C/D - 0 OC – 0	Intelligence report – **0**		
40	PP – 2h **£19.71/60min x 120 = £39.60** CL – 98 min **£19.71/60min x 98= £32.34** C/D – (2 x 30min) **£19.80** OC – **£84.23**	(CHIR – 0.3) Intelligence report – 2 **2 x 0.3 = 0.6**	HLO 0.6 / £175.97	0.003 (0.3%)
41	PP – 2h **£19.71/60min x 120 = £39.60** CL – 4 min **£19.71/60min x 4= £1.32** C/D – 30 min **£9.90** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 1 1 x 0.3 = 0.3	HLO 0.3 / £135.05	0.002 (0.2%)
42	PP – 2h **£19.71/60min x 120 = £39.60** CL – 7 min **£19.71/60min x 7= £2.31** C/D – 30min **£9.90** OC – **£84.23**	(CHIR – 0.3) Intelligence report – 1 **1 x 0.3 = 0.3**	HLO 0.3 / £136.04	0.002 (0.2%)
43	PP – 8h (2 handlers) **£19.71/60min x 480 x 2= £316.80** CL – 150 min (2 handlers) **£19.71/60min x 150 x 2= £99** C/D – (5 x 30min) **£49.50** OC – **£84.23**	(CHIR – **0.3)** Intelligence report – 5 **5 x 0.3 = 1.5** Arrest – 1 **1 x 0.3 = 0.3** Physical value class – 1 **1 x 0.3 = 0.3**	HLO 2.1 / £549.53	0.004 (0.4%)
44	PP – 2h	(CHIR – **0.3)**	HLO 0.3 / £137.03	0.002

	£19.71/60min x 120 = £39.60 CL – 10 min **£19.71/60min x 10= £3.30** C/D – 30min **£9.90** OC – **£84.23**	Intelligence report – 1 **1 x 0.3 = 0.3**		(0.2%)
45	PP – 2h **£19.71/60min x 120 = £39.60** CL – 1 min **£19.71/60min x 1= £0.33**	(CHIR – **0)** Intelligence report – **0**	HLO 0 / £39.93	0

Appendix R: CHIS 2 calculated value for each individual interaction

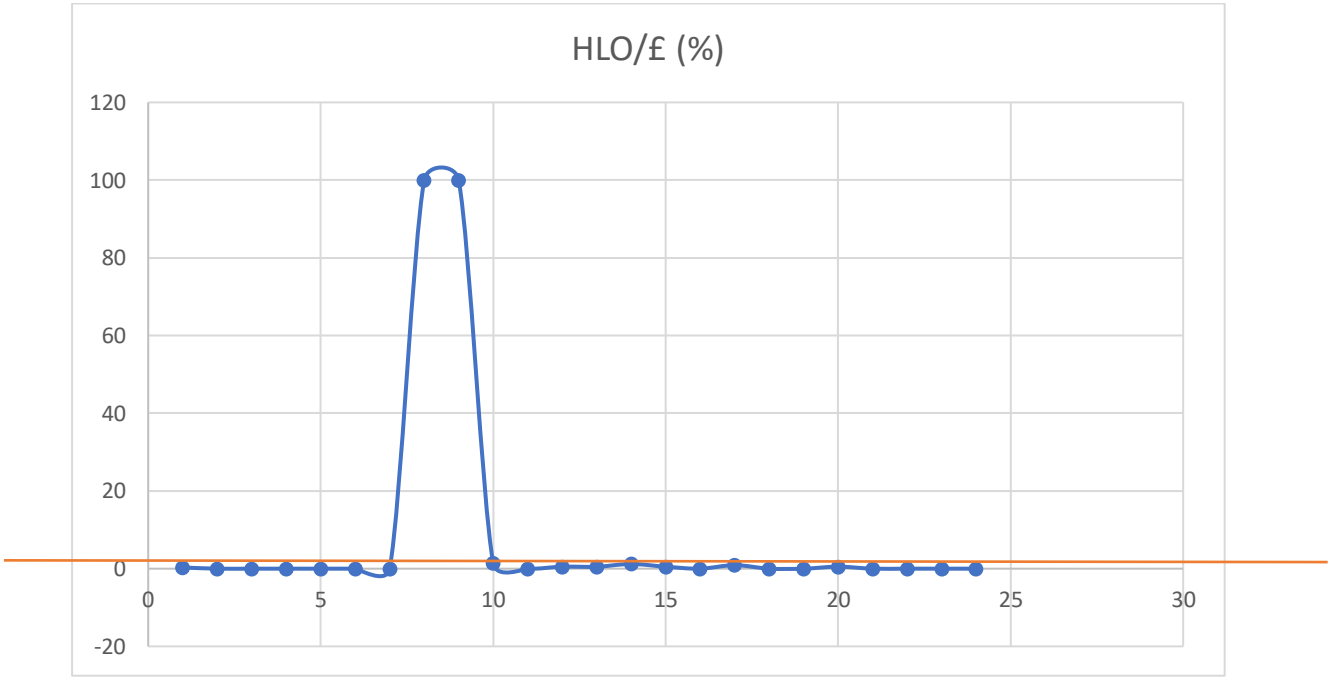
Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (3h 20min) - £66.00 PP (2h) - £39.00	0	£105.60	0
2	M (6min) – £1.98 PP (2h) - £39.60	0	£41.58	0
3	M (1h 36min) – £63.36 PP (8h x 2 handlers) - £316.80 R (5 x C/D30min) £49.50 Rew - £111.17	(0.3) I – 5 x 0.3= 1.5	1.5 / £540.83	0.003 (0.3%)
4	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
5	M (6min) – £1.98 PP (2h) – £39.60 R (1 x C/D30min) – £9.90 Rew - £111.17	(0.3) I – 1 x 0.3= 0.3	0.3 / £162.65	0.002 (0.2%)
6	M (5min) – £1.65 PP (2h) – 39.60	0	£41.25	0
7	M (3min) – £0.99 PP (2h) - £39.60	0	£40.59	0
8	M (1h 10min) – £46.20 PP (8h x 2 handlers) – £316.80 R (11 x C/D30min) – £108.90 Rew - £111.17	(4.9) I – 11 x 4.9 = 53.9 Ar – 1 x 4.9 = 4.9 PV – 1 x 4.9 = 4.9 Out – 4 x 4.9 = 19.6	83.3 / £583.07	0.143 (14.3%)
9	M (1min) – £0.33 PP (2h) - £39.60	0	£39.93	0
10	M (1h 59min) – £78.54 PP (8h x 2 handlers) – £316.80 R (10 x C/D30min)- £99 Rew - £111.17	(84.1) I – 10 x 84.1 = 841	841 / £605.51	1.389 (100%)


HLO/£ (%)
120
100
80
60
40
20
0
-20
0
2
4
6
8
10
12

Appendix S: CHIS 3 calculated value for each individual interaction

Contact No.	Outputs	Inputs	Equation	HLO/£
1	M – £50.49 PP – £39.60 R (1 x C/D30min) – £9.90 Rew - £1.37	(0.3) I – 1 x 0.3 = 0.3	0.3 / £101.36	0.003 (0.3%)
2	M – £0.33 PP – £39.60	0	£39.93	0
3	M – £49.83 PP - £39.60	0	£89.43	0
4	M – £0.33 PP - £39.93	0	£39.93	0
5	M – £111.87 PP - £39.60	0	£151.47	0
6	M – £1.65 PP – £39.60	0	£41.25	0
7	M – £12.87 PP - £39.60	0	£52.47	0
8	M – £71.61 PP – £39.60 R (2 x C/D30min) – £19.80 Rew - £1.37	(84.1) I – 2 x 84.1 = 168.2	168.2 / £132.38	1.27 (100%)
9	M – £143.22 PP – £316.80 R (7 x C/D30min) – £69.30 Rew - £1.37	(84.1) I – 7 x 84.1 = 588.7	588.7 / £530.69	1.11 (100%)
10	M – £2.97 PP – £39.60 R (4 x C/D30min) – £39.60 Rew - £1.37	(0.3) I – 4 x 0.3 = 1.2	1.2 / £83.54	0.014 (1.4%)
11	M – £0.33 PP – £39.60	0	£39.93	0
12	M – £9.57 PP – £39.60 R (1 x C/D30min) – £9.90 Rew - £1.37	(0.3) I - 1 x 0.3 = 0.3	0.3 / £60.44	0.005 (0.5%)
13	M – £3.96 PP – £39.60 R (1 x C/D30min) – £9.90 Rew - £1.37	(0.3) I – 1 x 0.3 = 0.3	0.3 / £54.83	0.005 (0.5%)
14	M – £5.28 PP – £39.60 R (3 x C/D30min) – £9.90 Rew - £1.37	(0.3) I – 3 x 0.3 = 0.9	0.9 / £75.95	0.012 (1.2%)
15	M – £7.92 PP – £39.60 R (1 x C/D30min) – £9.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £58.79	0.005 (0.5%)

	Rew - £1.37			
16	M – £11.55 PP – £39.60	0	£51.15	0
17	M – £3.30 PP – £39.60 R (2 x C/D30min) – £19.80 Rew - £1.37	(0.3) I – 2 x 0.3 = 0.6	0.6 / £64.07	0.009 (0.9%)
18	M – £0.66 PP – £39.60	0	£40.26	0
19	M - £1.32 PP - £39.60	0	£40.92	0
20	M – £5.28 PP – £39.60 R (1 x C/D30min) – £9.90 Rew - £1.37	(0.3) I – 1 x 0.3 = 0.3	0.3 / £56.15	0.005 (0.5%)
21	M - £0.33 PP - £39.60	0	£39.93	0
22	M - £29.04 PP - £39.60	0	£68.64	0
23	M - £0.99 PP - £39.60	0	£40.59	0
24	M - £14.52 PP - £39.60	0	£54.12	0

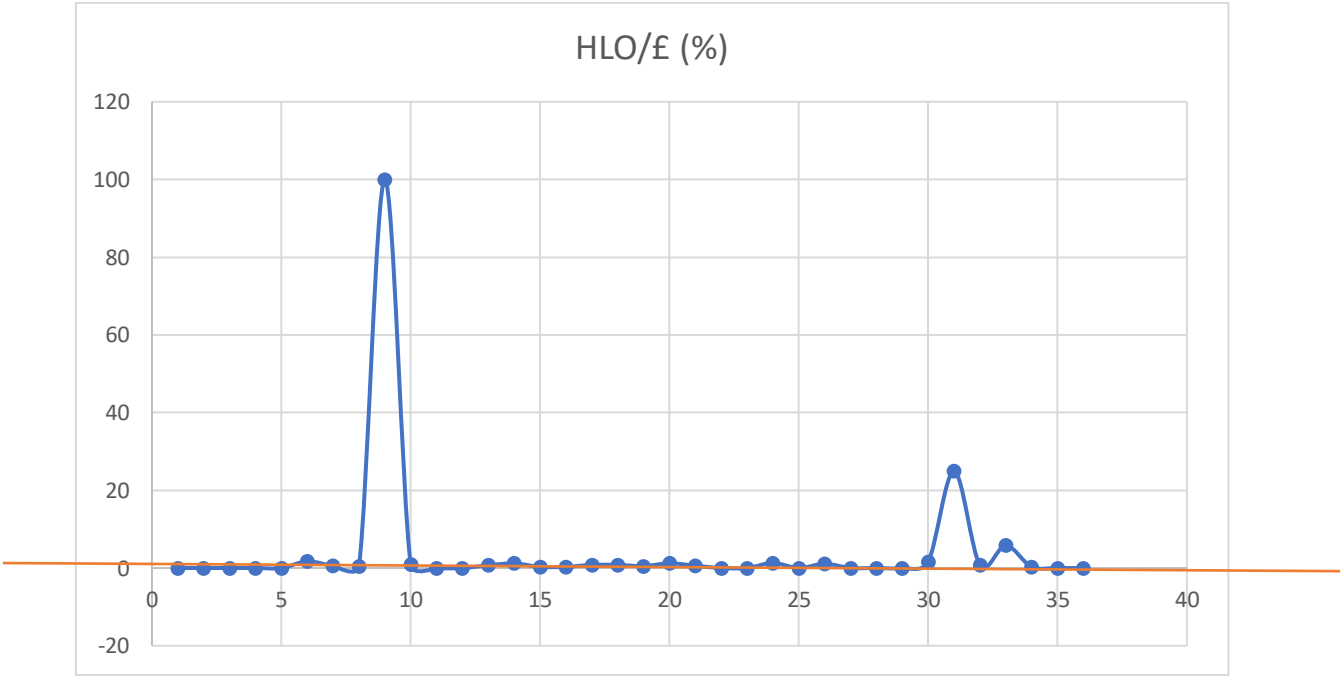


Appendix T: CHIS 4 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M - £0.33 PP - £39.60	0	£39.93	0
2	M - £11.22 PP - £39.60	0	£50.82	0
3	M - £9.24 PP - £39.60	0	£48.84	0
4	M - £0.33 PP - £39.60	0	£39.93	0
5	M - £0.33 PP - £39.60	0	£39.93	0
6	M - £11.22 PP - £39.60 R – £118.80 Rew - £43.18	(0.3) I – 12 x 0.3 = 3.6	3.6 / £212.80	0.017 (1.7%)
7	M - £4.29 PP - £39.60 R - £19.80 Rew - £43.18	(0.3) I – 2 x 0.3 = 0.6	0.6 / £106.87	0.006 (0.6%)
8	M – £8.58 PP – £39.60 R – £19.80 Rew - £43.18	(0.3) I – 2 x 0.3 = 0.6	0.6 / £111.16	0.005 (0.5%)
9	M – £39.60 PP – £316.80 R – £59.40 Rew - £43.18	(84.1) I – 6 x 84.1 = 504.6 Ar – 3 x 84.1 = 252.3 Out – 4 x 84.1 = 336.4 PV- 2 x 84.1 = 168.2	1,261.5 / £458.98	2.75 (100%)
10	M – £5.61 PP – £39.60 R – £39.60 Rew -£43.18	(0.3) I – 4 x 0.3 = 1.2	1.2 / £127.99	0.009 (0.9%)
11	M - £9.90 PP - £39.60	0	£49.50	0
12	M - £0.33 PP - £39.60	0	£39.93	0
13	M - £8.58 PP - £39.60 R – £29.70 Rew - £43.18	(0.3) 3 x 0.3 = 0.9	0.9 / £121.06	0.007 (0.7%)
14	M - £12.54 PP - £39.60 R – £9.90 Rew - £43.18	(0.3) I – 6 x 0.3 = 1.8	1.8 / £154.72 0.012 (1.2%)	0.012 (1.2%)
15	M - £7.92 PP - £39.60 R - £ 9.90 Rew - £43.18	(0.3) I – 1 x 0.3 = 0.3	0.3 / £100.60	0.003 (0.3%)

16	M - £4.29 PP - £39.60 R - £ 9.90 Rew - £43.18	(0.3) I – 1 x 0.3 = 0.3	0.3 / £96.97	0.003 (0.3%)
17	M - £4.95 PP - £39.60 R - £ 29.70 Rew - £43.18	(0.3) I – 3 x 0.3 = 0.9	0.9 / £117.43	0.008 (0.8%)
18	M - £4.95 PP - £39.60 R - £ 29.70 Rew - £43.18	(0.3) I – 3 x 0.3 = 0.9	0.9 / £117.43	0.008 (0.8%)
19	M - £22.70 PP - £39.60 R - £ 19.80 Rew - £43.18	(0.3) I – 2 x 0.3 = 0.6	0.6 / £125.35	0.005 (0.5%)
20	M - £6.27 PP - £39.60 R - £ 59.40 Rew - £43.18	(0.3) I – 6 x 0.3 = 1.8	1.8 / £148.45	0.012 (1.2%)
21	M - £5.94 PP - £39.60 R - £ 19.80 Rew - £43.18	(0.3) I – 2 x 0.3 = 0.6	0.6 / £108.52	0.006 (0.6%)
22	M - £7.26 PP - £39.60	0	£46.86	0
23	M - £0.33 PP - £39.60	0	£39.93	0
24	M - £7.26 PP - £39.60 R - £69.30 Rew - £43.18	(0.3) I – 7 x 0.3 = 2.1	2.1 / £159.34	0.013 (1.3%)
25	M - £9.24 PP - £39.60	0	£48.84	0
26	M - £9.57 PP - £39.60 R - £ 49.50 Rew - £43.18	(0.3) I – 5 x 0.3 = 1.5	1.5 / £141.85	0.011 (1.1%)
27	M - £0.33 PP - £39.60	0	£39.93	0
28	M - £4.95 PP - £39.60	0	£44.55	0
29	M - £4.62 PP - £39.60	0	£44.22	0
30	M - £13.86 PP - £39.60 R - £ 59.40 Rew - £43.18	(0.3) I – 6 x 0.3 = 1.8	1.8 / £156.04	0.016 (1.6%)
31	M - £10.89 PP - £39.60 R - £ 69.30	(4.9) I – 7 x 4.9 = 34.3	34.3 / £162.97	0.210 (24.9%)

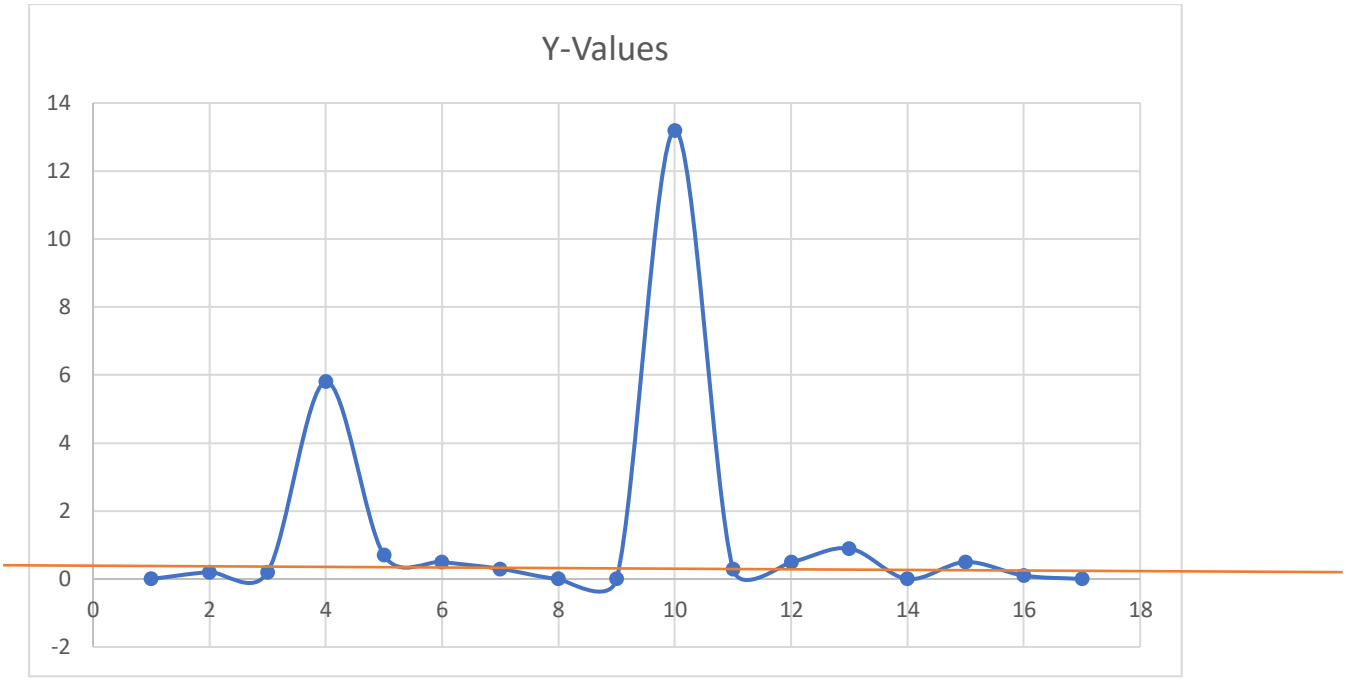
	Rew - £43.18			
32	M - £26.40 PP - £316.80 R - £39.60 Rew - £43.18	(0.3) I – 4 x 0.3 = 1.2 Ar 2 x 0.3 = 0.6 PV 2 x 0.3 = 0.6 Out 4 x 0.3 = 1.2	3.6 / £425.98	0.008 (0.8%)
33	M - £7.26 PP - £39.60 R - £9.90 Rew - £43.18	(4.9) I – 1 x 5.8 = 4.9	4.9 / £99.94	0.049 (4.9%)
34	M - £11.55 PP - £39.60 R - £ 9.90 Rew - £43.18	(0.3) I – 1 x 0.3 = 0.3	0.3 / £104.23	0.003 (0.3%)
35	M - £6.93 PP - £39.60 R - £9.90 Rew - £43.18	0	0.3 / £99.61	0.003 (0.3%)
36	M - £0.99 PP - £39.60	0	£40.59	0
37	M - £4.29 PP - £39.60	0	£43.89	0



Appendix U: CHIS 5 calculated value for each individual value

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (8 min) - £2.64 PP (2h) - £39.60	0	£42.24	0
2	M (2h 41min x 2 handlers) - £106.26 PP (8h x 2 handlers) - £316.80 R (2 x C/D30min) - £19.80 Rew - £44.11	(0.3) I – 2 x 0.3 = 0.6 PV – 1 x 0.3 = 0.3 Ar – 1 x 0.3 = 0.3	1.2 / £486.97	0.002 (0.2%)
3	M (2h 58min) - £58.74 PP (2h) - £39.60 R – (1 x C/D30min) £9.90 Rew - £44.11	(0.3) I – 1 x 0.3 = 0.3	0.3 / £152.35	0.002 (0.2%)
4	M (21min) – £6.93 PP (2h) – £39.60 R – (1 x C/D30min) £9.90 Rew - £44.11	(4.9) I – 1 x 4.9 = 4.9	4.9 / £100.54	0.049 (4.9)
5	M (3h 4min x 2 handlers) – £121.44 PP (8h x 2 handlers) – £316.80 R (10 x C/D30min) – £99.00 Rew - £44.11	(0.3) I – 10 x 0.3 = 3 Ar – 3 x 0.3 = 0.6 PV – 1 x 0.3 = 0.3	3.9 / £581.35	0.007 (0.7%)
6	M (38min) – £12.54 PP (2h) – £39.60 R (2 x C/D30min) – £19.80 Rew - £44.11	(0.3) I – 2 x 0.3 = 0.6	0.6 / £116.05	0.005 (0.5%)
7	M (4min) – £1.32 PP (2h) – £39.60 R (1 x C/D30min) – £9.90 Rew - £44.11	(0.3) I – 1 x 0.3	0.3 / £94.93	0.003 (0.3%)
8	M (1min) – £0.33 PP (2h) – £39.60	0	£39.93	0
9	M (3h 38min) – £71.94 PP (2h) – £39.60	0	£111.54	0
10	M(4h 33min x 2 handlers) – £180.18 PP (8h x 2 handlers) – £316.80 R (12 x C/D30min) – £118.80 Rew - £44.11	(4.9) I – 12 x 4.9 = 58.8 Ar – 2 x 4.9 = 9.8 PV – 1 x 4.9 = 4.9	73.5 / £659.89	0.111 (11.1%)

11	M (3h 31min) – £69.63 PP (2h) – £39.60 (2 x R C/D30min) – £19.80 Rew - £44.11	(0.3) I – 2 x 0.3 = 0.6	£0.6 / £173.14	0.003 (0.3)
12	M (4h 59min x 2 handlers) – £316.14 PP (8h x 2 handlers) – £316.80 R (11 x C/D30min) – £108.90 Rew - £44.11	(0.3) I – 11 x 0.3 = 3.3 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3	3.9 / £785.95	0.005 (0.5%)
13	M (49min) – £16.17 PP (2h) – £39.60 R (4 x C/D30min) – £39.60 Rew - £44.11	(0.3) I – 4 x 0.3 = 1.2	1.2 / £139.48	0.009 (0.9%)
14	M (1min) – £0.33 PP – £39.60	0	£39.93	0
15	M (18min) – £5.94 PP (2h) – £39.60 R (2 x C/D30min) – £19.80 Rew - £44.11	(0.3) I – 2 x 0.3 = 0.6	0.6 / £109.45	0.005 (0.5)
16	M (5h 43min) – £113.19 PP (2h) – £39.60 R (1 x C/D30min) – £9.90 Rew - £44.11	(0.3) I – 1 x 0.3 = 0.3	0.3 / £206.80	0.001 (0.1%)
17	M (17min) – £5.61 PP (2h) – £39.60	0	£45.21	0

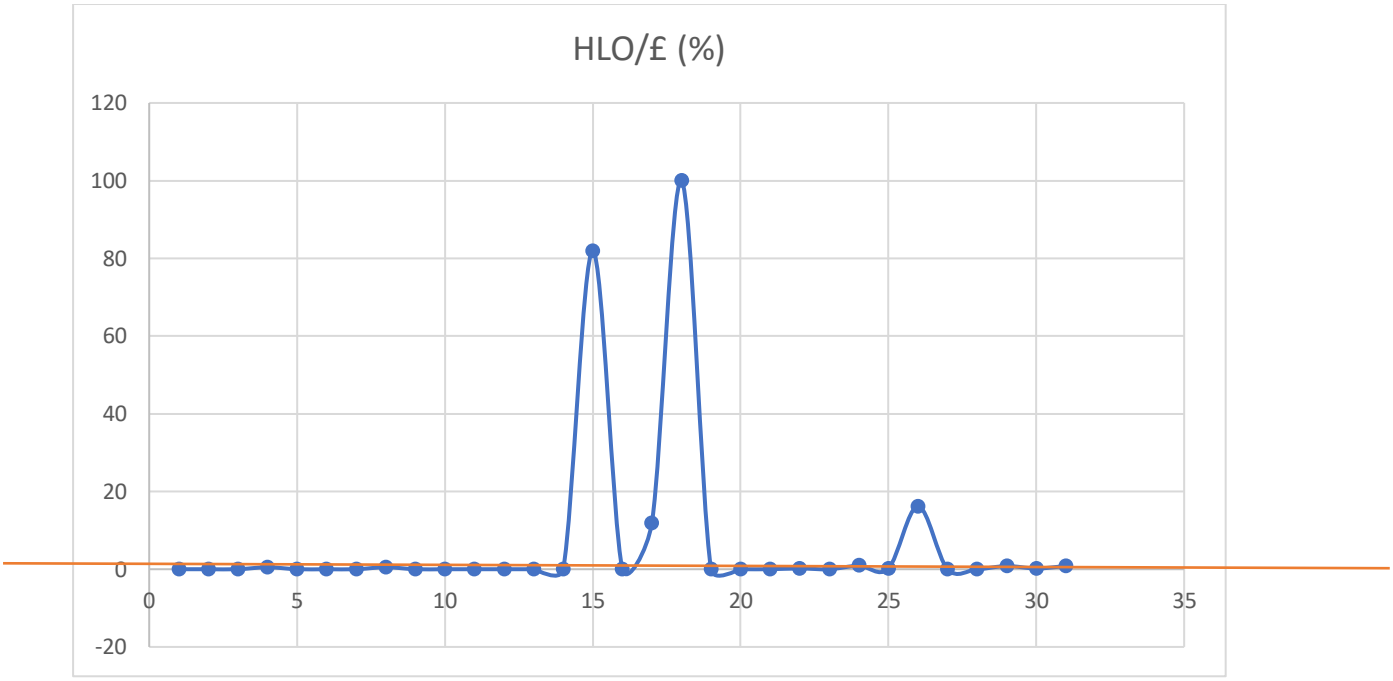

Y-Values
14
12
10
8
6
4
2
0
-2
0
2
4
6
8
10
12
14
16
18

Appendix V: CHIS 6 calculated value for each individual interaction

Contact no.	Inputs	Outputs	Equation	HLO/£
1	M (8min) - £2.64 PP (2h) - £39.60	0	£42.24	0
2	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
3	M (14min) - £4.62 PP (2h) - £39.60	0	£44.22	0
4	M (22min) - £7.26 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew -£4.67	(0.3) I – 1 x 0.3 = 0.3	0.3 / £61.43	0.005 (0.5%)
5	M (15min) - £4.95 PP (2h) - £39.60	0	£44.55	0
6	M (44min 2 handlers) - £29.04 PP (8h x 2 handlers) - £316.80	0	£345.84	0
7	M (3min) - £0.990 PP (2h) - £39.60	0	£40.59	0
8	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £4.67	(0.3) I – 1 x 0.3 = 0.3	0.3 / £59.12	0.005 (0.5%)
9	M (5min) - £1.65 PP (2h) - £39.60	0	£41.260	0
10	M (2h 21min) - £46.53 PP (2h) - £39.60	0	£86.13	0
11	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
12	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
13	M (10min) - £3.30 PP (2h) - £39/60	0	£42.90	0
14	M (13min) - £4.29 PP (2h) - £39.60	0	£43.89	0
15	M (10min) - £3.30 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £4.67	(23.5) I – 2 x 23.5 = 47	47 / £67.37	0.698 (69.8%)
16	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
17	M (1h 40min x 2 handlers) - £66.00 PP (8h x 2 handlers) - £316.80	(4.9) I – 10 x 4.9 = 49	49 / £486.47	0.107 (10.7%)

	R (10 x C/D 30min) - £99.00 Rew - £4.67			
18	M (2h 37min) - £103.62 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £4.67	(84.1) I – 4 x 84.1 = 336.4	336.4 / £187.49	1.794 (100%)
19	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
20	M (16min) - £5.28 PP (2h) - £39.60	0	£44.88	0
21	M (25min) - £8.25 PP (2h) - £39.60	0	£47.85	0
22	M (3h 31min) - £69.63 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £4.67	(0.3) I – 1 x 0.3 = 0.3	0.3 / £123.80	0.002 (0.2%)
23	M (14min) - £4.62 PP (2h) - £39.60	0	£44.22	0
24	M (14min) - £4.62 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £4.67	(0.3) I – 2 x 0.3 = 0.6	0.6 / £68.69	0.009 (0.9%)
25	M (36min x 2 handlers) - £23.76 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £4.67	(0.3) I – 3 x 0.3 = 0.9	0.9 / £374.93	0.002 (0.2)
26	M (4h 17min) - £84.81 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £4.67	(4.9) I – 5 x 4.9 = 24.5	24.5 / £178.58	0.137 (13.7%)
27	M (34min) - £11.22 PP (2h) - £39.60	0	£50.82	0
28	M (9min) - £2.97 PP (2h) - £39.60	0	£42.57	0
29	M (29min) - £9.57 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £4.67	(0.3) I – 2 x 0.3 = 0.6	0.6 / £73.64	0.008 (0.8%)
30	M (4h 34min) - £90.42 PP (2h) - £39.60 R (1 x C/D 30min) – £9.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £144.59	0.002 (0.2)

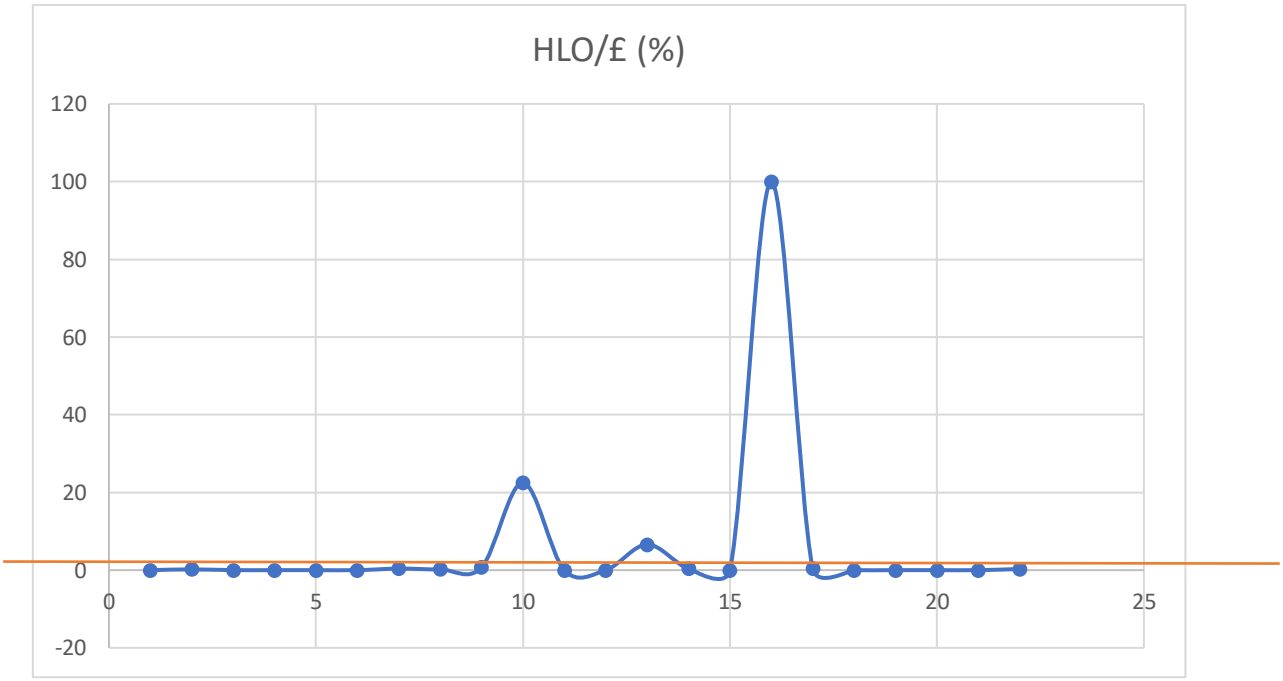
	Rew - £4.67			
31	M (47min) - £15.51 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £4.67	(0.3) I – 2 x 0.3 = 0.6	0.6 / £79.58	0.008 (0.8%)



Appendix W: CHIS 7 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (10 min) – £3.30 PP (2h) - £39.60	0	£42.90	0
2	M (55min x 2 handlers) – £36.30 PP (8h x 2 handlers) - £316.80 R (2 x C/D30min) £19.80 Rew - £19.13	(0.3) I – 2 x 0.3 = 0.6	0.6 / £392.03	0.002 (0.2%)
3	M (4 min) – £1.32 PP (2h) - £39.60	0	£40.92	0
4	M (5min) – £1.65 PP (2h) - £39.60	0	£41.25	0
5	M (4 min) – £1.32 PP (2h) - £39.60	0	£40.92	0
6	M (4 min) – £1.32 PP (2h) - £316.80	0	£40.92	0
7	M (1h 47min x 2 handlers) – £70.62 PP (8h x 2 handlers) - £316.80 R (6 x C/D30min) £59.40 Rew - £19.13	(0.3) I – 6 x 0.3 = 1.8	1.8 / £465.95	0.004 (0.4%)
8	M (6h 8min) – £121.44 PP (2h) - £39.60 R (1 x C/D30min) £9.90 Rew - £19.13	(0.3) I – 1 x 0.3 = 0.3	0.3 / £190.07	0.002 (0.2%)
9	M (6min) – £1.98 PP(2h) - £39.60 R (2 x C/D30min) £19.80 Rew - £19.13	(0.3) I – 2 x 0.3 = 0.6	0.6 / £80.51	0.007 (0.7%)
10	M (14min) – £4.64 PP(2h) - £39.60 R (4 x C/D30min) £39.60 Rew - £19.13	(4.9) I – 4 x 4.9 = 19.6	19.6 / £102.95	0.19 (19%)
11	M (1h 45min) – £34.65 PP(2h) - £39.60	0	£74.25	0
12	M (11min) – £3.63 PP(2h) - £39.60	0	£43.23	0
13	M (1h 26min x 2 handlers) – £56.76 PP(8h x 2 handlers) - £316.80 R (5 x C/D30min) £49.50 Rew - £19.13	(4.9) I – 4.9 x 5 = 24.5	24.5 / £442.19	0.056 (5.6%)
14	M (7min) – £2.31 PP(2h) - £39.60 R (1 x C/D30min) £9.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £70.94	0.004 (0.4%)

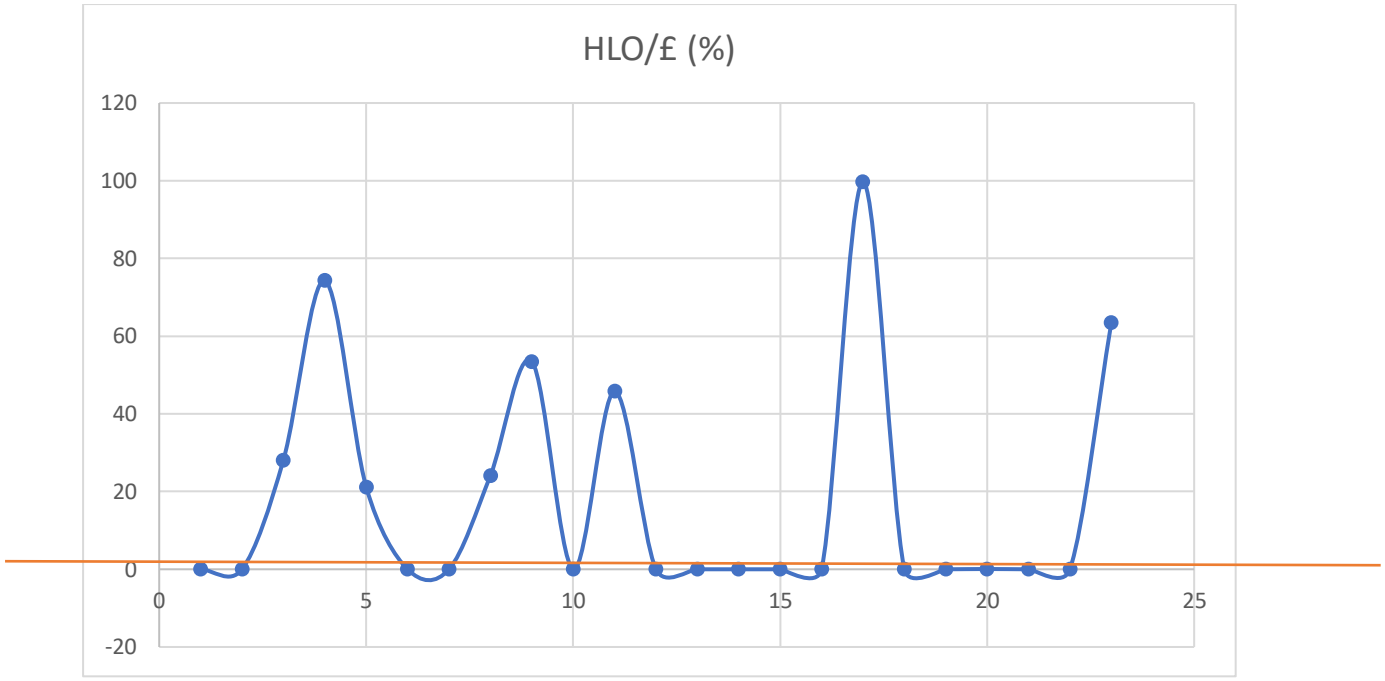
	Rew - £19.13			
15	M (2minmin) – £0.66 PP(2h) - £39.60	0	£40.26	0
16	M (5min) – £1.65 PP(2h) - £39.60 R (1 x C/D30min) £9.90 Rew - £19.13	(84.1) I – 1 x 84.1 = 84.1	84.1 / £70.28	1.197 (100%)
17	M (4min) – £1.32 PP(2h) - £39.60 R (1 x C/D30min) £9.90 Rew - £19.13	(0.3) I – 1 x 0.3 = 0.3	0.3 / £69.95	0.004 (0.4%)
18	M (2min) – £0.66 PP(2h) - £39.60	0	£40.26	0
19	M (57min) – £18.81 PP(2h) - £39.60	0	£58.41	0
20	M (9min) – £2.97 PP(2h) - £39.60	0	£42.57	0
21	M (3min) – £0.99 PP(2h) - £39.60	0	£40.59	0
22	M (3h 43min x 2 handlers) – £147.18 PP (8h x 2 handlers) - £316.80 R (4 x C/D30min) £39.60 Rew - £19.13	(0.3) I – 4 x 0.3 = 1.2 Ar – 1 x 0.3 = 0.3	1.5 / £522.71	0.003 (0.3%)



Appendix X: CHIS 8 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
2	M (1h 1min) - £20.13 PP (2h) - £39.60	0	£59.73	0
3	M (1h 37min x 2 handlers) - £64.02 PP (8h x 2 handlers) - £39.60 R (5 x C/D 30min) - £49.50 Rew – £60.45	(23.5) I – 5 x 23.5 = 117.5	117.5 / £490.77	0.239 (23.9%)
4	M (27min) - £8.91 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew – £60.45	(23.5) I – 4 x 23.5 = 94	94 / £148.56	0.633 (63.3%)
5	M (1h 2min) - £20.46 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew – £60.45	(23.5) I – 1 x 23.5 = 23.5	23.5 / £130.41	0.18 (18%)
6	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
7	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
8	M (3h 42min x 2 handlers) - £146.52 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew – £60.45	(23.5) I – 5 x 23.5 = 117.5	117.5 / £573.27	0.205 (20.5%)
9	M (1h 16min) - £25.08 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew – £60.45	(23.5) I – 3 x 23.5 = 70.5	70.5 / £154.83	0.455 (45.5%)
10	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
11	M (2min) - £0.66 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew – £60.45	(23.5) I – 2 x 23.5 = 47	47 / £120.51	0.39 (39%)
12	M (3h 59min) - £78.87 PP (2h) - £39.60	0	£118.47	0
13	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0

14	M (2h 11min x 2 handlers) - £86.46 PP (8h x 2 handlers) - £316.80	0	£403.26	0
15	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
16	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
17	M (20min) - £6.60 PP (2h) - £39.60 R (6 x C/D 30min) - £59.40 Rew – £60.45	(23.5) I – 6 x 23.5 = 141	141 / £166.05	0.849 (84.9%)
18	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
19	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
20	M (1h 28min x 2 handlers) - £58.08 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew – £60.45	(0.3) I – 1 x 0.3 = 0.3	0.3 / £445.23	0.0007 (0.07%)
21	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
22	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
23	M (2min) - £0.66 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew – £60.45	(23.5) I – 3 x 23.5 = 70.5	70.5 / £130.41	0.541 (54.1%)

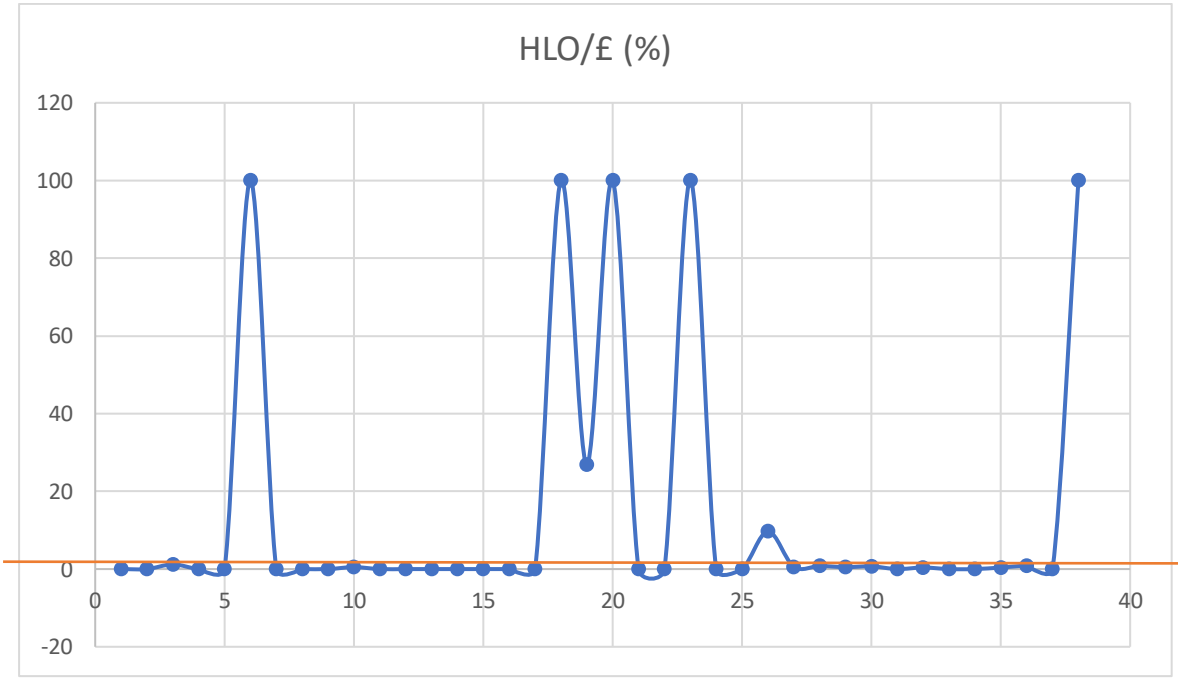

HLO/£ (%)
120
100
80
60
40
20
0
-20
0
5
10
15
20
25

Appendix Y: CHIS 9 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
2	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
3	M (14min) - £4.62 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £14.60	(0.3) I – 4 x 0.3 = 1.2	1.2 / £98.42	0.012 (1.2%)
4	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
5	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
6	M (10min) - £3.30 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew - £14.60	(84.1) I – 7 x 84.1 = 588.7	588.7 / £126.80	4.643 (100%)
7	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
8	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
9	M (8min) - £2.64 PP (2h) - £39.60	0	£42.24	0
10	M (2h 12min x 2 handlers) - £87.12 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £14.60	(0.3) I – 9 x 0.3 = 2.7	2.7 / £507.62	0.005 (0.5%)
11	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
12	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
13	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
14	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
15	M (4h) - £79.20 PP (2h) - £39.60	0	£118.80	0
16	M (23min) - £7.59 PP (2h) - £39.60	0	£47.19	0
17	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
18	M (31min) - £10.23 PP (2h) - £39.60	(84.1) I – 1 x 84.1 = 84.1	84.1 / £74.33	1.131 (100%)

	R (1 x C/D 30min) - £9.90 Rew - £14.60			
19	M (12min) - £3.96 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £14.60	(4.9) I – 5 x 4.9 = 24.5	24.5 / £107.66	0.228 (22.8%)
20	M (7h 28min) - £147.84 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £14.60	(84.1) I – 5 x 84.1 = 420.5	420.5 / £251.54	1.672 (100%)
21	M (6h 46min) - £133.98 PP (2h) - £39.60	0	£173.58	0
22	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
23	M (4h 21min x 2 handlers) - £172.26 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £14.60	(84.1) I – 7 x 84.1 = 588.7	588.7 / £572.96	1.027 (100%)
24	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
25	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
26	M (29min x 2 handlers) - £19.14 PP (8h) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £14.60	(4.9) I – 7 x 4.9 = 34.3	34.3 / £419.84	0.082 (8.2%)
27	M (3h 13min) - £63.69 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £14.60	(0.3) I – 3 x 0.3 = 0.9	0.9 / £147.59	0.006 (0.6%)
28	M (13min) - £4.29 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £14.60	(0.3) I – 2 x 0.3 = 0.6	0.6 / £78.29	0.008 (0.8%)
29	M (5min) - £1.65 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £14.60	(0.3) I – 1 x 0.3 = 0.3	0.3 / £65.75	0.005 (0.5%)
30	M (2h 10min) - £42.90 PP (2h) - £39.60	(0.3) I – 3 x 0.3 = 0.9	0.9 / £126.80	0.007 (0.7%)

	R (3 x C/D 30min) - £29.70 Rew - £14.60			
31	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
32	M (7h) - £138.60 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £14.60	(0.3) I – 3 x 0.3 = 0.9	0.9 / £222.50	0.004 (0.4%)
33	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
34	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
35	M (13min) - £4.29 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £14.60	(0.3) I – 2 x 0.3 = 0.6	0.6 / £78.29	0.004 (0.4%)
36	M (8h 56min) - £176.88 PP (2h) - £39.60 R (8 x C/D 30min) - £79.20 Rew - £14.60	(0.3) I – 8 x 0.3 = 2.4	2.4 / £310.28	0.008 (0.8%)
37	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
38	M (53min) - £17.49 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £14.60	(84.1) I – 5 x 84.1 = 420.5	420.5 / £121.19	3.47 (100%)

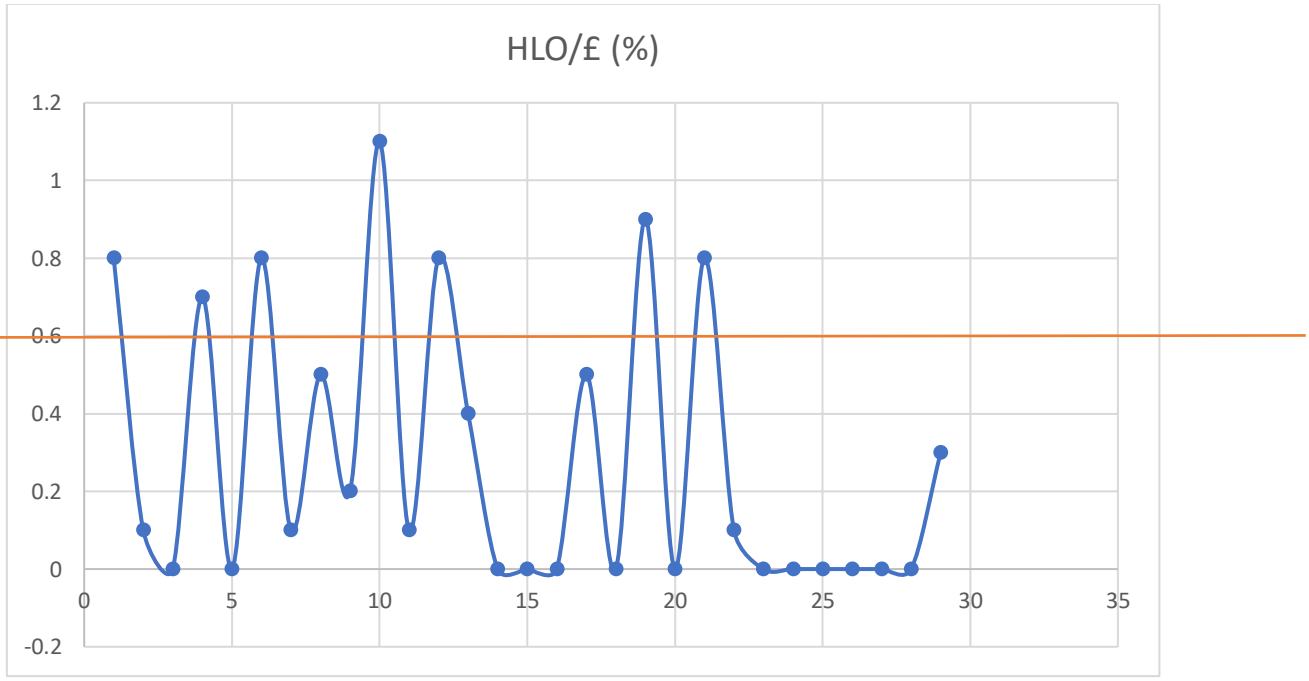


Appendix Z: CHIS 10 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (1h 38min x 2 handlers) - £64.68 PP (8h x 2 handlers) - £316.80 R (12 x C/D 30min) - £118.80 Rew - £167.03	(0.3) I – 12 x 0.3 = 3.6 Ar – 2 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	5.4 / £667.31	0.008 (0.8%)
2	M (5min) - £1.65 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £167.03	(0.3) 1 x 0.3 = 0.3	0.3 / £218.18	0.001 (0.1%)
3	M (24min) - £7.92 PP (2h) - £39.60	0	£47.52	0
4	M (3h 38min x 2 handlers) - £143.88 PP (8h x 2 handlers) - £316.80 R (12 x C/D 30min) - £118.80 Rew - £167.03	(0.3) I – 12 x 0.3 = 3.6 Ar – 2 x 0.3 = 1.2 Out – 4 x 0.3 = 1.2	5.4 / £746.51	0.007 (0.7%)
5	M (52min) - £17.16 PP (2h) - £39.60	0	£56.76	0
6	M (35min x 2 handlers) - £23.10 PP (8h x 2 handlers) - £316.80 R (11 x C/D 30min) - £108.90 Rew - £167.03	(0.3) I – 11 x 0.3 = 3.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2 Ar – 1 x 0.3 = 0.3	5.1 / £615.83	0.008 (0.8%)
7	M (6min) - £1.98 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £167.03	(0.3) I – 1 x 0.3 = 0.3	0.3 / £218.51	0.001 (0.1%)
8	M (1h 23min x 2 handlers) - £54.78 PP (8h x 2 handlers) - £316.80 R (10 x C/D 30min) - £99.00 Rew - £167.03	(0.3) I – 10 x 0.3 = 3	3 / £637.61	0.005 (0.5%)
9	M (1h 27min) - £28.71 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £167.03	(0.3) I – 2 x 0.3 = 0.6	0.6 / £255.14	0.002 (0.2%)
10	M (2h 34min x 2 handlers) - £101.64 PP (8h x 2 handlers) - £316.80	(0.3) I – 16 x 0.3 = 4.8 Ar 5 x 0.3 = 1.5 PV 2 x 0.3 = 0.6	8.1 / £743.87	0.011 (1.1%)

	R (16 x C/D 30min) - £158.40 Rew - £167.03	Out - 4 x 0.3 = 1.2		
11	M (5min) - £1.65 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £167.03	(0.3) I – 1 x 0.3 = 0.3	0.3 / £218.18	0.001 (0.1%)
12	M (50min x 2 handlers) - £33.00 PP (8h x 2 handlers) - £316.80 R (16 x C/D 30min) - £158.40 Rew - £167.03	(0.3) I – 16 x 0.3 = 4.8 PV – 1 x 0.3 = 0.3	5.1 / £675.23	0.008 (0.8%)
13	M (1h 44min x 2 handlers) - £68.64 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £167.03	(0.3) I – 9 x 0.3 = 2.7	2.7 / £641.57	0.004 (0.4%)
14	M (1h 7min) - £22.11 PP (2h) - £39.60	0	£61.22	0
15	M (21min) - £6.93 PP (2h) - £39.60	0	£46.04	0
16	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
17	M (4h 45min x 2 handlers) - £188.10 PP (8h x 2 handlers) - £316.80 Rew - £167.03	(0.3) PV – 4 x 0.3 = 1,2 OW - 4 x 0.3 = 1.2 Out – 4 x 0.3 = 1.2	3.6 / £671.93	0.005 (0.5%)
18	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
19	M (21min x 2 handlers) - £6.93 PP (8h x 2 handlers) - £316.80 R (12 x C/D 30min) - £118.80 Rew - £167.03	(0.3) I – 12 x 0.3 = 3.6	3.6 / £609.56	0.009 (0.9%)
20	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
21	M (50min x 2 handlers) - £16.50 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £167.03	(0.3) I – 5 x 0.3 = 1.5 Ar – 3 x 0.3 = 0.9 PV – 2 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	4.2 / £549.83	0.008 (0.8%)
22	M (4min) - £1.32 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £217.85	0.001 (0.1%)

	Rew – 167.03			
23	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
24	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
25	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
26	M (57min) - £18.81 PP (2h) - £39.60	0	£58.41	0
27	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
28	M (6min) - £1.98 PP (2h) - £39.60	0	£41.58	0
29	M (4h 20min x 2 handlers) - £171.60 PP (8h x 2 handlers) - £316.80 Rew - £167.03	(0.3) Ar – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2 SP – 1 x 0.3 = 0.3	1.8 / £655.43	0.003 (0.3%)

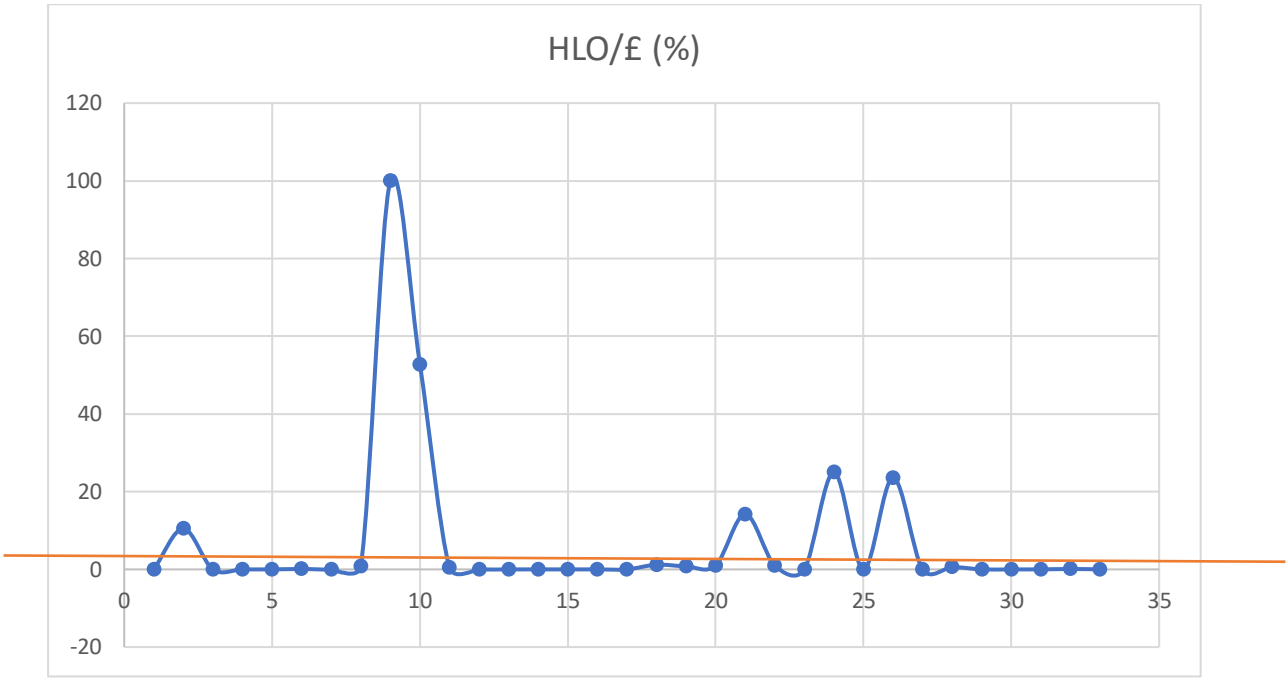


Appendix AA: CHIS 11 calculated value for each individual interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M - £13.86 PP - £39.60	0	£53.46	0
2	M (42 minutes x 2 handlers) - £76.56 PP (8h x 2 handlers)- £316.80 R (9 x C/D 30min) - £89.10 Rew - £15.63	(4.9) 9 x 4.9 = 44.1	44.1 / £498.09	0.086 (8.6%)
3	M (1h) - £19.80 PP (2h) - £39.60	0	£59.40	0
4	M (11min) - £3.63 PP (2h) - £39.60	(0.3) PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	1.5 / £43.23	0.035 (3.5%)
5	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
6	M (7h 55min) - £156.75 PP (2h)- £39.60 R (1 x C/D 30min) - £9.90 Rew - £15.63	(0.3) I – 1 x 0.3 = 0.3	0.3 / £221.88	0.001 (0.1%)
7	M (1 min) - £0.33 PP (2h) - £39.60	0	£39.93	0
8	M (10min) - £3.30 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £15.63	(0.3) I – 2 x 0.3 = 0.6	0.6 / £78.33	0.008 (0.8%)
9	M (13min) - £4.29 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £15.63	(84.1) I – 4 x 84.1 = 336.4	336.4 / £99.12	3.394 (100%)
10	M (32min x 2 handlers) – £21.12 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £15.63	(84.1) I – 2 x 84.1 = 168.2	168.2 / £373.35	0.451 (45.1%)
11	M (2 min) - £0.66 PP (2h) - £39.60	0	£40.26	0
12	M (2min) - £0.66 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £15.63	(0.3) I – 1 x 0.3 = 0.3	0.3 x £65.79	0.005 (0.5%)
13	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
14	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
15	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
16	M (1min) - £0.33	0	£39.93	0

	PP (2h) - £39.60			
17	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
18	M (13min) – £4.29 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £15.63	(0.3) I – 4 x 0.3 = 1.2	1.2 / £99.12	0.012 (1.2%)
19	M (7 min) - £2.31 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £15.63	(0.3) I – 2 x 0.3 = 0.6	0.6 / 77.34	0.008 (0.8%)
20	M (21min) - £6.93 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £15.63	(0.3) I – 3 x 0.3 = 0.9	0.9 / £91.86	0.01 (1%)
21	M (21min) - £6.93 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £15.63	(4.9) I – 2 x 4.9 = 9.8	9.8 / £81.96	0.12 (12%)
22	M (12 min) – £3.96 PP (2h) - £39.60 R (3 x C/D 30min) – £29.70 Rew - £15.63	(0.3) I – 3 x 0.3 = 0.9	0.9 / £88.89	0.01 (1%)
23	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
24	M (34 min) - £11.22 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £15.63	(4.9) I – 5 x 4.9 = 24.5	24.5 / £115.95	0.211 (21.1%)
25	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
26	M (55min) – £18.15 PP (2h) – £39.60 R (5 x C/D 30min) - £49.50 Rew - £15.63	(4.9) I – 5 x 4.9 = 24.5	24.5 / £122.88	0.199 (19.9%)
27	M (10h 58min) - £217.14 PP (2h) - £39.60	0	£256.74	0
28	M (3h 39min x 2 handlers) - £144.54 PP (8h x 2 handlers) – £316.80 R (12 x C/D 30min) - £118.80 Rew - £15.63	(0.3) I – 12 x 0.3 = 3.6	3.6 / £595.77	0.006 (0.6%)
29	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
30	M (1h 10min) - £23.10 PP (2h) - £39.60	0	£62.70	0
31	M (10h 21min) - £204.93 PP (2h) - £39.60	0	£244.53	0
32	M (8h 20min) - £165.00	(0.3)	0.3 / £249.90	0.001

	PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £15.60	I – 3 x 0.3		(0.1%)
33	M (27min) - £8.91 PP (2h) - £39.60	0	£48.51	0



Appendix AB: CHIS 12 calculated value of each interaction

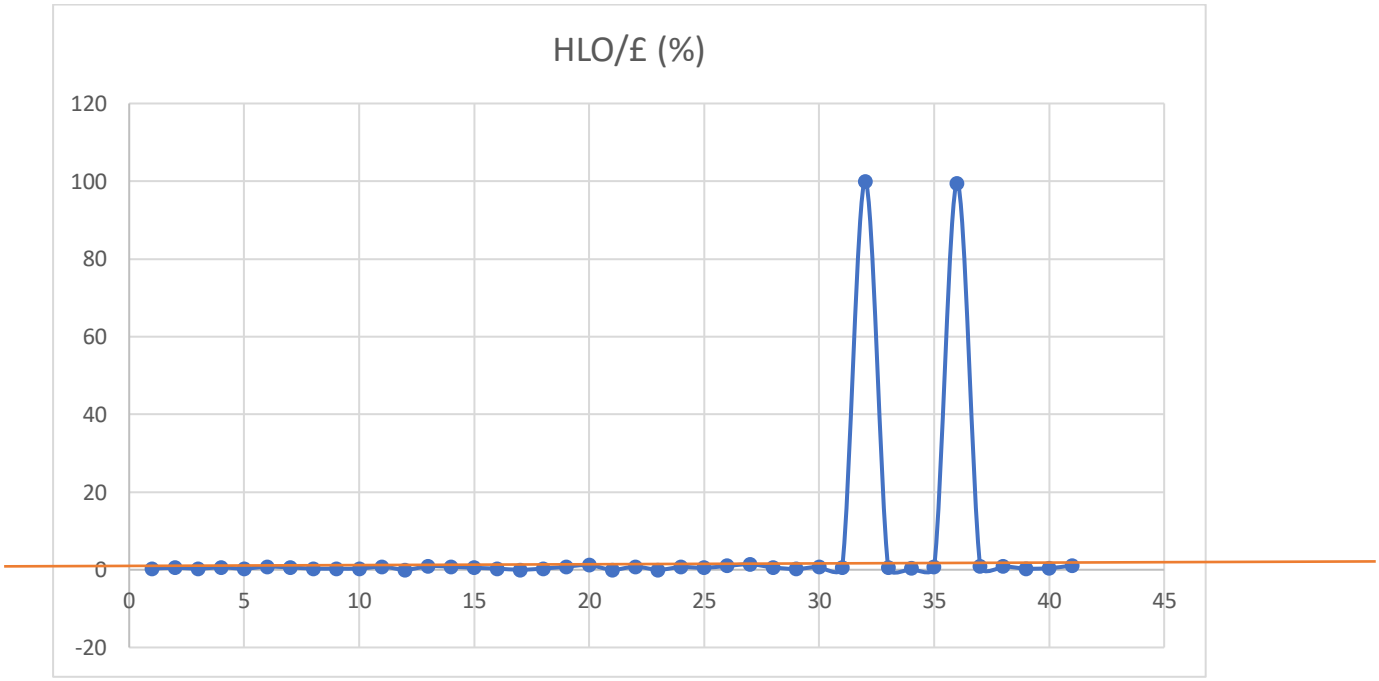
Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (3h 51min) – £76.23 PP (2h) - £39.60 R (2 x C/D 30min) – £19.80 Rew - £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £180.09	0.003 (0.3%)
2	M (1h x 2 handlers) - £39.60 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	2.1 / £410.99	0.005 (0.5%)
3	M (2 min) - £0.66 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3	0.3 / £94.85	0.003 (0.3%)
4	M (13min) - £4.29 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £108.38	0.006 (0.6%)
5	M (34 min x 2 handlers) - £22.44 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5	1.5 / £433.43	0.003 (0.3%)
6	M (10 min) – £3.30 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £44.69	(0.3) I – 3 x 0.3 = 0.9	0.9 / £117.29	0.008 (0.8)
7	M (6 min) - £1.98 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £106.07	0.006 (0.6%)
8	M (5 min) - £1.65 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3	0.3 / £95.84	0.003 (0.3%)
9	M (8 min) - £2.64 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £96.83	0.003 (0.3%)

	Rew - £44.69			
10	M (5 min) - £1.65 PP (2h)- £39.60 R (1 x C/D 30min)- £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3	0.3 / £95.84	0.003 (0.3%)
11	M (14min x 2 handlers) - £9.24 PP (8h x 2 handlers) – £316.80 R (5 x C/D 30min) – £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5 Ar – 2 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	3.3 / £420.23	0.008 (0.8%)
12	M (2h 52min) - £56.76 PP (2h) - £39.60	0	£96.36	0
13	M (40min x 2 handlers) - £26.40 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5 Ar – 3 x 0.3 = 0.9 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.9 /£437.39	0.009 (0.9%)
14	M (24 min x 2 handlers) - £15.84 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5 Ar – 2 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	3.3 / £426.83	0.008 (0.8%)
15	M (1 x 2 handlers) - £0.66 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5 Ar – 1 x 0.3 = 0.3 Out 1 x 0.3 = 0.3	2.1 / £411.65	0.005 (0.5%)
16	M (4min) - £1.32 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3	0.3 / £95.51	0.003 (0.3%)
17	M (2 min) - £0.66 PP (2h) - £39.60	0	£40.26	0
18	M (7 min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3	0.3 / £96.50	0.003 (0.3%)
19	M (30 min x 2 handlers) - £19.80 PP (8h x 2 handlers) - £316.80	(0.3) I – 7 x 0.3 = 2.1 Ar – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.6 / £450.59	0.008 (0.8%)

	R (7 x C/D 30min) - £69.30 Rew - £44.69			
20	M (10min) - £3.30 PP (2h) - £39.60 R (6 x C/D 30min) - £59.40 Rew - £44.69	(0.3) I – 6 x 0.3 = 1.8	1.8 / £146.99	0.012 (1.2%)
21	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
22	M (1h 30min) - £29.70 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £44.69	(0.3) I – 4 x 0.3 = 1.2	1.2 / £153.59	0.008 (0.8%)
23	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
24	M (1h 5min x 2 handlers) - £42.90 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.3 / 453.89	0.007 (0.7%)
25	M (58 min) - £19.14 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £123.23	0.005 (0.5%)
26	M (3min) - £0.99 PP (2h)- £39.60 R (4 x C/D 30min) - £39.60 Rew - £44.69	(0.3) I – 4 x 0.3 = 1.2	1.2 x 124.88	0.01 (1%)
27	M (43 min) - £14.19 PP (2h) - £39.60 R (8 x C/D 30min) - £79.20 Rew - £44.69	(0.3) I – 8 x 0.3 = 2.4	2.4 / £177.68	0.014 (1.4%)
28	M (10min) - £3.30 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3 PS – 1 x 0.3 = 0.3	0.6 / 97.49	0.006 (0.6%)
29	M (2h 9min) - £42.57 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	(0.3) I – 1 x 0.3 = 0.3	0.3 / £136.76	0.002 (0.2%)
30	M (1h 34min x 2 handlers) - £62.04	(0.3) I – 6 x 0.3 = 1.8	3.9 / 482.93	0.008 (0.8%)

	PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min) - £59.40 Rew - £44.69	PV – 1 x 0.3 = 0.3 Ar – 2 x 0.3 = 0.6 Out 4 x 0.3 = 1.2		
31	M (3min) - £0.99 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £105.08	0.006 (0.6%)
32	M (1h 10min x 2 handlers) - £46.20 PP (8h x 2 handlers) - £316.80 R (18 x C/D 30min) - £178.20 Rew – £44.69	(84.1) I – 18 x 84.1 = 1,513.8 Ar – 4 x 84.1 = 336.4 PV 1 x 84.1 = 84.1 Out 4 x 84.1 = 336.4	2,270.7 / 585.89	3.876 (100%)
33	M (13min) - £4.29 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £108.38	0.006 (0.6%)
34	M (2h 52min) - £56.76 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew £44.69	(0.3) I – 2 x 0.3 = 0.6	0.6 / £160.85	0.004 (0.4%)
35	M (30min x 2 handlers) - £19.80 PP (8h x 2 handlers) - £316.80 R (11 x C/D 30min) - £108.90 Rew £44.69	(0.3) I – 11 x 0.3 = 3.3	3.3 / £490.19	0.007 (0.7%)
36	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew £44.69	(84.1) I – 1 x 84.1 = 84.1	84.1 / £99.14	0.848 (84.8%)
37	M (10min) - £3.30 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £44.69	(0.3) I – 4 x 0.3 = 1.2	1.2 / £127.19	0.009 (0.9%)
38	M (50min) - £16.50 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £44.69	(0.3) I – 4 x 0.3 = 1.2	1.2 / £140.39	0.009 (0.9%)
39	M (16min) - £5.28	(0.3)	0.3 / £99.47	0.003

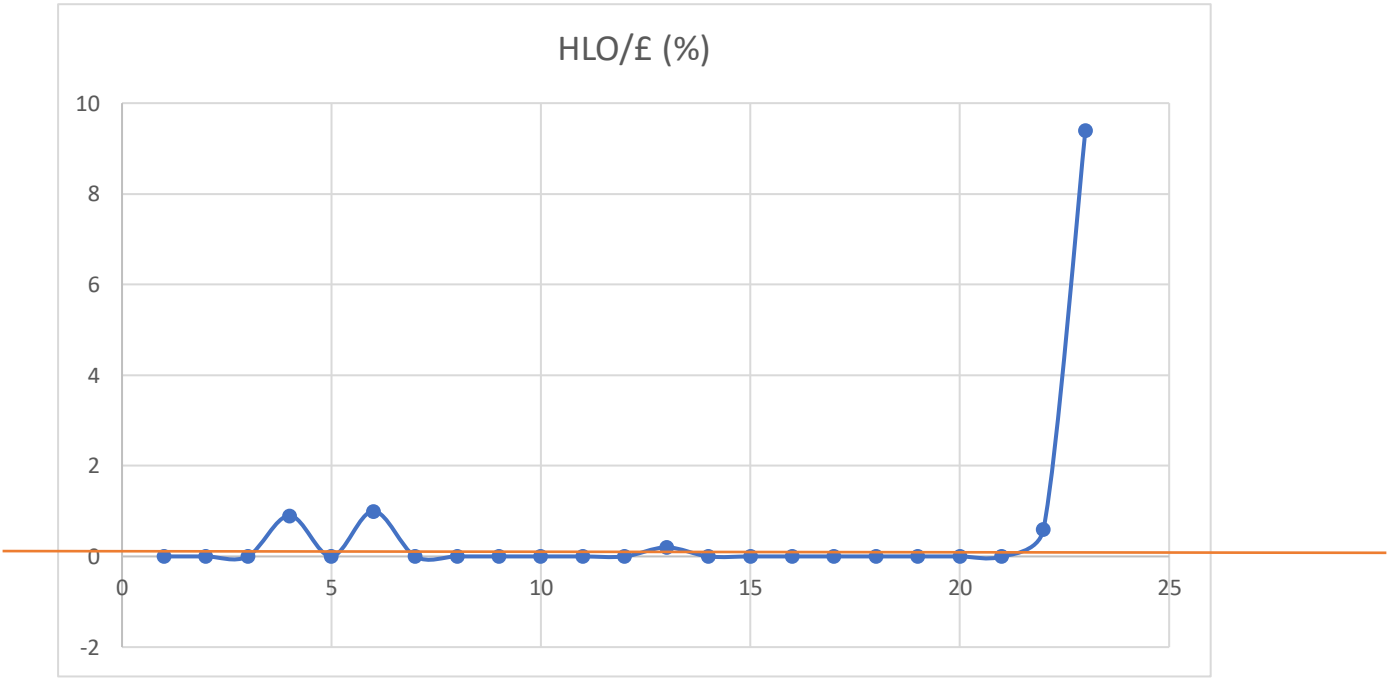
	PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £44.69	I – 1 x 0.3 = 0.3		(0.3%)
40	M (1h 37min x 2 handlers) - £64.02 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £44.69	(0.3) I – 7 x 0.3 = 2.1	2.1 / £494.81	0.004 (0.4%)
41	M (12min) - £3.96 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £44.69	(0.3) I – 5 x 0.3 = 1.5	1.5 / £137.75	0.011 (1.1%)



Appendix AC: CHIS 13 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
2	M (25min) - £8.25 PP (2h) - £39.60	0	£47.85	0
3	M (4min) - £1.32 PP (2h) £39.60	0	£40.92	0
4	M (1h 25min x 2 handlers) - £56.10 PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min) - £59.40 Rew - £58.88	(0.3) I – 6 x 0.3 = 1.8 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.6 / 491.18	0.009 (0.9)
5	M (4h 1min) - £79.53 PP (2h) - £39.60	0	£119.13	0
6	M (3h 45min x 2 handlers) - £148.50 PP (8h x 2 handlers) - £316.80 R (11 x C/D 30min) - £108.90 Rew £58.88	(0.3) I – 11 x 0.3 = 3.3 Ar – 1 x 0.3 = 0.3 PV – 6 x 0.3 = 1.8 Out – 4 x 0.3 = 1.2	6.6 / £633.08	0.01 (1%)
7	M (6 min) – £1.98 PP (2h) - £39.60	0	£41.58	0
8	M (8h 6min) - £160.38 PP (2h) - £39.60	0	£199.98	0
9	M (17min) - £5.61 PP (2h) - £39.60	0	£45.21	0
10	M (48min) - £15.84 PP (2h) - £39.60	0	£55.44	0
11	M (1 min) - £0.33 PP (2h) - £39.60	0	£39.93	0
12	M (1h 54min) - £37.62 PP (2h) - £39.60	0	£77.22	0
13	M (2h 38min x 2 handlers) - £104.28 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £58.88	(0.3) I – 3 x 0.3 = 0.9	0.9 / £509.66	0.002 (0.2%)
14	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
15	M (1min) -£0.33 PP (2h) - £39.60	0	£39.93	0
16	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
17	M (2h 2min) - £40.26 PP (2h) - £39.60	0	£79.86	0
18	M (1min) - £0.33	0	£39.93	0

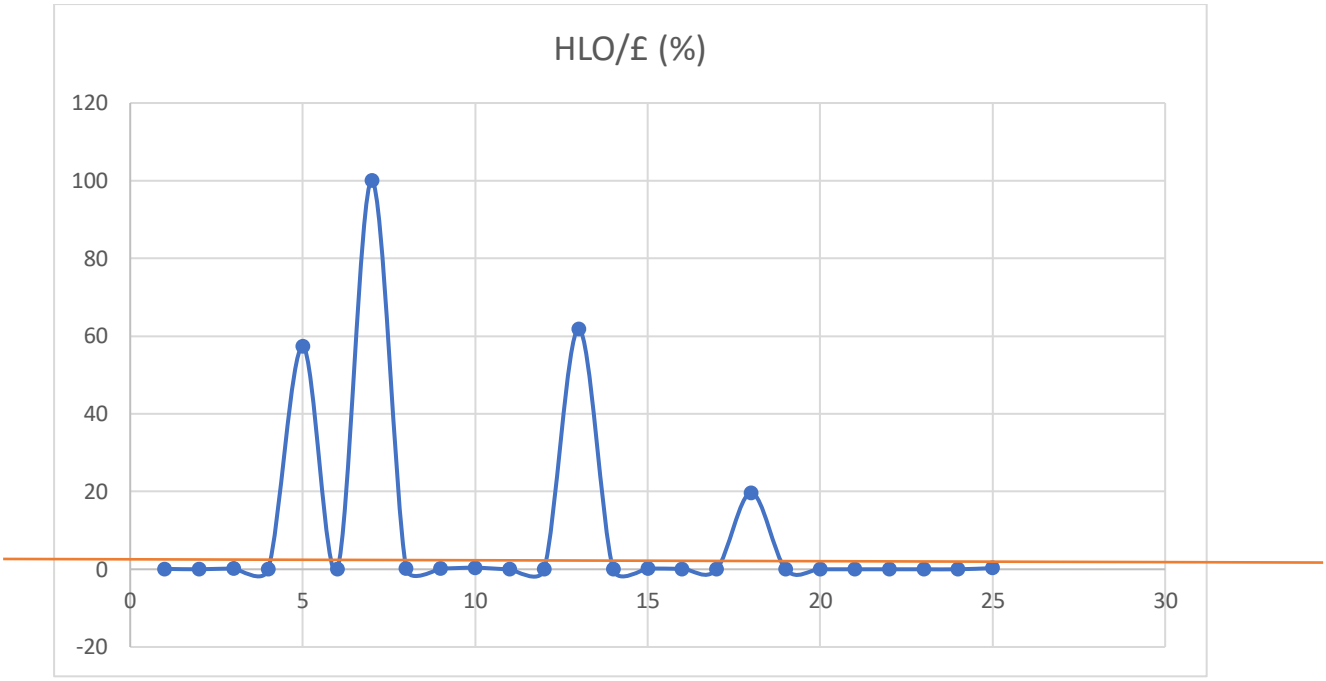
	PP (2h) - £39.60			
19	M (1h 57min) - £38.61 PP (2h) - £39.60	0	£78.21	0
20	M (4h 27min) - £88.11 PP (2h) - £39.60	0	£127.71	0
21	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
22	M (3h 37min x 2 handlers) - £143.22 PP (8h x 2 handlers) - £316.80 R (12 x C/D 30min) - £118.80 Rew - £58.88	(0.3) I – 12 x 0.3 = 3.6	3.6 / £637.70	0.006 (0.6%)
23	M (16 min) - £5.28 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £58.88	(4.9) I – 2 x 4.9 = 9.8	9.8 / £123.56	0.079 (7.9%)



Appendix AD: CHIS 14 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (6h 59min) - £138.27 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £93.31	(0.3) I – 1 x 0.3 = 0.3	0.3 / 281.08	0.001 (0.1%)
2	M (1h 44min) - £34.32 PP (2h) - £39.60	0	£73.92	0
3	M (8min) - £2.64 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £93.31	(0.3) I – 1 x 0.3 = 0.3	03. / £145.45	0.002 (0.2%)
4	M (10min) - £3.30 PP (2h) - £39.60	0	£42.90	0
5	M (1h 41min x 2 handler) - £66.66 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £93.31	(16.7) I – 7 x 16.7 = 116.9 Ar – 1 x 16.7 = 16.7 PS – 4 x 16.7 = 66.8 Out – 4 x 16.7 = 66.8	267.2 / 546.07	0.489 (48.9%)
6	M (24min) - £7.92 PP (2h) - £39.60	0	£47.52	0
7	M (3h 37min) - £71.61 PP (2h) - £39.60 R (6 x C/D 30min) - £59.40 Rew - £93.31	(84.1) I – 6 x 84.1 = 504.6	504.6 / 263.92	1.912 (100%)
8	M (20min) - £6.60 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £93.31	(0.3) I – 1 x 0.3 = 0.3	0.3 / £149.41	0.002 (0.2%)
9	M (1h x 2 handlers) - £39.60 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £93.31	(0.3) I – 4 x 0.3 = 1.2	1.2 / 489.31	0.002 (0.2%)
10	M (4min) - £1.32 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £93.31	(0.3) I – 2 x 0.3 = 0.6	0.6 / £154.03	0.004 (0.4%)
11	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
12	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
13	M (50min) - £16.50 PP (2h) - £39.60	(84.1) I – 1 x 84.1 = 84.1	84.1 / £159.31	0.528 (52.8%)

	R (1 x C/D 30min) - £9.90 Rew - £93.31			
14	M (2min)- £0.66 PP (2h) £39.60	0	£40.26	0
15	M (4min) - £1.32 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £93.31	(0.3) I – 1 x 0.3 = 0.3	0.3 / £144.13	0.002 (0.2)
16	M (4h 45min) - £94.05 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £93.31	(0.3) I – 1 x 0.3 = 0.3	0.3 / 236.86	0.001 (0.1%)
17	M (1min) - £0.33 PP (2h) - £39.60	0	£39.60	0
18	M (2h 2min x 2 handlers) - £80.52 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £93.31	(84.1) I – 1 x 84.1 = 84.1	84.1 / 500.53	0.168 (16.8%)
19	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
20	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
21	M (1min) - £0.33 PP (2h) - £39.60	0	£39.60	0
22	M (12min) - £3.96 PP (2h) - £39.60	0	£43.56	0
23	M (45min) - £14.85 PP (2h) - £39.60	0	£54.45	0
24	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
25	M (1h 26min x 2) - £56.76 PP (8h x 2 handlers) - £316.80 R (0 x C/D 30min) - £0 Rew - £93.31	(0.3) Ar – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	1.5 / £466.87	0.003 (0.3%)

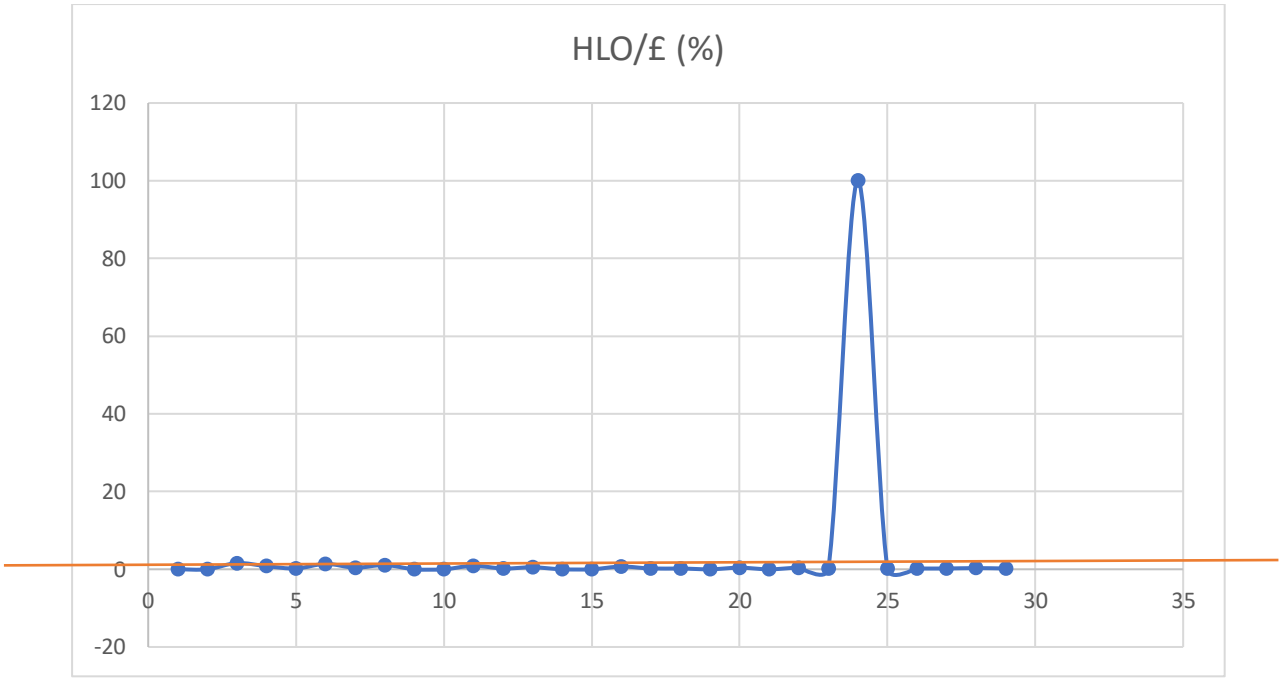

HLO/£ (%)
120
100
80
60
40
20
0
-20
0
5
10
15
20
25
30

Appendix AE: CHIS 15 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
2	M (3h 58min) - £78.54 PP (2h) - £39.60	0	£118.14	0
3	M (21min) - £6.93 PP (2h) - £39.60 R (8 x C/D 30min) - £79.20 Rew - £81.50	(0.3) I – 8 x 0.3 = 2.4	3.4 / 207.23	0.016 (1.6%)
4	M (4h 1min x 2 handlers) - £159.06 PP (8h x 2 handlers) - £316.80 R (10 x C/D 30min) - £99.00 Rew - £81.50	(0.3) I – 10 x 0.3 = 3 Ar – 2 x 0.3 = 0.6 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	5.1 / 656.36	0.008 (0.8%)
5	M (1h 20min x 2handlers) - £52.80 PP (2h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £81.50	(0.3) I – 3 x 0.3 = 0.9	0.9 / 480.80	0.002 (0.2%)
6	M (2h 33min) - £50.49 PP (2h) - £39.60 R (15 x C/D 30min) - £148.50 Rew - £81.50	(0.3) I – 15 x 0.3 = 4.5	4.5 / 320.09	0.014 (1.4%)
7	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £81.50	(0.3) I – 2 x 0.3 = 0.6	0.6 / 143.54	0.004 (0.4)
8	M (4h 8min) - £163.68 PP (8h x 2 handlers) - £316.80 R (21 x C/D 30min) - £207.90 Rew - £81.50	(0.3) I – 21 x 0.3 = 6.3 Ar – 3 x 0.3 = 0.9 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	8.7 / 769.88	0.011 (1.1%)
9	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
10	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
11	M (4h 9min x 2handlers) - £164.34 PP (8h x 2 handlers) - £316.80	(0.3) I – 0.3 x 13 = 3.9 Ar -2 x 0.3 = 0.6 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	6 / £691.34	0.009 (0.9%)

	R (13 x C/D 30min) - £128.70 Rew - £81.50			
12	M (1h 56min) - £38.28 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £81.50	(0.3) I – 1 x 0.3 = 0.3	0.3 / 169.28	0.002 (0.2%)
13	M (37min x 2 handlers) - £24.42 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £81.50	(0.3) I – 9 x 0.3 = 2.7	2.7 / 511.82	0.005 (0.5)
14	M (2min) - £0.66 PP (2h) - £39.80	0	£40.26	0
15	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
16	M (4h 10min x 2 handlers) - £165.00 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £81.50	(0.3) I – 9 x 0.3 = 2.7 Ar – 1 x 0.3 = 0.3 PV – 2 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	4.8 / 652.40	0.007 (0.7%)
17	M (9 min) - £2.97 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £81.50	(0.3) I – 1 x 0.3 = 0.3	0.3 / £133.97	0.002 (0.2%)
18	M (13min) - £4.29 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £81.50	(0.3) I – 1 x 0.3 = 0.3	0.3 / £135.29	0.002 (0.2%)
19	M (11min) - £3.63 PP (2h) - £39.60	0	£43.23	0
20	M (4h 32min x 2 handlers) - £179.52 PP (8h x 2 handlers) - £316.80 R (10 x C/D 30min) - £99.00 Rew - £81.50	(0.3) I – 10 x 0.3 = 3	3 / 676.82	0.004 (0.4%)
21	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
22	M (9min) - £2.97 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80	(0.3) I – 2 x 0.3 = 0.6	0.6 / 143.87	0.004 (0.4%)

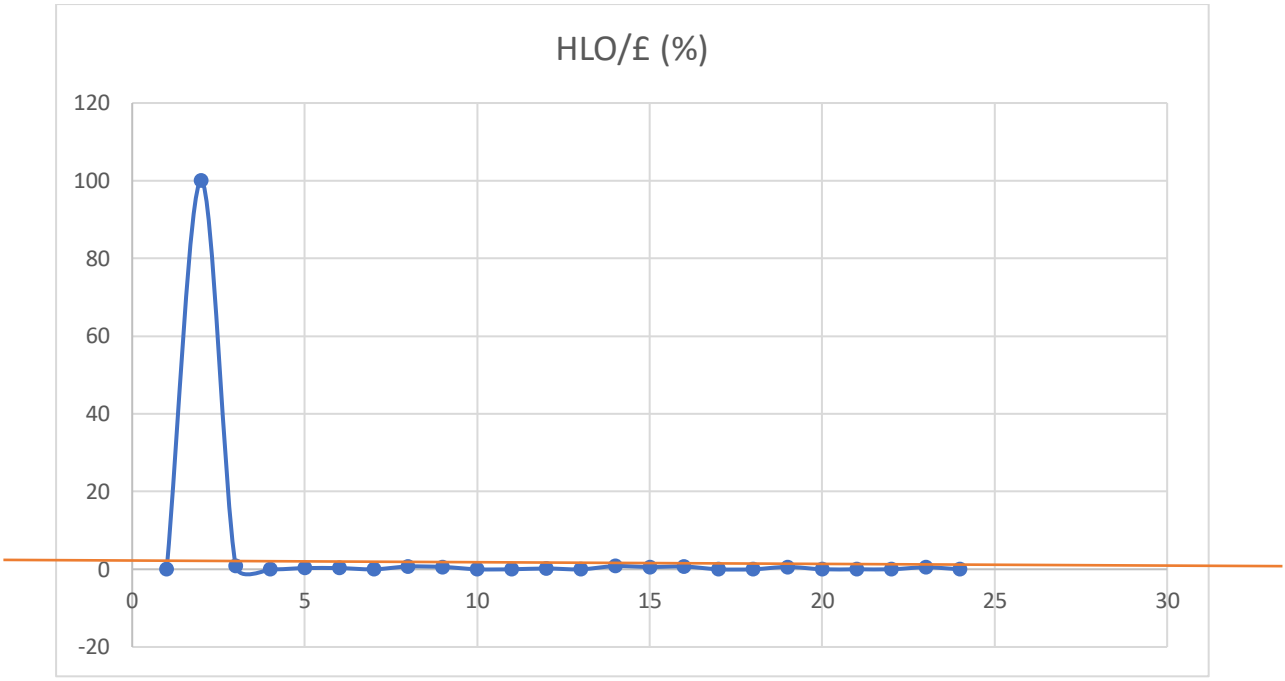
	Rew - £81.50			
23	M (1h 48min) - £35.64 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £81.50	(0.3) I – 1 x 0.3 = 0.3	0.3 / 166.64	0.002 (0.2%)
24	M (3h 56min x 2 handlers) - £155.76 PP (8h x 2 handlers) - £316.80 R (15 x C/D 30min) - £148.50 Rew - £81.50	(84.1) I – 15 x 84.1 = 1,261.5 Ar – 1 x 84.1 = 84.1 PV – 1 x 84.1 = 84.1 Out – 4 x 84.1 = 336.4	1,766.1 / 702.56	2.514 (100%)
25	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £81.50	(0.3) I – 1 x 0.3 = 0.3	0.3 / 135.95	0.002 (0.2%)
26	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £81.50	(0.3) I – 1 x 0.3 = 0.3	0.3 / £135.95	0.002 (0.2)
27	M (2h 6min x 2 handlers) - £83.16 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £81.50	(0.3) I – 4 x 0.3 = 1.2	1.2 / £521.06	0.002 (0.2%)
28	M (25min x 2 handlers) - £16.50 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £81.50	(0.3) I – 4 x 0.3 = 1.2	1.2 / £454.40	0.003 (0.3%)
29	M (3h 39min x 2 handlers) - £144.54 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £81.50	(0.3) I – 3 x 0.3 = 0.9	0.9 / 572.54	0.002 (0.2%)


HLO/£ (%)
120
100
80
60
40
20
0
-20
0
5
10
15
20
25
30
35

Appendix AF: CHIS 16 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (2h 23min) - £47.19 PP (2h) - £39.60	0	£86.79	0
2	M (3h 56min) - £77.88 PP (2h) - £39.60 R (10 x C/D 30min) - £99.00 Rew -36.25	(84.1) I – 10 x 84.1 = 841 PS – 1 x 84.1 = 84.1	925.1 / £252.73	3.66 (100%)
3	M (2h 14min) - £44.22 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £36.25	(0.3) I – 5 x 0.3 = 1.5	1.5 / £169.57	0.009 (0.9%)
4	M (22min) - £7.26 PP (2h) - £39.60	0	£46.86	0
5	M (30min) - £9.90 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £36.25	(0.3) I – 1 x 0.3 = 0.3	0.3 / £95.65	0.003 (0.3%)
6	M (6min) - £1.98 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £36.25	(0.3) I – 1 x 0.3 = 0.3	0.3 / £87.73	0.003 (0.3%)
7	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
8	M (1h 7min x 2 handlers) - £44.22 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £36.25	(0.3) I – 1 x 0.3 = 0.3 Ar – 2 x 0.3 = 0.6 PV – 1 x 0.3 = 0.3 Out – 4 x 0.4 = 1.2 OW – 1 x 0.3 = 0.3	2.7 / 407.17	0.007 (0.7%)
9	M (4h 58min) - £98.34 PP (2h) - £39.60 R (4 x C/D 30min) – £39.60 Rew - £36.25	(0.3) I – 4 x 0.3 = 1.2	1.2 / 213.79	0.006 (0.6%)
10	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
11	M (6h 4min) - £120.12 PP (2h) - £39.60	0	£159.72	0
12	M (5h 25min) - £107.25 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £36.25	(0.3) I – 1 x 0.3 = 0.3	0.3 / 193.00	0.002 (0.2%)
13	M (2h 42min) - £53.46 PP (2h) - £39.60	0	£93.06	0
14	M (6min) - £1.98 PP (2h) - £39.60	(0.3) I – 3 x 0.3 = 0.9	0.9 / £107.53	0.008 (0.8%)

	R (3 x C/D 30min) - £29.70 Rew - £36.25			
15	M (30min) - £9.90 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £36.25	(0.3) I – 2 x 0.3 = 0.6	0.6 / £105.55	0.006 (0.6%)
16	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £36.25	(0.3) I – 1 x 0.3 = 0.3 PS – 1 x 0.3 = 0.3	0.6 / £88.06	0.007 (0.7%)
17	M (5min) - £1.65 PP (2h) - £39.60	0	£40.65	0
18	M (26min) - £8.58 PP (2h) - £39.60	0	£48.18	0
19	M (18min) - £5.94 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £36.25	(0.3) I – 2 x 0.3 = 0.6	0.6 / £101.59	0.006 (0.6%)
20	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
21	M (11min) - £3.63 PP (2h) - £39.60	0	£43.23	0
22	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
23	M (1h 8min) - £22.44 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £36.25	(0.3) I – 2 x 0.3 = 0.6	0.6 / £118.09	0.005 (0.5%)
24	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0

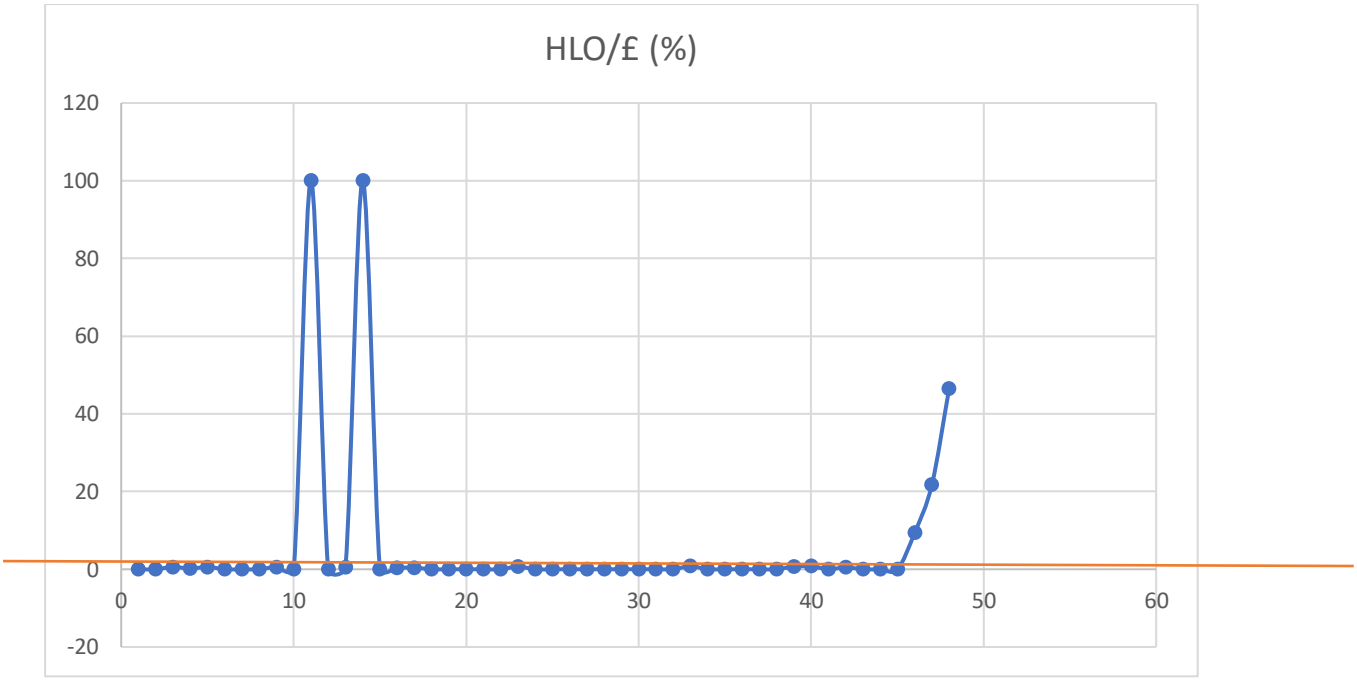

HLO/£ (%)
120
100
80
60
40
20
0
-20
0
5
10
15
20
25
30

Appendix AG: CHIS 17 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
2	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
3	M (8h 18min) - £164.34 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew – £71.18	(0.3) I – 7 x 0.3 = 2.1	2.1 / £344.42	0.006 (0.6%)
4	M (2h 25min x 2 handlers) - £95.70 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) – £39.60 Rew - £71.18	(0.3) I – 4 x 0.3 = 1.2	1.2 / 523.28	0.002 (0.2%)
5	M (3h 17min) - £65.01 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £71.18	(0.3) I – 4 x 0.3 = 1.2	1.2 / £215.39	0.006 (0.6%)
6	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
7	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
8	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
9	M (8h 46min) - £173.58 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew - £71.18	(0.3) I – 7 x 0.3 = 2.1	2.1 / 353.66	0.006 (0.6%)
10	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
11	M (4h 48min x 2 handlers) - £190.08 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £71.18	(84.1) I – 4 x 84.1 = 336.4 Ar – 2 x 84.1 = 168.2 PV – 1 x 84.1 = 84.1 OW – 5 x 84.1 = 420.5 Out 4 x 84.1 = 336.4	1,345.6 / 617.66	2.179 (100%)
12	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
13	M (4h 44min) - £93.72 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £71.18	(0.3) I – 5 x 0.3 = 1.5	1.5 / £254.00	0.006 (0.6%)
14	M (56min) - £18.48 PP (2h) - £39.60	(84.1) I – 9 x 84.1= 756.9	756.9 / £218.36	3.466 (100%)

	R (9 x C/D 30min) - £89.10 Rew - £71.18			
15	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
16	M (6h 14min) - £123.42 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £71.18	(0.3) I – 4 x 0.3 = 1.2	1.2 / £273.80	0.004 (0.4%)
17	M (41min x 2 handlers) - £27.06 PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min) - £59.40 Rew - £71.18	(0.3) I – 6 x 0.3 = 1.8	1.8 / 474.44	0.004 (0.4%)
18	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
19	M (1min) - £0.33 PP (2h) - £39.60	0	£39.60	0
20	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
21	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
22	M (2h 36min) - £51.48 PP (2h) - £39.60	0	£91.08	0
23	M (1h 6min x 2 handlers) - £43.56 PP (8h x 2 handlers) - £316.80 R (11 x C/D 30min) - £108.90 Rew - £71.18	(0.3) I – 11 x 0.3 = 3.3 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out 0	3.9 / £540.44	0.007 (0.7%)
24	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
25	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
26	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
27	M (2h 47min) - £55.11 PP (2h) - £39.60	0	£94.71	0
28	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
29	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
30	M (4h 28min) - £88.44 PP (2h) - £39.60	0	£128.04	0
31	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
32	M (2min) - £0.66 PP (2h) - £39.60	0	£39.93	0
33	M (37min x 2 handlers) - £24.42 PP (8h x 2 handlers) - £316.80 R (8 x C/D 30min) - £79.20 Rew – 71.18	(0.3) I – 8 x 0.3 = 2.4 Ar – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.9 / £491.60	0.008 (0.8%)

34	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
35	M (1h 6min) - £21.78 PP (2h) - £39.60	0	£61.38	0
36	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
37	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
38	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
39	M (4h 38min x 2 handlers) - £183.48 PP (8h x handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £71.18	(0.3) I – 9 x 0.3 = 2.7 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 OW – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	4.8 / £660.56	0.007 (0.7%)
40	M (8min) - £2.64 PP (2h) - £39.60 R (4 x C/D 30min) – 39.60 Rew - £71.18	(0.3) I – 4 x 0.3 = 1.2	1.2 / £153.02	0.008 (0.8%)
41	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
42	M (4h 37min x 2 handlers) - £182.82 PP (8h x 2 handlers) - £316.80 R (11 x C/D 30min) - £108.90 Rew - £71.18	(0.3) I – 11 x 0.3 = 3.3 PV 1 x 0.3 = 0.3	3.6 / £679.7	0.005 (0.5%)
43	M (3h) - £59.40 PP (2h) - £39.60	0	£99.00	0
44	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
45	M (3h 44min) - £73.92 PP (2h) - £39.60	0	£113.52	0
46	M (2h x 2 handlers) - £79.20 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £71.18	(4.9) I – 9 x 4.9 = 44.1	44.1 / £556.28	0.079 (7.9%)
47	M (18min) - £5.94 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew - £71.18	(4.9) I – 7 x 4.9 = 34.3	34.3 / £186.02	0.184 (18.4%)
48	M (2h 22min x 2 handlers) - £93.72 PP (8h x 2 handlers) - £316.80 R (11 x C/D 30min) - £108.90 Rew - £71.18	(16.7) I – 11 x 16.7 = 183.7 Ar – 1 x 16.7 = 16.7 PV – 1 x 16.7 = 16.7 Out – 4 x 16.7 = 66.8	283.9 / £590.60	0.481 (48.1%)

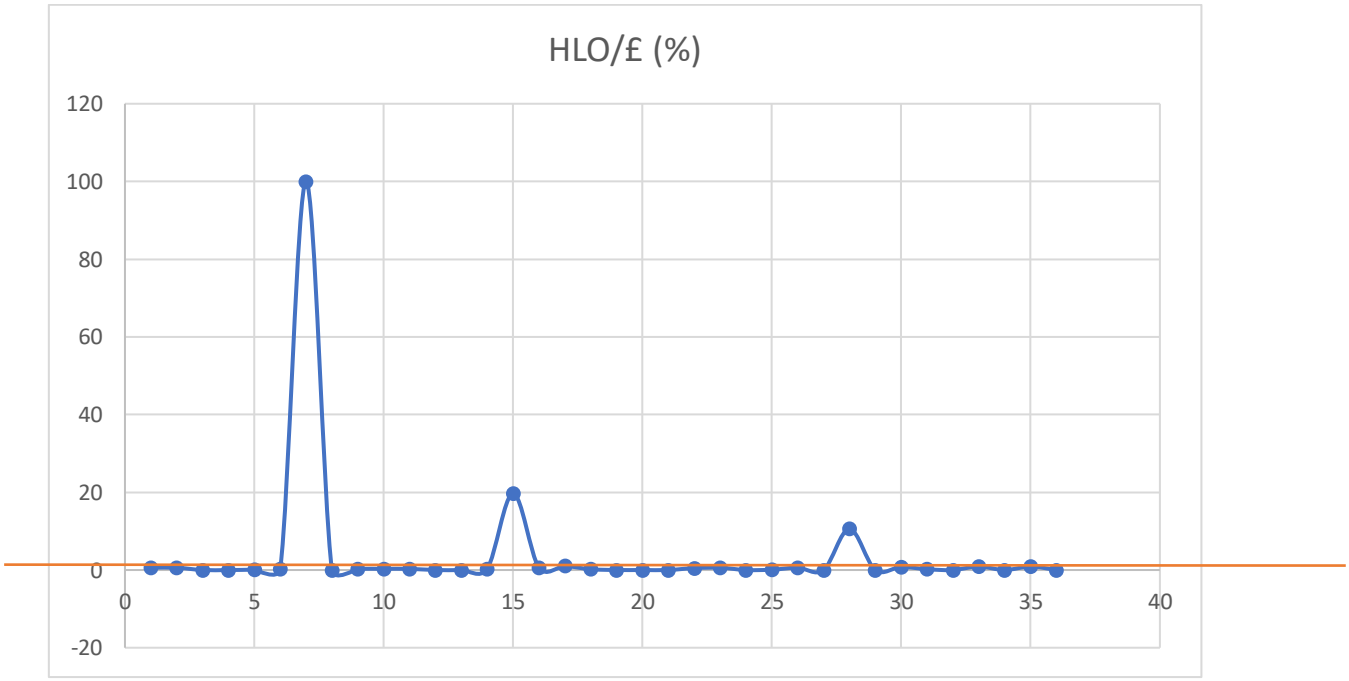

HLO/£ (%)
120
100
80
60
40
20
0
-20
0
10
20
30
40
50
60

Appendix AH: CHIS 18 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (31min) - £10.23 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew -38.85	(0.3) I – 2 x 0.3 = 0.6	0.6 / £108.48	0.006 (0.6%)
2	M (11min) - £3.63 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £38.85	(0.3) I – 2 x 0.3 = 0.6	0.6 / £101.88	0.006 (0.6%)
3	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
4	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
5	M (4h 44min x 2 handlers) - £187.44 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £38.85	(0.3) I – 2 x 0.3 = 0.6	0.6 / 562.89	0.001 (0.1%)
6	M (46min) - £15.18 PP (2h) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £38.85	(0.3) I – 4 x 0.3 = 1.2	1.2 / 410.43	0.003 (0.3%)
7	M (16min) - £5.28 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £38.85	(84.1) I – 3 x 84.1 = 252.3	252.3 / 113.43	2.224 (100%)
8	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
9	M (17min) - £5.61 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.85	(0.3) I – 1 x 0.3 = 0.3	0.3 / 93.96	0.003 (0.3%)
10	M (44min) - £14.52 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.85	(0.3) I – 1 x 0.3 = 0.3	0.3 / £102.87	0.003 (0.3%)
11	M (14min) - £4.62 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.85	(0.3) I – 1 x 0.3 = 0.3	0.3 / £92.97	0.003 (0.3)
12	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
13	M (24min) - £7.92 PP (2h) - £39.60	0	£47.52	0
14	M (48min) - £15.84 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.85	(0.3) I- 1 x 0.3 = 0.3	0.3 / £104.19	0.003 (0.3%)

15	M (58min) - £19.14 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £38.85	(4.9) I – 5 x 4.9 = 24.5	24.5 / £147.09	0.167 (16.7%)
16	M (22min) - £7.26 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £38.85	(0.3) I – 2 x 0.3 = 0.6	0.6 / £105.51	0.006 (0.6%)
17	M (9min) - £2.97 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £38.85	(0.3) I – 4 x 0.3 = 1.2	1.2 / 121.02	0.01 (1%)
18	M (3h 47min) - £74.91 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.85	(0.3) I – 1 x 0.3 = 0.3	0.3 / £163.26	0.002 (0.2%)
19	M (16min) - £5.28 PP (2h) - £39.60	0	£44.88	0
20	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
21	M (16min) - £5.28 PP (2h) - £39.60	0	£44.88	0
22	M (50min) - £16.50 PP (2h) - £39.60	(0.3) Ar – 1 x 0.3 = 0.3	0.3 / £56.10	0.005 (0.5%)
23	M (4min) - £1.32 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £38.85	(0.3) I – 2 x 0.3 = 0.6	0.6 / £99.57	0.006 (0.6%)
24	M (32min) - £10.56 PP (2h) - £39.60	0	£50.16	0
25	M (35min x 2 handlers) - £23.10 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £38.85	(0.3) I – 1 x 0.3 = 0.3	0.3 /£388.65	0.0008 0.08%
26	M (4min) - £1.32 PP (2h) - £39.60 R (2 x C/D 30min) -£19.80 Rew - £38.85	(0.3) I – 2 x 0.3 = 0.6	0.6 / £99.57	0.006 (0.6%)
27	M (32min) - £10.56 PP (2h) - £39.60	0	£50.16	0
28	M (2h 34min x 2 handlers) - £101.64 PP (2h) - £39.60 R (4 x C/D 30min) – 39.60 Rew - £38.85	(4.9) I – 4 x 4.9 = 19.6	19.6 / £219.69	0.089 (8.9%)
29	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
30	M (30min) - £9.90 PP (2h) - £39.60	(0.3) I – 3 x 0.3 = 0.9	0.9 / £118.05	0.008 (0.8%)

	R (3 x C/D 30min) - £29.70 Rew - £38.85			
31	M (5h 4min x 2 handlers) - £200.64 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £38.85	(0.3) I – 2 x 0.3 = 0.6 PS – 1 x 0.3 = 0.3	0.9 / 576.09	0.002 (0.2%)
32	M (21min) - £6.93 PP (2h) - £39.80	0	£46.53	0
33	M (36min) - £11.88 PP (2h) - £39.80 R (4 x C/D 30min) - £39.60 Rew - £38.85	(0.3) I – 4 x 0.3 = 1.2	1.2 / £130.13	0.009 (0.9%)
34	M (9min) - £2.97 PP (2h) - £39.60	0	£42.57	0
35	M (29min) - £9.57 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £38.85	(0.3) I – 4 x 0.3 = 1.2	1.2 / £127.62	0.009 (0.9%)
36	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0

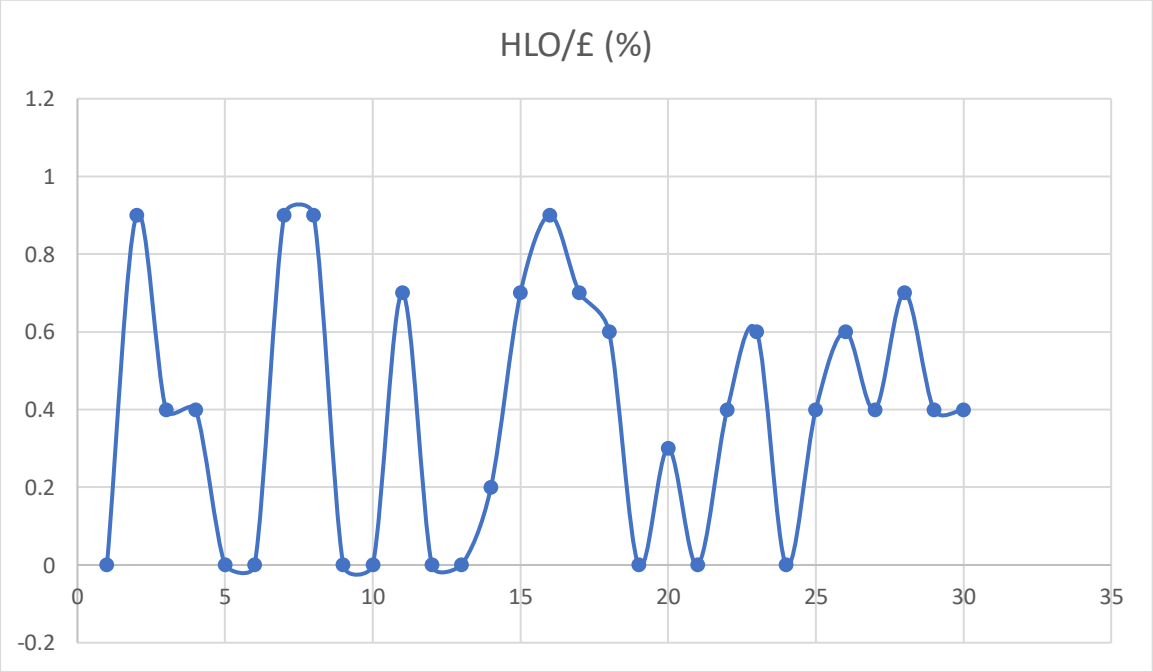


Appendix AI: CHIS 19 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
2	M (6min) - £1.98 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £29.66	(0.3) I – 3 x 0.3 = 0.9	0.9 / £100.94	0.009 (0.9%)
3	M (9min) - £2.97 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £29.66	(0.3) I – 1 x 0.3 = 0.3	0.3 / £82.13	0.004 (0.4%)
4	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £29.66	(0.3) I – 1 x 0.3 = 0.3	0.3 / £84.11	0.004 (0.4%)
5	M (8min) - £2.64 PP (2h) - £39.60	0	£42.24	0
6	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
7	M (1h 35min x 2 handlers) - £62.70 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £29.66	(0.3) I – 3 x 0.3 = 0.9 Ar – 3 x 0.3 = 0.9 PV – 3 x 0.3 = 0.9 Out – 4 x 0.3 = 1.2	3.9 / £438.86	0.009 (0.9%)
8	M (7min) - £2.31 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £29.66	(0.3) I – 3 x 0.3 = 0.9	0.9 / £101.27	0.009 (0.9%)
9	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
10	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
11	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £29.66	(0.3) I – 2 x 0.3 = 0.6	0.6 / £91.70	0.007 (0.7%)
12	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
13	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
14	M (1h 15min x 2 handlers) - £49.50 PP (8h x 2 handlers) - £316.80	(0.3) I – 3 x 0.3 = 0.9	0.9 / £425.66	0.002 (0.2%)

	R (3 x C/D 30min) - £29.70 Rew - £29.66			
15	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £29.66	(0.3) I – 2 x 0.3 = 0.6	0.6 / £91.70	0.007 (0.7%)
16	M (1h 15min x 2 handlers) - £49.50 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £29.66	(0.3) I – 9 x 0.3 = 2.7 Ar – 1 x 0.3 = 0.3 PV -1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	4.5 / £485.06	0.009 (0.9%)
17	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £29.66	(0.3) I – 2 x 0.3 = 0.6	0.6 / £91.70	0.007 (0.7%)
18	M (16min) - £5.28 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £29.66	(0.3) I – 2 x 0.3 = 0.6	0.6 / £94.34	0.006 (0.6%)
19	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
20	M (59min) - £19.47 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £29.66	(0.3) I – 1 x 0.3 = 0.3	0.3 / £98.63	0.003 (0.3%)
21	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
22	M (3 min) - £0.99 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £29.66	(0.3) I – 1 x 0.3 = 0.3	0.3 / £80.15	0.004 (0.4%)
23	M (2h 40min x 2 handlers) - £105.60 PP (8h x 2 handlers) - £316.80 R (8 x C/D 30min) - £79.20 Rew - £29.66	(0.3) I – 8 x 0.3 = 2.4 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out 1 x 0.3 = 0.3	3.3 / £531.26	0.006 (0.6%)
24	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
25	M (11min) - £3.63 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £29.66	(0.3) I – 1 x 0.3 = 0.3	0.3 / £82.79	0.004 (0.4%)
26	M (16min) - £5.28 PP (2h) - £39.80	(0.3) I – 2 x 0.3 = 0.6	0.6 / £94.54	0.006 (0.6%)

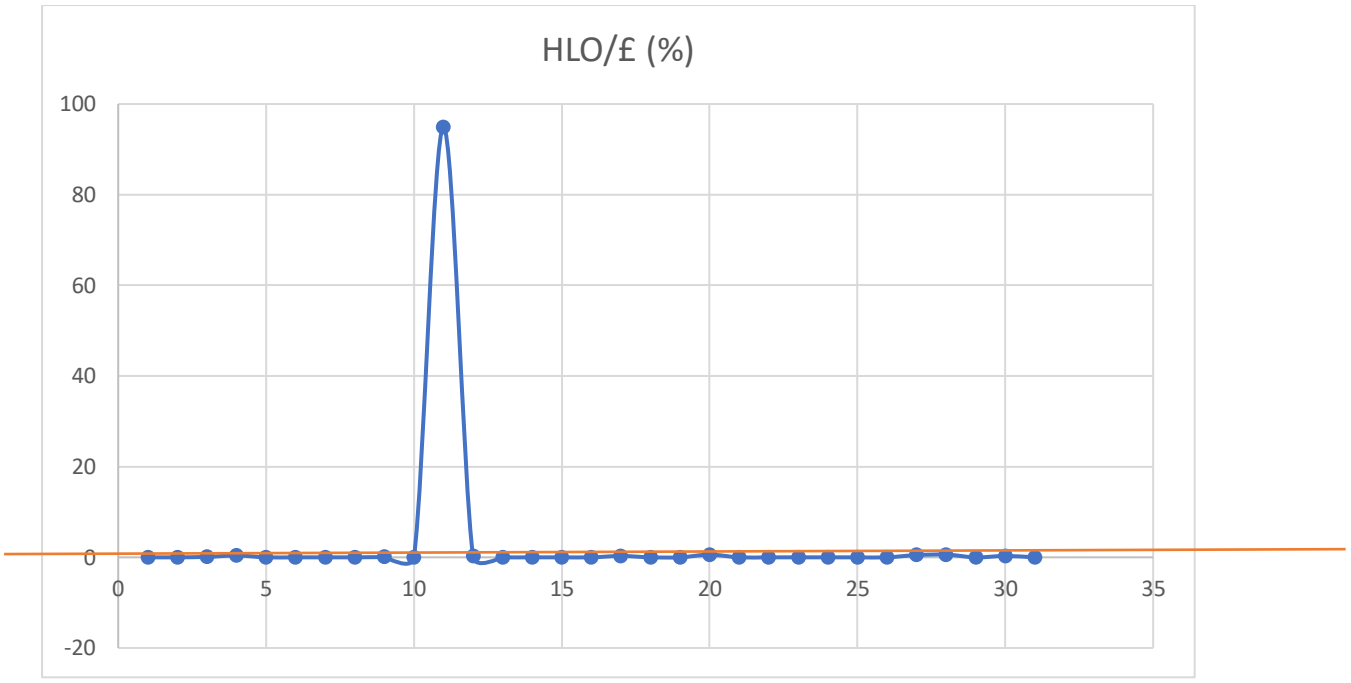
	R (2 x C/D 30min) - £19.80 Rew - £29.66			
27	M (3h 28min) - £68.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £29.66	(0.3) I – 2 x 0.3 = 0.6	0.6 / £157.70	0.004 (0.4%)
28	M (9min) - £2.97 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £29.66	(0.3) I – 2 x 0.3 = 0.6	0.6 / £92.03	0.007 (0.7%)
29	M (2h 6min x 2 handlers) - £83.16 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £29.66	(0.3) I – 7 x 0.3 = 2.1	2.1 / £498.92	0.004 (0.4%)
30	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £29.66	(0.3) I – 1 x 0.3 = 0.3	0.3 / £81.47	0.004 (0.4%)



Appendix AJ: CHIS 20 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (31min) - £10.23 PP (2h) - £39.60	0	£49.83	0
2	M (9min) - £2.97 PP (2h) - £39.60	0	£42.57	0
3	M (10h 29min x 2 handlers) - £415.14 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £38.62	(0.3) I – 3 x 0.3 = 0.9	0.9 / £800.26	0.001 (0.1%)
4	M (2h 6min) - £41.58 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £38.62	(0.3) I – 2 x 0.3 = 0.6	0.6 / £139.60	0.004 (0.4%)
5	M (5h 5min) - £100.65 PP (2h) - £39.60	0	£140.25	0
6	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
7	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
8	M (13min) - £4.29 PP (2h) - £39.60	0	£43.89	0
9	M (4h 46min x 2 handlers) - £188.76 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £38.62	(0.3) I – 1 x 0.3 = 0.3	0.3 / £554.08	0.0005 (0.05%)
10	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
11	M (2h 54min x 2 handlers) - £114.84 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £38.62	(84.1) I – 5 x 84.1 = 420.5	420.5 / £519.76	0.809 (80.9%)
12	M (1h 53min) - £37.29 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.62	(0.3) I – 1 x 0.3 = 0.3	0.3 / £125.41	0.002 (0.2%)
13	M (1h 33min) - £30.69 PP (2h) - £39.60	0	£70.29	0
14	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
15	M (59min) - £19.47	0	£59.07	0

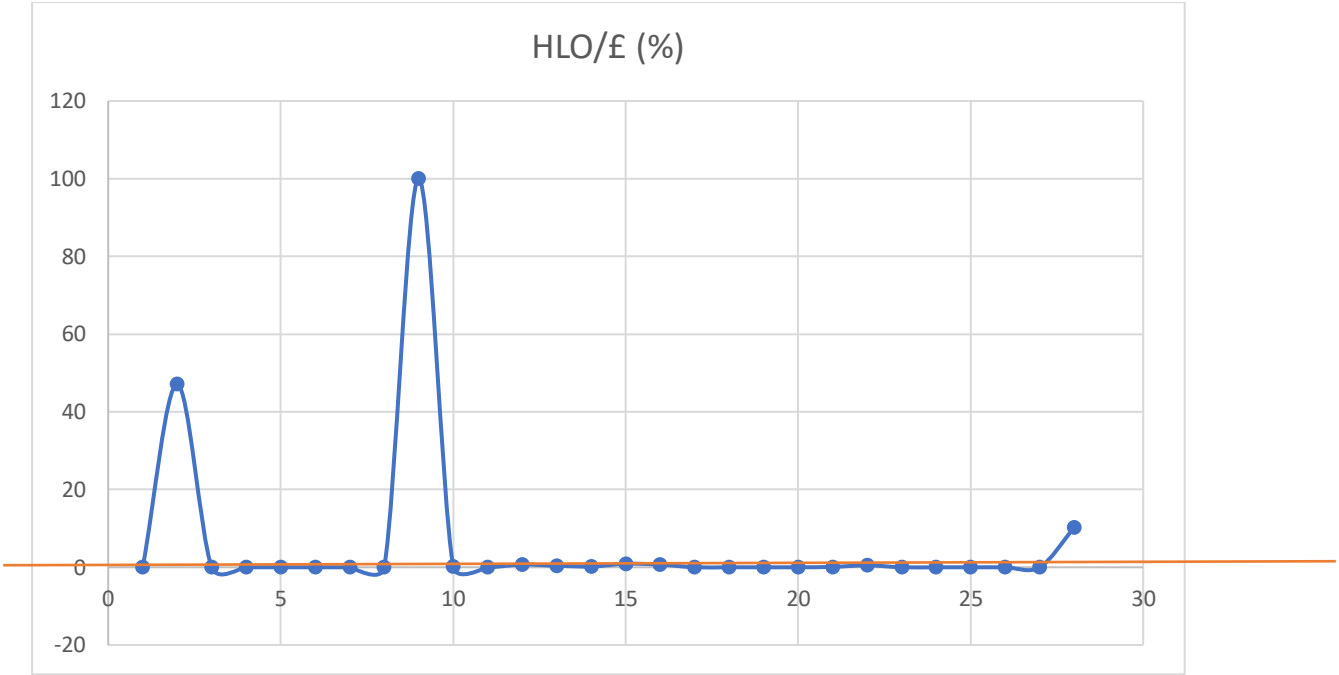
	PP (2h) - £39.80			
16	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
17	M (2h 55min x 2 handlers) - £115.50 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £38.62	(0.3) I – 5 x 0.3 = 1.5	1.5 / £520.42	0.003 (0.3%)
18	M (4min) - £1.32 PP (2h) - £39.80	0	£40.92	0
19	M (6h 4min) - £120.12 PP (2h) - £39.60	0	£159.72	0
20	M (2h 24min x 2 handlers) - £47.52 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £38.62	(0.3) I – 1 x 0.3 = 0.3 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 OW – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	2.4 / £412.84	0.006 (0.6%)
21	M (51 min) - £16.83 PP (2h) - £39.60	0	£56.43	0
22	M (10min) - £3.30 PP (2h) - £39.60	0	£42.90	0
23	M (14min) - £4.62 PP (2h) - £39.60	0	£44.22	0
24	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
25	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
26	M (5h 59min) - £118.47 PP (2h) - £39.60	0	£158.07	0
27	M (48min x 2 handlers) - £31.68 PP (8h x 2 handlers) - £316.80 R (0 x C/D 30min) - 0 Rew - £38.62	(0.3) Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	1.8 / £387.10	0.005 (0.5%)
28	M (9min) - £2.97 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £38.62	(0.3) I – 2 x 0.3 = 0.6	0.6 / £100.99	0.006 (0.6%)
29	M (53min) - £17.49 PP (2h) - £39.60	0	£57.09	0
30	M (4min) - £1.32 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £38.62	(0.3) I – 1 x 0.3 = 0.3	0.3 / £89.44	0.003 (0.3%)
31	M (15min) - £4.95 PP (2h) - £39.60	0	£44.55	0


HLO/£ (%)
100
80
60
40
20
0
-20
0
5
10
15
20
25
30
35

Appendix AK: CHIS 21 calculated value of each interaction

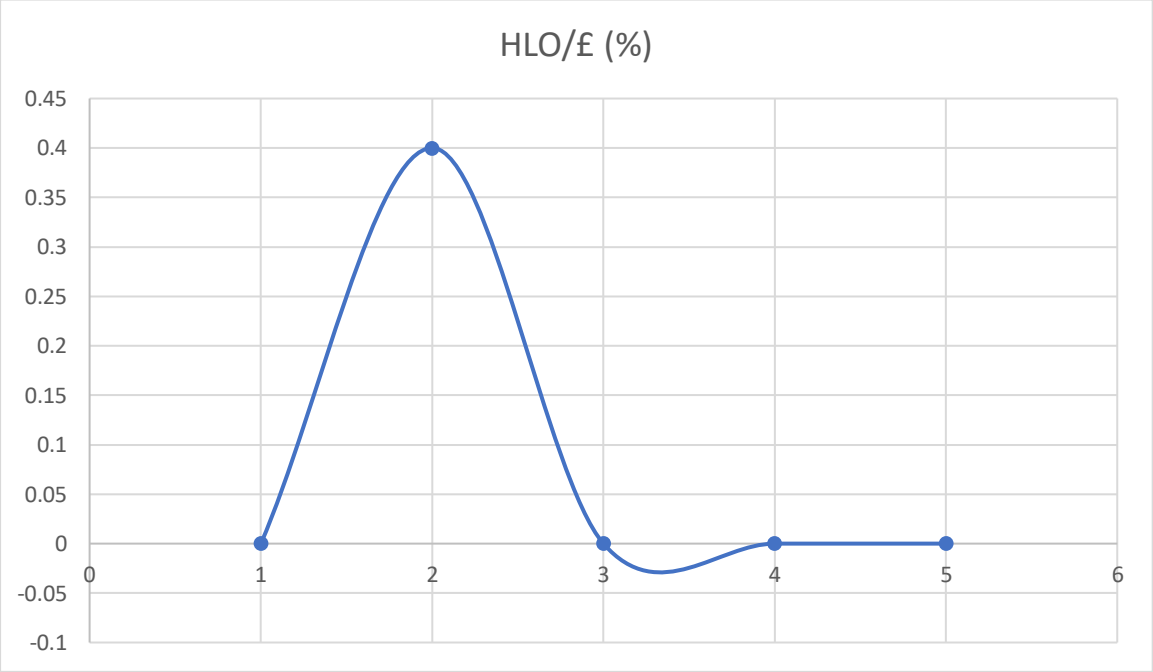
Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (2h 9min) - £42.57 PP (2h) - £39.60	0	£82.17	0
2	M (1h 6min x 2 handlers) - £43.56 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £28.26	(16.7) I – 7 x 19.6 = 116.9 PV – 3 x 19.6 = 50.1 Out – 1 x 19.6 = 16.7	183.7 / £457.92	0.401 (40.1%)
3	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
4	M (6min) - £1.98 PP (2h) - £39.60	0	£41.58	0
5	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
6	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
7	M (3h 5min) - £61.05 PP (2h) - £39.60	0	£100.65	0
8	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
9	M (1h 36min x 2 handlers) - £63.36 PP (8h x 2 handlers) - £316.80 R (8 x C/D 30min) - £79.20 Rew - £28.26	(84.1) I – 8 x 84.1 = 672.8 Ar – 1 x 84.1 = 84.1 PS – 1 x 84.1 = 84.1 Out – 2 x 84.1 = 168.2	1,009.2 / £487.62	2.07 (100%)
10	M (4h 56min) - £97.68 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £28.26	(0.3) I - 1 x 0.3 = 0.3	0.3/ £175.44	0.002 (0.2%)
11	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
12	M (6min) - £1.98 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £28.26	(0.3) I – 2 x 0.3 = 0.6	0.6 / £89.64	0.007 (0.7%)
13	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £28.26	(0.3) I – 1 x 0.3 = 0.3	0.3 / £82.71	0.004 (0.4%)
14	M (2h 15min) - £44.55 PP (2h) - £39.60 R (1x C/D 30min) - £9.90 Rew - £28.26	(0.3) I – 1 x 0.3 = 0.3	0.3 / £122.31	0.002 (0.2%)
15	M (7min x 2 handlers) - £4.62	(0.3) I – 16 x 0.3 = 4.8	4.8 / £508.08	0.009 (0.9%)

	PP (8h x 2 handlers) - £316.80 R (16 x C/D 30min) - £158.40 Rew -£28.26			
16	M (5min) - £1.65 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £28.26	(0.3) I – 2 x 0.3 = 0.6	0.6 / £89.31	0.007 (0.7%)
17	M (3h 3min x 2 handlers) - £120.78 PP (8h x 2 handlers) - £316.80	0	£437.58	0
18	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
19	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
20	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
21	M (1h x 2 handlers) - £39.60 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) – £19.80 Rew - £28.26	(0.3) I – 2 x 0.3 = 0.6	0.6 / £404.46	0.001 (0.1%)
22	M (1h 31min x 2 handlers) - £60.06 PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min) - £59.40 Rew - £28.26	(0.3) I – 6 x 0.3 = 1.8 PS – 1 x 0.3 = 0.3 Out – 1 x 0.3 = 0.3	2.4 / £464.52	0.005 (0.5%)
23	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
24	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
25	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
26	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
27	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
28	M (1h 57min x 2 handlers) - £77.22 PP (8h x 2 handlers) - £316.80 R (9 x C/D 30min) - £89.10 Rew - £28.26	(4.9) I – 9 x 4.9 = 44.1	44.1 / £511.38	0.0.86 (8.6%)


HLO/£ (%)
120
100
80
60
40
20
0
-20
0
5
10
15
20
25
30

Appendix AL: CHIS 22 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
2	M (1h x 2 handlers) - £39.60 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £132.50	(0.3) I – 4 x 0.3 = 1.2 Ar – 1 x 0.3 = 0.3 PS – 1 x 0.3 = 0.3 Out – 1 x 0.3 = 0.3	2.1 / £528.50	0.004 (0.4%)
3	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
4	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
5	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0

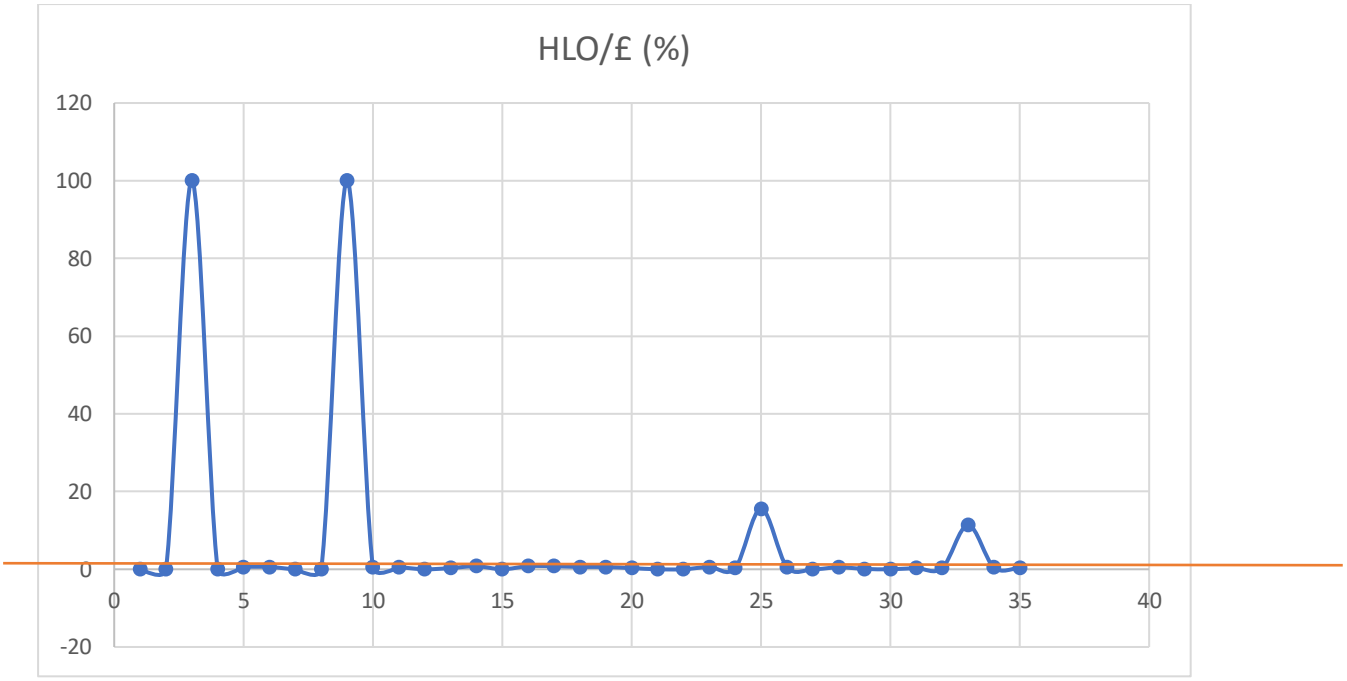


Appendix AM: CHIS 23 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
2	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
3	M (22min) - £7.26 PP (2h) - £39.60 R (18 x C/D 30min) - £178.20 Rew - £40.00	(84.1) I - 18 x 84.1 = 1,515.6	1,515.6 / £265.06	5.718 (100%)
4	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
5	M (13min) - £4.29 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £103.69	0.006 (0.6%)
6	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £102.04	0.006 (0.6%)
7	M (14min) - £4.62 PP (2h) - £39.60	0	£44.22	0
8	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
9	M (7min) - £2.31 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(84.1) I – 2 x 84.1 = 168.2	168.2 / £101.71	1.654 (100%)
10	M (1h 2min) - £20.46 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £119.86	0.005 (0.5%)
11	M (1h 17min x 2 handlers) - £50.82 PP (8h x 2 handlers) - £316.80 R (8 x C/D 30min) – 79.20 Rew - £40.00	(0.3) I – 8 x 0.3 = 2.4	2.4 / £486.82	0.005 (0.5%)
12	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
13	M (8min) - £2.64 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £40.00	(0.3) I – 1 x 0.3 = 0.3	0.3 / £92.14	0.003 (0.3)
14	M (10min) - £3.30 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £40.00	(0.3) I – 3 x 0.3 = 0.9	0.9 / £112.60	0.008 (0.8%)
15	M (1min) - £0.33	0	£39.93	0

	PP (2h) - £39.60			
16	M (3h 2min x 2 handlers) - £120.12 PP (8h x 2 handlers) - £316.80 R (10 x C/D 30min) - £99.00 Rew - £40.00	(0.3) I – 10 x 0.3 = 3 Ar 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	4.8 / £575.92	0.008 (0.8%)
17	M (10min) - £3.30 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £40.00	(0.3) I – 3 x 0.3 = 0.9	0.9 / £112.60	0.008 (0.8%)
18	M (2h 18min) - £45.54 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £40.00	(0.3) I – 3 x 0.3 = 0.9	0.9 / £154.84	0.006 (0.6%)
19	M (10min) - £3.30 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £102.70	0.006 (0.6%)
20	M (17min) - £5.61 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £40.00	(0.3) I – 1 x 0.3 = 0.3	0.3 / £95.11	0.003 (0.3%)
21	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
22	M (44min) - £14.52 PP (2h) - £39.60	0	£54.12	0
23	M (9min) - £2.97 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £102.37	0.006 (0.6%)
24	M (5h 33min) - £109.89 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £209.29	0.003 (0.3%)
25	M (1h 29min x 2 handlers) - £58.74 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) – £29.70 Rew - £40.00	(4.9) I – 3 x 4.9 = 14.7 Ar – 2 x 4.9 = 9.8 PV – 1 x 4.9 =4.9 OW – 2 x 4.9 = 9.8 Out – 4 x 4.9 = 19.6	58.8 / £445.24	0.156 (15.6%)
26	M (11min) - £3.63 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £103.03	0.006 (0.6%)
27	M (6min) - £1.98 PP (2h) - £39.60	0	£41.58	0
28	M (1h 30min) - £29.70	(0.3)	0.6 / £129.10	0.005

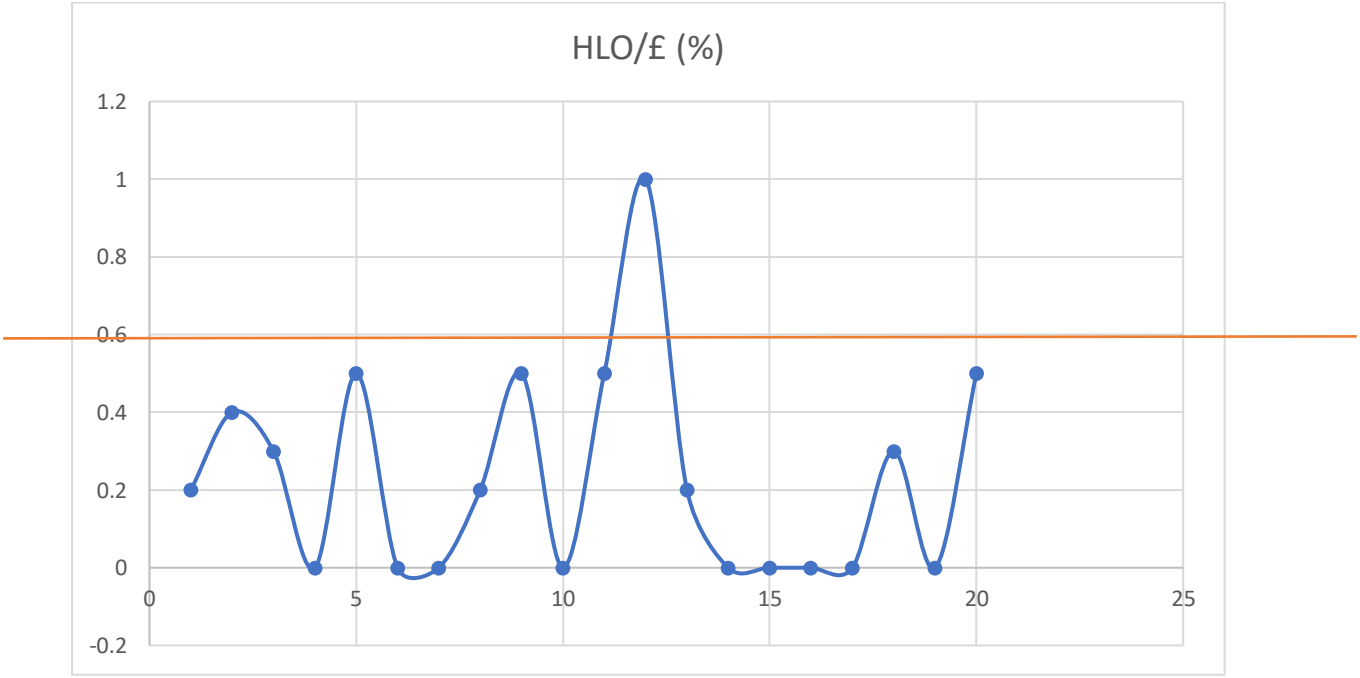
	PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	I – 2 x 0.3 = 0.6		(0.5%)
29	M (1h 17min x 2 handlers) - £50.82 PP (2h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £40.00	(0.3) I – 2 x 0.3 = 0.6	0.6 / £427.42	0.001 (0.1%)
30	M (44min) - £14.52 PP (2h) - £39.60	0	£54.12	0
31	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £40.00	(0.3) I – 1 x 0.3 = 0.3	0.3 / £91.81	0.003 (0.3%)
32	M (8min) - £2.64 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £40.00	(0.3) I – 1 x 0.3 = 0.3	0.3 /£92.14	0.003 (0.3%)
33	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £40.00	(4.9) I – 2 x 4.9 = 9.8	9.8 / £102.04	0.096 (9.6%)
34	M (4h 10min x 2 handlers) - £165.00 PP (8h x 2 handlers) - £316.80 Rew - £40.00	(0.3) Ar – 2 x 0.3 = 0.6 PV – 3 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	2.4 / £521.80	0.005 (0.5%)
35	M (12min) - £3.96 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £40.00	(0.3) I – 1 x 0.3 = 0.3	0.3 / £93.46	0.003 (0.3%)


HLO/£ (%)
120
100
80
60
40
20
0
-20
0
5
10
15
20
25
30
35
40

Appendix AN: CHIS 24 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (12min x 2 handlers) - £7.92 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £10.90	(0.3) I – 2 x 0.3 = 0.6	0.6 / £255.42	0.002 (0.2%)
2	M (41min) - £13.53 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £10.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £73.93	0.004 (0.4%)
3	M (17min) - £5.61 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £10.90	(0.3) I – 3 x 0.3 = 0.9	0.3 / £85.81	0.003 (0.3%)
4	M (18min) - £5.94 PP (2h) - £39.60	0	£45.54	0
5	M (3h 3min) - £120.78 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £10.90	(0.3) I – 4 x 0.3 = 1.2 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 2 x 0.3 = 0.6	2.4 / £488.08	0.005 (0.5%)
6	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
7	M (3min) - £40.59 PP (2h) - £39.60	0	£40.59	0
8	M (4h 36min) - £91.08 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £10.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £151.48	0.002 (0.2%)
9	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £10.90	(0.3) I – 1 x 0.3	0.3 / £62.71	0.005 (0.5%)
10	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
11	M (5min) - £1.65 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £10.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £62.05	0.005 (0.5%)
12	M (20min) - £6.60 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £10.90	(0.3) I – 3 x 0.3 = 0.9	0.9 / £86.80	0.01 (1%)
13	M (2h 6min x 2 handlers) - £83.16 PP (8h x 2 handlers) - £316.80 R (3 x C/D 30min) - £29.70 Rew - £10.90	(0.3) I – 3 x 0.3 = 0.9	0.9 / £440.56	0.002 (0.2%)
14	M (3h 36min) - £71.28	0	£110.88	0

	PP (2h) - £39.60			
15	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
16	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
17	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
18	M (2h 33min x 2 handlers) - £100.98 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £10.90	(0.3) I – 5 x 0.3 = 1.5	1.5 / £478.18	0.003 (0.3%)
19	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
20	M (3min) - £0.99 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £10.90	(0.3) I – 1 x 0.3 = 0.3	0.3 / £61.39	0.005 (0.5%)

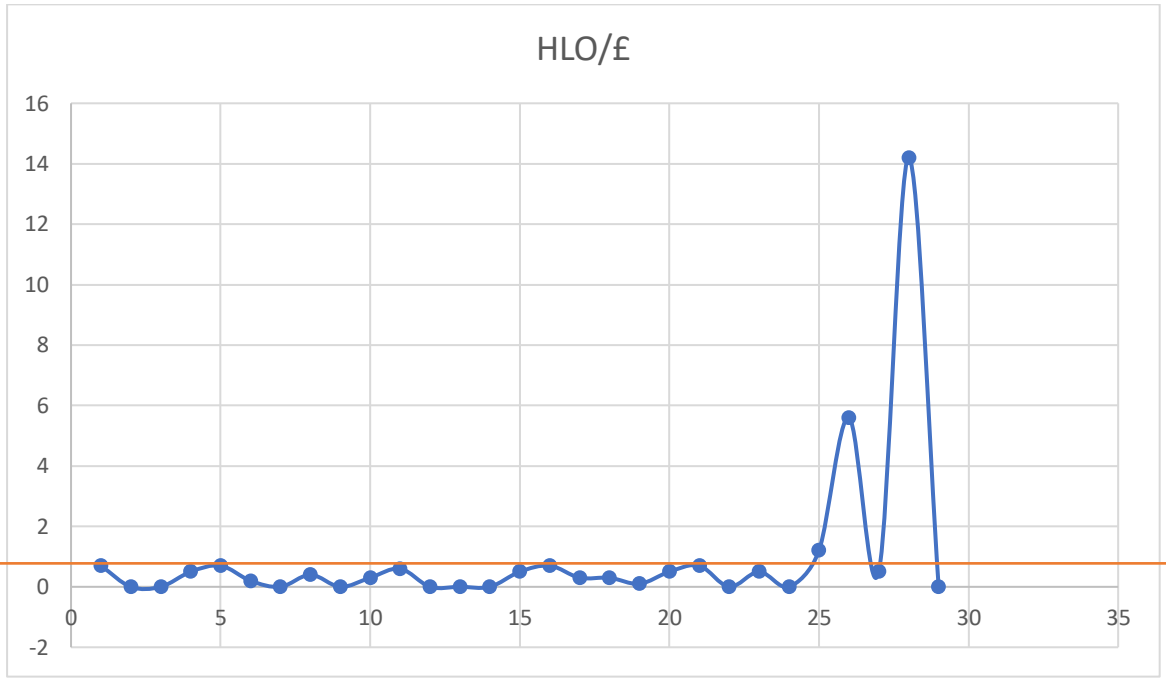


Appendix AO: CHIS 25 calculate value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (8min) - £2.64 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £57.89	(0.3) I – 3 x 0.3 = 0.9	0.9 / £129.83	0.007 (0.7%)
2	M (2h 2min) - £40.26 PP (2h) - £39.60	0	£79.86	0
3	M (3h 25min) - £67.65 PP (2h) - £39.60	0	£107.25	0
4	M (1h 50min x 2 handlers) - £72.60 PP (8h x 2 handlers) - £316.80 R (10 x C/D 30min) - £99.00 Rew - £57.89	(0.3) I – 10 x 0.3 = 3	3 / £546.29	0.005 (0.5%)
5	M (10min) - £3.30 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £57.89	(0.3) I – 3 x 0.3 = 0.9	0.9 / £130.49	0.007 (0.7)
6	M (1h 18min) - £15.84 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £57.89	(0.3) I – 1 x 0.3 = 0.3	0.3 / £123.23	0.002 (0.2%)
7	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
8	M (1h 41min) - £33.33 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £57.89	(0.3) I – 2 x 0.3 = 0.6	0.6 / £150.62	0.004 (0.4%)
9	M (8min) - £2.64 PP (2h) - £39.60	0	£42.24	0
10	M (19min) - £6.27 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £57.89	(0.3) I – 1 x 0.3 = 0.3	0.3 / £113.66	0.003 (0.3%)
11	M (4h 46min x 2 handlers) - £188.76 PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min) - £59.40 Rew - £57.89	(0.3) I – 6 x 0.3 = 1.8 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.6 / £622.85	0.006 (0.6%)
12	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
13	M (11min) - £3.63 PP (2h) - £39.60	0	£43.23	0
14	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
15	M (6min) - £1.98 PP (2h) - £39.60	(0.3) I – 2 x 0.3 = 0.6	0.6 / £119.27	0.005 (0.5%)

	R (2 x C/D 30min) - £19.80 Rew - £57.89			
16	M (8min) - £2.64 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £57.89	(0.3) I – 3 x 0.3 = 0.9	0.9 / £129.83	0.007 (0.7%)
17	M (6min) - £1.98 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £57.89	(0.3) I – 1 x 0.3 = 0.3	0.3 / £109.37	0.003 (0.3%)
18	M (4h 30min) - £89.10 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £57.89	(0.3) I – 2 x 0.3 = 0.6	0.6 / £206.39	0.003 (0.3%)
19	M (6h 13min) - £123.09 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £57.89	(0.3) I – 1 x 0.3 = 0.3	0.3 / £230.48	0.001 (0.1%)
20	M (37min) - £12.21 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £57.89	(0.3) I – 2 x 0.3 = 0.6	0.6 / £129.50	0.005 (0.5%)
21	M (4h 19min) - £170.94 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min) - £69.30 Rew - £57.89	(0.3) I – 7 x 0.3 = 2.1 Ar 1 x 0.3 = 0.3 PV – 2 x 0.3 = 0.6 Out – 4 x 0.3 = 1.2	4.2 / £614.93	0.007 (0.7%)
22	M (2h 15min) - £44.55 PP (2h) - £39.60	0	£84.15	0
23	M (9min) - £2.97 PP (2h) - £39.60 R (2 x C/D 30min) – £19.80 Rew - £57.89	(0.3) I – 2 x 0.3 = 0.6	0.6 / £120.26	0.005 (0.5%)
24	M (4h 6min) - £81.18 PP (2h) - £39.60	0	£120.78	0
25	M (24min) - £7.92 PP (2h) - £39.60 R (7 x C/D 30min) – £69.30 Rew - £57.89	(0.3) I – 7 x 0.3 = 2.1	2.1 / £174.71	0.012 (1.2%)
26	M (4h 40min x 2 handlers) - £184.80 PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min) - £59.40 Rew - £57.89	(4.9) I – 6 x 4.9 = 29.4	29.4 / £618.89	0.048 (4.8%)
27	M (5min) - £1.65 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £57.89	(0.3) I – 2 x 0.3 = 0.6	0.6 / £118.94	0.005 (0.5%)
28	M (2h 55min) - £57.75 PP (2h) - £39.60	(4.9) I – 5 x 4.9 = 24.5	24.5 / £204.74	0.12 (12%)

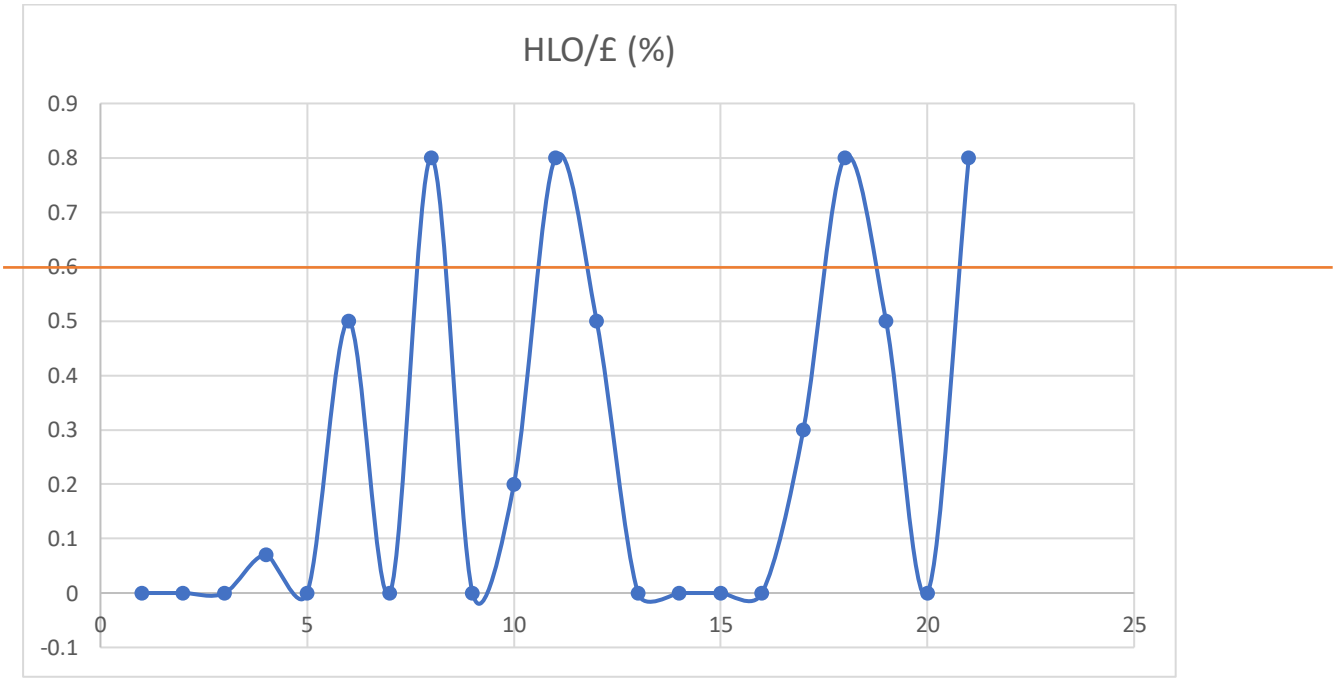
	R (5 x C/D 30min) - £49.50 Rew - £57.89			
29	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0



Appendix AP: CHIS 26 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (2min) - £0.66 PP (2h) - £ 39.60	0	£40.26	0
2	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
3	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
4	M (2h 38min x 2 handlers) - £104.28 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £9.22	(0.3) I – 1 x 0.3 = 0.3	0.3 / £440.20	0.0007 (0.07%)
5	M (37min) - £12.21 PP (2h) - £39.60	0	£51.81	0
6	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £9.22	(0.3) I – 1 x 0.3 = 0.3	0.3 / £61.03	0.005 (0.5%)
7	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
8	M (12min) - £3.96 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £9.22	(0.3) I – 2 x 0.3 = 0.6	0.6 / £72.58	0.008 (0.8%)
9	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
10	M (31min x 2 handlers) - £20.46 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £9.22	(0.3) I – 2 x 0.3 = 0.6	0.6 / £366.28	0.002 (0.2%)
11	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £9.22	(0.3) I – 2 x 0.3 = 0.6	0.6 / £71.26	0.008 (0.8%)
12	M (11min) - £3.63 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £9.22	(0.3) I – 1 x 0.3 = 0.3	0.3 / £62.35	0.005 (0.5%)
13	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
14	M (2h 23min) - £47.19 PP (2h) - £39.60	0	£50.19	0
15	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0
16	M (2min) - £0.66 PP (2h) - £39.60	0	£40.26	0

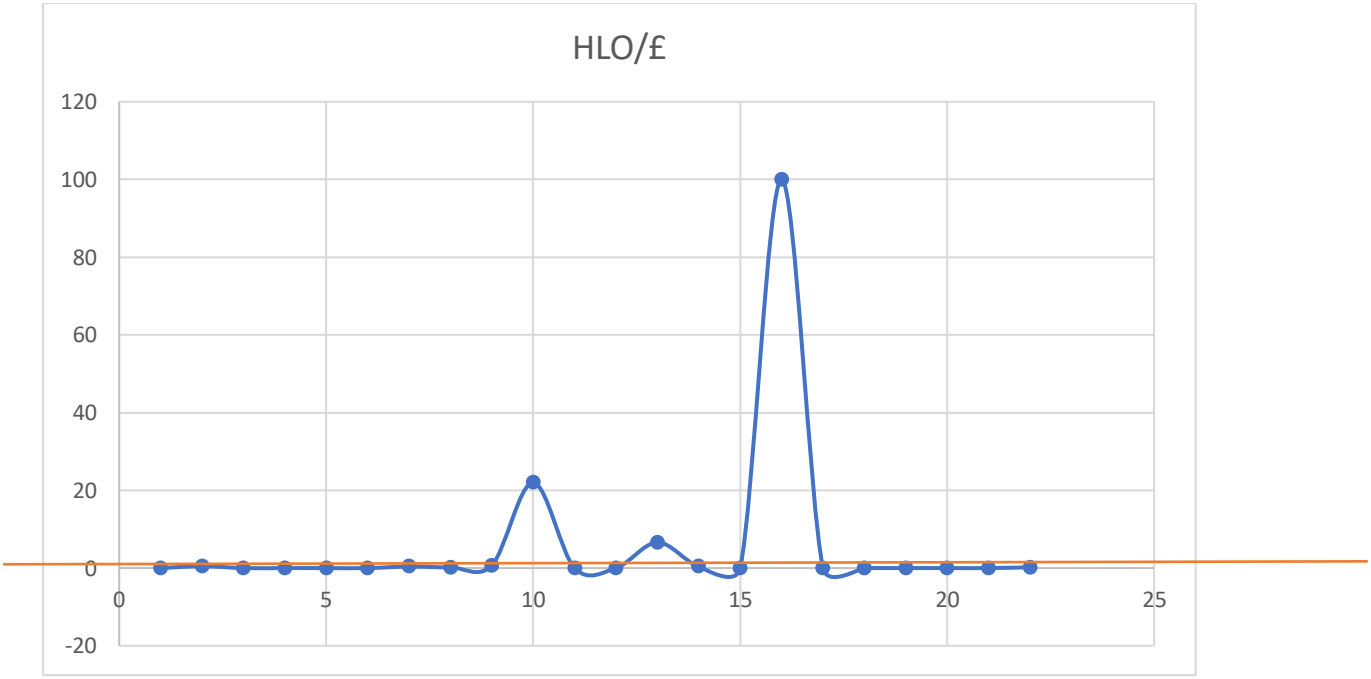
17	M (2h 30min x 2 handlers) - £99.00 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £9.22	(0.3) I – 4 x 0.3 = 1.2	1.2 / £464.62	0.003 (0.3%)
18	M (7min) - £2.31 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £9.22	(0.3) I – 2 x 0.3 = 0.6	0.6 / £70.93	0.008 (0.8%)
19	M (6min) - £1.98 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £9.22	(0.3) I – 1 x 0.3 = 0.3	0.3 / £60.70	0.005 (0.5%)
20	M (17min) - £5.61 PP (2h) - £39.60	0	£45.21	0
21	M (8min) - £2.64 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £9.22	(0.3) I – 2 x 0.3 = 0.6	0.6 / £71.26	0.008 (0.8%)



Appendix AQ: CHIS 27 calculated value of each interaction

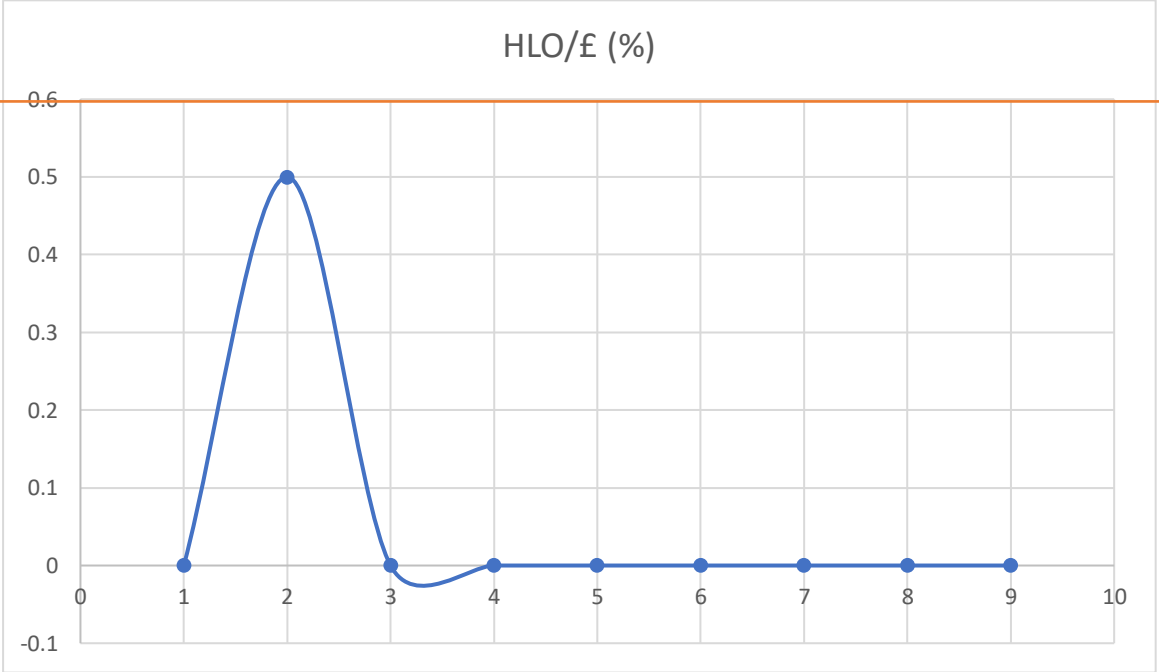
Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
2	M (55min x 2 handlers) - £36.30 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £21.59	(0.3) I – 2 x 0.3 = 0.6	0.6 / £113.69	0.005 (0.5%)
3	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
4	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
5	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
6	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
7	M (1h 47 x 2 handlers) - £70.62 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew - £21.59	(0.3) I – 6 x 0.3= 1.8	1.8 / £418.91	0.004 (0.4%)
8	M (6h 8min) - £121.44 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £21.59	(0.3) I – 1 x 0.3 = 0.3	0.3 / £192.53	0.002 (0.2%)
9	M (5min) - £1.65 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £21.59	(0.3) I – 2 x 0.3 = 0.6	0.6 / £82.64	0.007 (0.7%)
10	M (13min) - £4.29 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £21.59	(4.9) I – 4 x 4.9 = 19.6	19.6 / £105.08	0.187 (18.7%)
11	M (1h 44min) - £34.32 PP (2h) - £39.60	0	£73.92	0
12	M (7min) - £2.31 PP (2h) - £39.60	0	£41.31	0
13	M (1h 15min x 2 handlers) - £49.50 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £21.59	(4.9) I – 5 x 4.9 = 24.5	24.5 / £437.39	0.056 (5.6%)
14	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £21.59	(0.3) I – 1 x 0.3 = 0.3	0.3 / £73.40	0.004 (0.4%)
15	M (3min) - £0.99 PP (2h) - £39.60	0	£40.59	0
16	M (7min) - £2.31 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90	(84.1) I – 84.1 x 1 = 84.1	84.1 / £73.40	1.146 (100%)

	Rew - £21.59			
17	M (4min) - £1.32 PP (2h) - £39.60	0	£40.92	0
18	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
19	M (1h 53min) - £37.29 PP (2h) - £39.60	0	£76.89	0
20	M (9min) - £2.97 PP (2h) - £39.60	0	£42.57	0
21	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
22	M (3h 35min x 2 handlers) - £141.90 PP (8h x 2 handlers) - £316.80 R (4 x C/D 30min) - £39.60 Rew - £21.59	(0.3) I – 4 x 0.3 = 1.2	1.2 / £519.89	0.002 (0.2%)



Appendix AR: CHIS 28 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (13min) - £4.29 PP (2h) - £39.60	0	£43.89	0
2	M (1h 7min x 2 handlers) - £44.22 PP (8h x 2 handlers) - £316.80 R (1 x C/D 30min) - £9.90 Rew £126.00	(0.3) I – 1 x 0.3 = 0.3 Ar – 3 x 0.3 = 0.9 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	2.7 / £496.92	0.005 (0.5%)
3	M (3h 34min) - £70.62 PP (2h) - £39.60	0	£110.22	0
4	M (3h 57min) - £78.21 PP (2h) - £39.60	0	£117.81	0
5	M (5h 48min) - £114.84 PP (2h) - £39.60	0	£154.44	0
6	M (4h 40min) - £92.40 PP (2h) - £39.60	0	£132.00	0
7	M (5h 33min) - £109.89 PP (2h) - £39.60	0	£149.49	0
8	M (5h 52min) - £116.16 PP (2h) - £39.60	0	£155.76	0
9	M (1h 11min) - £23.43 PP (2h) - £39.60	0	£63.03	0

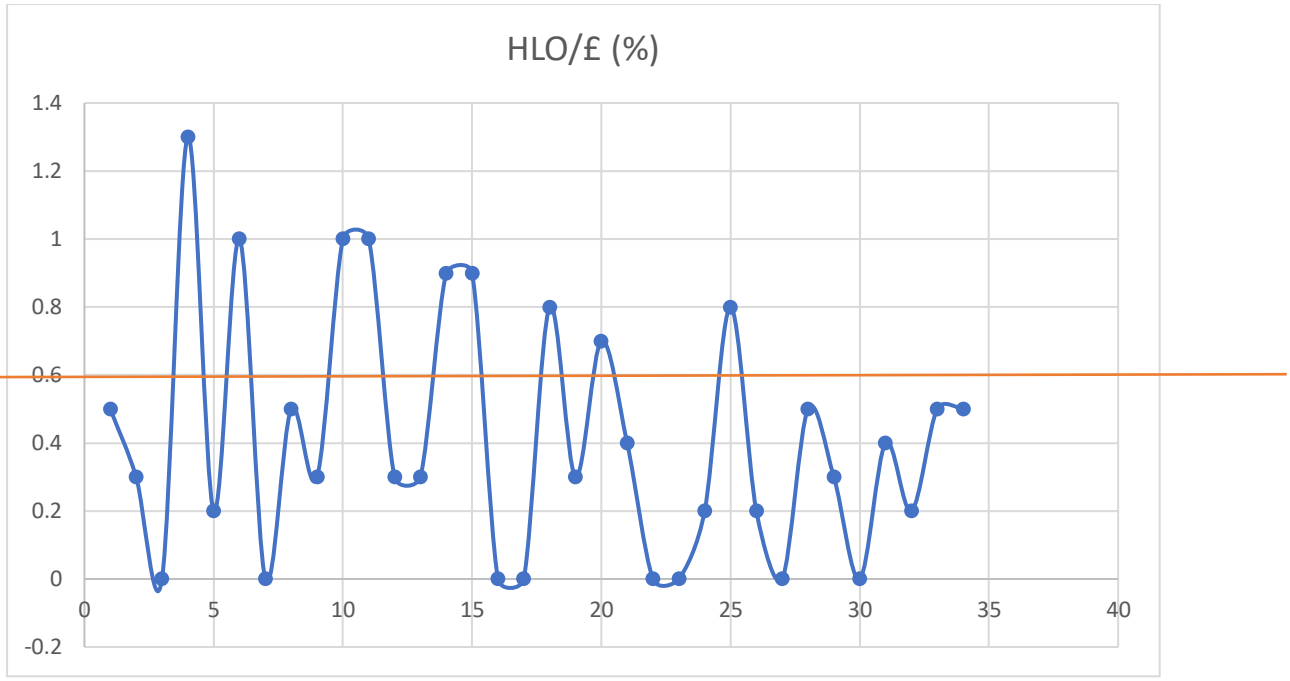


Appendix AS: CHIS 29 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (12min) - £3.96 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £53.21	(0.3) I – 2 x 0.3 =0.6	0.6 / £116.57	0.005 (0.5%)
2	M (11min) - £3.63 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £106.34	0.003 (0.3%)
3	M (30min) - £9.90 PP (2h) - £39.60	0	£49.50	0
4	M (3h 26min x 2 handlers) - £135.96 PP (8h x 2 handlers) - £316.80 R (22 x C/D 30min) - £217.80 Rew - £53.21	(0.3) I – 22 x 0.3 = 6.6 Ar – 4 x 0.3 = 1.2 PV 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	9.3 / £723.77	0.013 (1.3%)
5	M (11min) - £3.63 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £106.34	0.002 (0.2%)
6	M (20min) - £6.60 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £53.21	(0.3) I – 5 x 0.3 = 1.5	1.5 / £148.91	0.01 (1%)
7	M (1min x 2 handlers) - £0.66 PP (8h x 2 handlers) - £316.80	0	£317.46	0
8	M (2h 19min) - £45.87 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £53.21	(0.3) I – 3 x 0.3 = 0.9	0.9 / £168.38	0.005 (0.5%)
9	M (10min) - £3.30 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £106.01	0.003 (0.3%)
10	M (1h 25min x 2 handlers) - £56.10 PP (8h x 2 handlers) - £316.80 R (13 x C/D 30min) - £128.70 Rew - £53.21	(0.3) I – 13 x 0.3 = 3.9 Ar 1 x 0.3 = 0.3 PV 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	5.7 / £554.81	0.01 (1%)
11	M (16min) - £5.28 PP (2h) - £39.60 R (5 x C/D 30min)- £49.50 Rew - £53.21	(0.3) I – 5 x 0.3 = 1.5	1.5 / £147.59	0.01 (1%)

12	M (12min) - £3.96 PP (2h) - £39.60 R (1 x C/D 30min)- £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £106.67	0.003 (0.3%)
13	M (15min) - £4.95 PP (2h) - £39.60 R (1 x C/D 30min)- £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £107.66	0.003 (0.3%)
14	M (1h 15min) - £24.75 PP (2h) - £39.60 R (5 x C/D 30min)- £49.50 Rew - £53.21	(0.3) I – 5 x 0.3 = 1.5	1.5 / £167.06	0.009 (0.9%)
15	M (5min x 2 handlers) - £3.30 PP (8h x 2 handlers) - £316.80 R (7 x C/D 30min)- £69.30 Rew - £53.21	(0.3) I – 7 x 0.3 = 2.1 Ar 1 x 0.3 = 0.3 PV 1 x 0.3 = 0.3 F – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	4.2 / £442.61	0.009 (0.9%)
16	M (5min) - £1.65 PP (2h) - £39.60	0	£41.25	0
17	M (29min) - £9.57 PP (2h) - £39.60	0	£49.17	0
18	M (3h 15min x 2 handlers) - £128.70 PP (8h x 2 handlers) - £316.80 R (8 x C/D 30min)- £79.20 Rew - £53.21	(0.3) I – 8 x 0.3 = 2.4 Ar 2 x 0.3 = 0.6 PV – 1 x 0.3 = 0.3 Out -4 x 0.3 = 1.2	4.5 / £577.91	0.008 (0.8%)
19	M (3h 5min) - £61.05 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £53.21	(0.3) I – 2 x 0.3 = 0.6	0.6 / £173.66	0.003 (0.3%)
20	M (15min) - £4.95 PP (2h) - £39.60 R (3 x C/D 30min)- £29.70 Rew - £53.21	(0.3) I – 3 x 0.3 = 0.9	0.9 / £127.46	0.007 (0.7%)
21	M (1h 11min) - £23.43 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £53.21	(0.3) I – 2 x 0.3 = 0.6	0.6 / £136.04	0.004 (0.4%)
22	M (7min) - £2.31 PP (2h) - £39.60	0	£41.91	0
23	M (45min) - £14.85 PP (2h) - £39.60	0	£54.45	0
24	M (2h 32min) - £50.16 PP (2h) - £39.60 R (1 x C/D 30min)- £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £152.87	0.002 (0.2%)
25	M (3h 30min x 2 handlers) - £138.60	(0.3) I – 10 x 0.3 = 3	4.8 / £607.61	0.008 (0.8%)

	PP (8h x 2 handlers) - £316.80 R (10 x C/D 30min)- £99.00 Rew - £53.21	Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.4 = 1.2		
26	M (1h 56min) - £38.28 PP (2h) - £39.60 R (1 x C/D 30min)- £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £140.99	0.002 (0.2%)
27	M (14min) - £4.62 PP (2h) - £39.60	0	£44.22	0
28	M (10min) - £3.30 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £53.21	(0.3) I – 2 x 0.3 = 0.6	0.6 / £115.91	0.005 (0.5%)
29	M (3h 24min x 2 handlers) - £134.64 PP (8h x 2 handlers) - £316.80 R (6 x C/D 30min)- £59.40 Rew - £53.21	(0.3) I – 6 x 0.3 = 1.8	1.8 / £564.05	0.003 (0.3%)
30	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
31	M (4h 38min) - £91.74 PP (2h) - £39.60 R (3 x C/D 30min)- £29.70 Rew - £53.21	(0.3) I – 3 x 0.3 = 0.9	0.9 / £214.25	0.004% (0.4%)
32	M (2h 53min) - £57.09 PP (2h) - £39.60 R (1 x C/D 30min)- £9.90 Rew - £53.21	(0.3) I – 1 x 0.3 = 0.3	0.3 / £159.80	0.002 (0.2%)
33	M (1h 2min) - £20.46 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £53.21	(0.3) I – 2 x 0.3 = 0.6	0.6 / £133.07	0.005 (0.5%)
34	M (16min) - £5.28 PP (2h) - £39.60 R (2 x C/D 30min)- £19.80 Rew - £53.21	(0.3) I – 2 x 0.3 = 0.6	0.6 / £117.89	0.005 (0.5%)


HLO/£ (%)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
0
5
10
15
20
25
30
35
40

Appendix AT: CHIS 30 calculated value of each interaction

Contact No.	Inputs	Outputs	Equation	HLO/£
1	M (5h 34min x 2 handlers) - £220.44 PP (8h x 2 handlers) - £316.80 R (5 x C/D 30min) - £49.50 Rew - £76.74	(0.3) I – 5 x 0.3 = 1.5 Ar – 1 x 0.3 = 0.3 PV – 1 x 0.3 = 0.3 Out – 4 x 0.3 = 1.2	3.3 / £663.48	0.005 (0.5%)
2	M (4h 40min) - £92.40 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £76.74	(0.3) I – 3 x 0.3 = 0.9	0.9 / £238.44	0.004 (0.4%)
3	M (1h 25min) - £28.05 PP (2h) - £39.60	0	£67.65	0
4	M (39min) - £12.87 PP (2h) - £39.60	0	£52.47	0
5	M (5h 16min) - £104.28 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £76.74	(0.3) I – 5 x 0.3 = 1.5	1.5 / £270.12	0.005 (0.5%)
6	M (1h 3min) - £20.79 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £76.74	(0.3) I – 2 x 0.3 = 0.6	0.6 / £156.93	0.004 (0.4%)
7	M (5h 9min x 2 handlers) - £203.94 PP (8h x 2 handlers) - £316.80 R (15 x C/D 30min) - £148.50 Rew - £76.74	(4.9) I – 15 x 4.9 = 73.5 Ar – 1 x 4.9 = 4.9 PS – 1 x 4.9 = 4.9 Out – 4 x 4.9 = 3.6	86.9 / £745.98	0.116 (11.6%)
8	M (4h 3min) - £80.19 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £76.74	(84.1) I – 4 x 84.1 = 336.4	336.4 / £236.13	1.425 (100%)
9	M (5h 50min) - £115.50 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £76.74	(0.3) I – 5 x 0.3 = 1.5 PS – 1 x 0.3 = 0.3	1.8 / £281.34	0.006 (0.6%)
10	M (2h 53min) - £57.09 PP (2h) - £39.60 R (10 x C/D 30min) - £99.00 Rew - £76.74	(0.3) I – 10 x 0.3 = 3	3 / £272.43	0.011 (1.1%)

11	M (4h 59min) - £98.67 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £76.74	(4.9) I – 2 x 4.9 = 9.8	9.8 / £234.81	0.042 (4.2%)
12	M (5h) - £99.00 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £76.74	(0.3) I – 2 x 0.3 = 0.6	0.6 / £235.14	0.003 (0.3%)
13	M (6h 22min) - £126.06 PP (2h) - £76.74	0	£202.80	0
14	M (5h 43min x 2 handlers) - £198.00 PP (8h x 2 handlers) - £316.80 Rew - £76.74	(0.3) Ar – 13 x 0.3 = 3.9 PV – 3 x 0.3 – 0.9	4.8 / £591.54	0.008 (0.8%)
15	M (6h 15min) - £123.75 PP (2h) - £39.80 R (2 x C/D 30min) - £19.80 Rew - £76.74	(0.3) I – 2 x 0.3 = 0.6	0.6 / £259.89	0.002 (0.2%)
16	M (4h 49min) - £95.37 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew - £76.74	(0.3) I – 7 x 0.3 = 2.1 SP – 2 x 0.3 = 0.6	2.7 / £281.01	0.01 (1%)
17	M (6h 1min) - £119.13 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £76.74	(0.3) I – 3 x 0.3 = 0.9	0.9 / £265.17	0.003 (0.3%)
18	M (5h 19min) – £105.27 PP (2h) - £39.60	0	£144.87	0
19	M (4h 19min) - £85.47 PP (2h) - £39.60	0	£125.07	0
20	M (5h 49min) - £115.17 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £76.74	(0.3) I – 5 x 0.3 = 1.5	1.5 / £281.01	0.005 (0.5%)
21	M (5h 25min) - £107.25 PP (2h) - £39.60	0	£146.85	0
22	M (4h 22min) - £86.46 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £76.74	(0.3) I – 4 x 0.3 = 1.2	1.2 / £242.40	0.005 (0.5%)
23	M (6h 25min) - £254.10 PP (8h x 2 handlers) - £316.80	(0.3) I – 7 x 0.3 = 2.1 Ar – 2 x 0.3 = 0.6	3.9 / £716.94	0.005 (0.5%)

	R (7 x C/D 30min) - £69.30 Rew - £76.74	Out – 4 x 0.3 = 1.2		
24	M (4h 26min) - £87.78 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £76.74	(0.3) I – 4 x 0.3 = 1.2	1.2 / £243.72	0.005 (0.5%)
25	M (4h 1min) - £79.53 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew - £76.74	(0.3) I – 7 x 0.3 = 2.1	2.1 / £265.17	0.008 (0.8%)
26	M (5h 16min) - £104.28 PP (2h) - £39.60	0	£143.88	0
27	M (5h 19min) - £105.27 PP (2h) - £39.60 R (5 x C/D 30min) - £49.50 Rew - £76.74	(0.3) I – 5 x 0.3 = 1.5	1.5 / £271.11	0.006 (0.6%)
28	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
29	M (16min) - £5.28 PP (2h) - £39.60	0	£44.88	0
30	M (4h 49min) - £95.37 PP (2h) - £39.60 R (1 x C/D 30min) - £9.90 Rew - £76.74	(0.3) I – 1 x 0.3 = 0.3	0.3 / £221.61	0.001 (0.1%)
31	M (2h 42min x 2 handlers) - £106.92 PP (8h x 2 handlers) - £316.80 R (2 x C/D 30min) - £19.80 Rew - £76.74	(0.3) I – 2 x 0.3 = 0.6	0.6 / £520.26	0.001 (0.1%)
32	M (4h 43min) - £93.39min PP (2h) - £39.60 R (6 x C/D 30min) - £59.40 Rew - £76.74	(0.3) I – 6 x 0.3 = 1.8	1.8 / £269.13	0.007 (0.7%)
33	M (16min) - £5.28 PP (2h) - £39.60 R (3 x C/D 30min) - £29.70 Rew - £76.74	(0.3) I – 3 x 0.3 = 0.9	0.9 / £151.32	0.006 (0.6%)
34	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
35	M (6h 7min) - £121.11 PP (2h) - £39.60	(0.3) I – 2 x 0.3 = 0.6	0.6 / £257.25	0.002 (0.2%)

	R (2 x C/D 30min) - £19.80 Rew - £76.74			
36	M (6h 7min) - £121.11 PP (2h) - £39.60 R (2 x C/D 30min) - £19.80 Rew - £76.74	(84.1) I – 2 x 84.1 = 168.2	168.2 / £257.25	0.654 (65.4%)
37	M (4h 10min) - £82.50 PP (2h) - £39.60	0	£122.10	0
38	M (1min) - £0.33 PP (2h) - £39.60	0	£39.93	0
39	M (4h 6min) - £81.18 PP (2h) - £39.60 R (4 x C/D 30min) - £39.60 Rew - £76.74	(0.3) I – 4 x 0.3 = 1.2	1.2 / £237.12	0.005 (0.5%)
40	M (3h 47min) - £74.91 PP (2h) - £39.60 R (7 x C/D 30min) - £69.30 Rew - £76.74	(0.3) I – 7 x 0.3 = 2.1	2.1 / £260.55	0.008 (0.8%)