# COULD SYSTEM-FOCUSED INCIDENT REVIEW IN HEALTHCARE BRIDGE THE GAP BETWEEN THE ”WORK-AS-IMAGINED” AND ”THE WORK-AS-DONE”?

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# COULD SYSTEM-FOCUSED INCIDENT REVIEW IN HEALTHCARE BRIDGE THE GAP BETWEEN THE "WORK-AS-IMAGINED" AND "THE WORK-AS-DONE"?

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# Abstract

World Healthcare Organization identifies patient Safety as a global public health concern. Despite concerted efforts made to improve the healthcare system, incidents continues to happen at same rate (Braithwaite, Wears, & Hollnagel, 2015). The most contemporary approaches to safety such as System thinking, and Safety II remain underutilized in healthcare where learning from incidents is mainly conducted using RCA. In the complexity of healthcare organization as dynamic socio-technical system, the effect of applying system thinking and learning from success during incident review is still unknown.

This thesis aims at exploring how system-focused incident reviews that embed the new view of human errors and Safety II could have any impact in bridging the gap between "work as imagined" and "work as done". The study focuses on recommendations related to policies/procedures/guidelines and how those are addressed by policy owner and perceived by the frontline staff. The recommendations at study are from incidents reports resulting from reviews that question the background of the event which include reviewing the policies and procedures. The study includes interviews of both front-line staff involved in the incidents and policy owners responsible of addressing the policies-related recommendations. The aim is to shed light on what factors from the process of learning from incidents (LFI) enables or hinders reconciling the work-as-done (clinical practice) and the work-as-imagined (policies & procedures development).

The study shows that the system-focused incident reviews are appreciated to have helped shed light on many gaps between work-as-imagined and work-as-done, however, the gap is quite dynamic. While fully reconciling the dynamic gap between the WAI and WAD continue to be challenging, the frontline staff find the process of system-focused incident reviews meaningful when it reflects their reality and values their contribution and policy owners find the process of learning from incident meaningful when it studies more than one incident giving them extent of the problems at the sharp end. Other aspects such as compassion and team work were identified lacking in system-focused incident reviews.

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# List of abbreviations

CAS : Complex Adaptive System
CAST: Commercial Aviation Safety Team
CAST: Causal Analysis based on Systems Theory
ECW : Everyday Clinical Work
LFI : Learning From Incidents
RCA: Root Cause Analysis
SOEA: System Oriented Event Analysis
SME : Subject Matter Expert
STAMP: Systems Theoretic Accident Modelling and Processe
WHO : World Healthcare Organization

# 1. Introduction

Healthcare is suffering from a high level of adverse events across the globe. Some facts reported by the World Healthcare Organization (WHO) reflects the severity of the situation:

* 1 in 10 patients is harmed while receiving hospital care because of different type of failures, sadly, 1 in 300 patients die from such failures;

* Healthcare system failures cost some countries as much as US$ 19 billion annually (World Healthcare organization, 2018).

This last estimate of the financial burden does not include the costs related to the second victim. Healthcare providers are also affected, as second victims, their suffering ranges from anxiety to suicide ideation (Rothenberger, 2017) which is costly for both the system and the society.

This 'sorry state of affairs'- as Hollnagel et al (2015) eloquently labeled Patient Safety - seems to be a chronic reality of healthcare, with different symptoms, it is at least as longstanding as the medicine principle "First, do no harm" taught by Hippocrates hundreds years BC. Similarly, Nightingale, the founder of clinical nursing has also warned: "It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm" (Nightingale, 1863, p. ii). 136 years later, the report "to err is Human" published by the Institute of Medicine highlights that "At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented" (Institute of Medicine, 2000).

These numbers should provide a wealth of information to learn from. There is a significant agreement among researchers and practitioners on the value of incidents as an information source for Safety learning (Lindberg, Hansson, & Rollenhagen, 2010; Macrae, 2016; Margaryan, Littlejohn, & Stanton, 2017; Stemn, Bofinger, Cliff, & Hassall, 2018). Why is healthcare not learning from adverse events? One of the reasons is how we investigate or review those incidents.

Unfortunately, so often, the reviews of those incidents follow the *Old View* to human errors (Dekker, 2014) focusing on staff compliance with rules and policies, which does so little to any system improvement in view of the fact that policies are not as dynamic as the system they regulate (Hyman, 2005). Woloshynowhych et al. (2005) studied the investigation and analysis of critical incidents in healthcare and concluded on the lack of depth and absence of evaluation and validation of the techniques used in reviewing incidents in healthcare. Learning from incidents in healthcare is limited to single-loop learning, often using Root Cause Analysis (RCA) as a tool. The current practices in reviewing incidents in healthcare are missing the opportunity for double-loop learning that would allow for questioning the policies and procedures regulating the task that led to the incident (Drupsteen & Guldenmund, 2014). Incidents reviews do not study the complex system interactions that affect the daily work and constraint clinicians to adapt practices to achieve outcomes. Mcnab et al. (2016) highlight the concern of the fitness of linear methods of incident investigation used in healthcare to the complex interdependent processes of healthcare delivery:

> "Current incident investigation techniques often work backwards from an event until one or more 'malfunctioning' components are found such as deviations from protocol or a technical problem with equipment. […] Importantly, performance is often compared to *work-as-imagined* rather than to *work-as-done"* (p. 446).

In contrast, the *New View* of human error and Safety II seems a promising approach that could have positive implication in learning from incidents.

The *New View* invites to seeing human error as symptoms of deeper problems in the system, hence, *New View*-oriented incidents reviews would dig deeper into what happened looking at the event from the lenses of the people involved (Dekker, 2014). The *New View* challenges the trust in the safety that is built-in in the system and rather puts this trust in the individuals at the sharp end who create safety (Dekker & Breakey, 2016). Consequently, an incident review would go beyond assessing the individual or team performance against rules or policies to assessing how those policies are lived by, how they are supporting or constraining the tasks.

Learning from incidents with a Safety II lens would support looking at variation and adaptations more broadly than the context of the event and consequently, informing more comprehensive and more beneficial recommendations. Safety II invites exploring work-as-done, understanding and managing variation rather than constraining it in standard policies and procedures that do not reflect the daily circumstances in which practitioner are providing care (Hollnagel, 2014). Safety II shed the light on the fact that the success and failures are both rooted in system variability, in other words, that same variability that has led to success, could in other circumstances lead to failures. Policy makers, designers and administrators do not account for all the circumstances or for the intrinsic dynamic nature of health care delivery. Practitioners could deviate from a policy to meet patient needs in circumstances not predicted or addressed by the policy, basically, clinicians are constantly managing and coping with this gap between "the work as imagined" (regulated by policies) and the "work as done" (adapted by the sharp end).

This thesis aims at exploring how system-focused incident reviews that embed the new view of human error and Safety II could contribute to bridging the gap between "work as imagined" and "work as done". The study focuses on recommendations related to policies/procedures/guidelines and how those are addressed by policy owner and perceived by the frontline staff. The recommendations at study are from incidents reports resulting from reviews that incorporate the double-loop learning questioning of the whole background of the event which include reviewing the policies and procedures. The study includes interviews of both front-line staff involved in the incidents and policy owners responsible of addressing the policies-related recommendations. The aim is to shed light on what factors from the process of learning from incidents (LFI) enables or hinders reconciling the work-as-done (clinical practice) and the work-as-imagined (policies & procedures development).

## 2. Literature review: Learning from Incidents in Healthcare.

The literature provides significant critiques of the state of Patient Safety and lays great emphasis on the limitation of the current process of learning from incidents that seem to not lead to substantial improvements. On the other hand, trending concepts from Safety

science seem promising for Patient Safety if integrated and reflected in the process of learning from incidents.

## 2.1. The current state of learning from incidents in Healthcare

Incidents are globally recognized as valuable learning opportunities (World Health Organization, 2005); however, the effectiveness of the learning process is often questioned by both the sharp end, the practitioners (Anderson & Kodate, 2015; Braithwaite, Westbrook, Mallock, Travaglia, & Iedema, 2006) and the blunt end, regulators & Accreditation bodies (National Patient Safety Foundation, 2015; Percarpio, Watts, & Weeks, 2008). The process of learning from incidents is tied by the method –and the underlying model - used to review or investigate the incidents (Lundberg, Rollenhagen, & Hollnagel, 2009). Many organizations use Root Cause Analysis (RCA) because it is mandated by their health authorities (World Health Organization, 2005). Other organizations have the freedom to decide on the method to use to learn from incidents and they took the lead in trying other methods (Woloshynowych et al., 2005) and some regulators moved from monitoring what was learned to how the learning is taking place (Leistikow, Mulder, Vesseur, & Robben, 2017). All are efforts to overcome the current challenge of LFI in Healthcare, however, the current literature continues to show limitations in LFI in Healthcare due in major part to the approach and methods used (Canham, Jun, Waterson, & Khalid, 2018; Shojania & Thomas, 2013; Sujan, Huang, & Braithwaite, 2017).

### 2.1.1. Root cause analysis (RCA), the most common method used for learning from incidents

The RCA method originating from the Engineering field, is in wide spread use in healthcare globally since late 1990s, the era known for the contemporary Patient Safety movement (Nicolini, Waring, & Mengis, 2011; World Health Organization, 2005). RCA is often used as an organizational technique that promises quality improvement and avoid reoccurrence of similar incidents (Cerniglia-Lowensen, 2015; Taitz et al., 2010). The rationale behind the use of RCA in healthcare is to provide organizations with a tool and structure to identify contributing factors such as system design, policies and guidelines, etc. instead of

concluding simply with human error (Bagian et al., 2002; Hinckley et al., 2015) for the ultimate purpose of avoiding reoccurrence of the same incident (Nicolini et al., 2011; Peerally, Carr, Waring, & Dixon-Woods, 2016). When compared to previous practices that were used for incident reviews, RCA has shown a shift from Human error to system vulnerabilities (Bagian et al., 2002).

A sense we could get from the literature is that in the last 15 years, the number of studies highlighting flaws on RCAs conducted in healthcare are significantly increasing. Percarpio, Watt & Weeks (2008) have undertaken a literature review on the effectiveness of RCA in Healthcare ten years ago and concluded that a number of limitations existed and that there is "anecdotal evidence that RCA improves safety"(p. 391). Similar concerns continue to be raised in the literature ranging from critics on the absence of independent experts teams to weak recommendations that fail to inform improvements (Braithwaite et al., 2006; Hibbert et al., 2018; Kellogg et al., 2016; Nicolini et al., 2011; Peerally et al., 2016; Singh, 2018; Trbovich & Shojania, 2017; Woloshynowych et al., 2005).

### *RCA team*

RCA is conducted by multidisciplinary local teams. This is problematic in many ways:

- team members are not independent(Hibbert et al., 2018; Peerally et al., 2016);
- the facilitators, in best case scenarios, they are trained on RCA techniques(Braithwaite et al., 2006) but they are not equipped to handle critical meeting dynamics and manage emotions that have the potential to arise in such meetings (Nicolini et al., 2011) and often -if not always- lack expertise in Human Factors (Canham et al., 2018; Hibbert et al., 2018);
- the influence of the power and hierarchy in shaping the analysis direction (Nicolini et al., 2011);
- creates burden on organizations to allocate time and resources that are having other duties (Anderson, Kodate, Walters, & Dodds, 2013; Peerally et al., 2016) which lead often to trading–off the depth and accuracy of the investigation for the production of the report in a timely manner (Peerally et al., 2016).

### *RCA data gathering*

The data sources of the analysis - in addition to electronics and paper records – are interviews. Interviews are an important tool to get rich data (Waddington & Bull, 2007) but in the RCAs conducted in healthcare, they often are affected by the interviewees sense of safety and trust in the investigation process and quality of relationship with the interviewers (Carroll, Rudolph, & Hatakenaka, 2002; Cerniglia-Lowensen, 2015) and the ability of the interviewer to conduct cognitive interviewing (Peerally et al., 2016). Interviews often take a shape of interrogations or at least perceived as such by practitioners who reported that this process was anxiety provoking (Nicolini et al., 2011). Considering the complexity of failures (Cook, 2000b; Dekker, Cilliers, & Hofmeyr, 2011; Woods & Cook, 2002), interviews are not sufficient to get in-depth analysis of the system failures and vulnerabilities, they need to be supplemented by observational and simulation techniques (Hibbert et al., 2018; Trbovich & Shojania, 2017). For instance, hearing the staff on the use of specific equipment differs from simulating that use with them. The latter gives richer information.

### *RCA analysis*

The events that are candidates for RCA are often sentinel events where the patient died or had severe undesirable outcome (Hinckley et al., 2015; World Health Organization, 2005). The RCA review committee has the duty to review an event with severe outcomes which makes outcome bias inherent in the RCA used in healthcare. In retrospective analysis, the more severe the outcome, the more harsh reviewers tends to judge the preceding decisions (Dekker & Breakey, 2016). Unless there are conscious and trained efforts to overcome both the outcome and hindsight biases, the reviewers are often overestimating how the outcome could have been predicted and misjudging the decision that were made as poor, evidencing the lack of understanding of the complexity of the system where decisions and outcome are loosely linked (Henriksen & Kaplan, 2003).

RCA as a method encompasses multiples tools and techniques (Hinckley et al., 2015), however in practice, it has been reported that the main focus is on a timeline of the events

rather than the rational of the decision made at the time the event was unfolding (Henriksen & Kaplan, 2003; Nicolini et al., 2011).

RCA starts backward from the event, looking at the active failure, the most proximate cause which is often a human error and works downward to identify the latent failures, the holes of the Swiss Cheese model (Reason, 1997) that aligned for that specific incident under study. This has caused some concerns:

- a gross assumption on system linearity that is further emphasized by the use of the 5 whys technique which further narrows the analysis in a specific sequence (Peerally et al., 2016);
- make the process highly subjective, depending on the question being asked and who is answering, the results would be different for the same event if the reviewed by a different committee (Trbovich & Shojania, 2017);
- Focuses on the sequences of events instead of precursory circumstances (Henriksen & Kaplan, 2003; Kellogg et al., 2016);
- Makes it easy to focus on human error (Kellogg et al., 2016).

### *RCA outcomes: the recommendations and the "resulting" improvements*

The RCA recommendations are often what are most criticized as being limited. Hibbert et al. (2018) studied the strength of 1137 recommendations from 227 RCAs and they found that only 8% of the recommendations were strong (e.g. process redesign) while over 70% were weak (e.g. policy enforcement or training) concluding that RCAs fail to inform system improvements. Similarly, the main finding of a review of 445 RCA by the New South wales RCA review committee was that staff were not empowered to articulate recommendations that are beyond the organizations control remit concluding that the final output of the RCA do not lead to tangible Patient Safety improvements (Taitz et al., 2010). More recently, Kellogg et al (2016) studied 302 RCAs of which only 106 RCA went beyond stating the causal factor to proposing solutions, however, the effectiveness of the recommended solution was questioned since the most common were related to training and policy reinforcement. It has also been reported that RCA recommendations were manipulated to serve some other agendas (Hibbert et al., 2018; Nicolini et al., 2011).

Another aspect pointed up by Trbovich & Shojania (2017) is that even a well conducted RCA, result in hypothesis that cannot be regarded as solutions unless tested. This point make sense when we understand the nature of healthcare as a complex socio-technical system where a solution in one area can be a problem elsewhere.

In addition to the questionable quality of recommendations, RCAs suffers from inconsistency of implementation and follow up (Anderson et al., 2013; Edwards, 2017) moreover, staff who conduct RCA are not responsible of closing the loop on the recommendations and are often unaware how the recommendations are addressed (Braithwaite et al., 2006). Even more problematic the report findings are not shared with those who reported or those who were involved or might be affected by the recommendation implementation (Peerally et al., 2016).

### 2.1.2. Other methods used for learning from incidents in healthcare

Driven by the urgent need to learn from incidents and the above limitations of RCA, many have taken the lead into either improving the RCA method or coming with a new method.

The National Patient Safety Foundation (2015) opted for enhancing the RCA and came up with $RCA^2$, focusing on addressing two main concerns of the original RCA:

- the limitation of resources to conduct a review for all events with harm which is addressed in $RCA^2$ through the prioritization of the event that qualifies for RCA based on risk, basically, this has added the dimension of likelihood to the criteria of the severity of harm;
- the strength of the recommendations and their implementation which is addressed through mandating a minimum of 1 strong or intermediate recommendation per review and assigning the action responsibilities to individuals rather than teams or committees. The $RCA^2$ team must identify one measure for each action and this could be a process measure or an outcome measure.

No study could be found on the effectiveness of $RCA^2$ but we could conclude that the analysis part is still an RCA as no limitation from the literature with regard to this step is addressed in $RCA^2$.

Inspired by CAST (Commercial Aviation Safety Team) model, Pham et al. (2010) also looked at revamping the RCA by introducing the idea of prioritizing the causes and contributing factors based on their likelihood to have contributed to the studied event and potential contribution of future event. Another feature of their improved model is similar to $RCA^2$ regarding the implementation and measurement of the recommendations.

Canham et al. (2018) targeted the core issues of RCA which are the lack of expertise in Human Factors (HF) and the consideration of complexity theory by applying STAMP (Systems Theoretic Accident Modelling and Processes) to adverse events that underwent RCA previously. The results were encouraging in terms of providing more insights on system vulnerabilities and providing stronger recommendations. The challenge remain that HF experts are not available in healthcare organizations and this kind of reviews require more time (in this case 26 days in addition to the time invested in the RCA that usually goes from 45 to 60 days). Using the same model, Leveson et al.(2016) applied CAST (Causal Analysis based on Systems Theory) on 30 cardiovascular surgery adverse events. CAST starts from identifying the context that influenced the decisions that were made orienting the review process on the control system rather than the proximal causes that are human failures.

More on system-oriented methods, Chuang, Pan & Huang (2008) developed SOEA (System Oriented Event Analysis), a method that is quite unique in its capabilities of studying multiple events which according to the authors provide rich information on how the system failed differently leading to the same undesirable outcome. SOEA embodies system thinking in its four steps focusing from the first step into putting the context at the core of the analysis with the idea that incidents result from gaps in risk controls. Faced by the complexity and dynamic of healthcare organization, SOEA was only successful in reviewing events arising within strict sequential processes. Consequently, Chuang & Howley (2011) worked on enriching the method to address the non-sequential, network system flows.

Another model that reflects complex systems characteristics is the Functional Resonance Analysis Method (FRAM) that considers that variability is inevitable to adjust to the

changing conditions of a dynamic socio-technical system and provides a representation of system functions and their dependencies which provides insights on where improvement efforts could best be invested (Hollnagel, 2012). FRAM has been used to study healthcare processes but its use in learning from incidents in healthcare remains rare, the RCA continue to take the lead despite all the published evidence on its limitations.

### 2.1.3. Factors behind the LFI paralysis in healthcare

The need for LFI in Healthcare got more attention in the last two decades since the report *To err is human* (Institute of Medicine, 2000). From the literature, there are more critics than praises to the process of LFI in Healthcare. It could be argued that the positive sentiment about the process of LFI in Healthcare is often due to comparing the current attention to Patient Safety with the past where Patient Safety did not benefit from such investments; this could be sensed from some of the practitioners' reported comments: 'It is a good process that I think is *changing* attitudes'; 'There is more transparency *now*' ; 'A cultural *change is occurring*' (Braithwaite et al., 2006, p. 397). On the other hand, the outcome measure -the reoccurrence of the same incidents again and again- is a recurrent evidence by the critics (Kellogg et al., 2016; Macrae, 2016; Sharpe, 2003; Shojania & Thomas, 2013; Sujan et al., 2017; Charle Vincent, 2004). The current systemic methods used for LFI in healthcare have shown focus on causes related to system structure and processes without great focus on complex system interactions that are inherent to the nature of healthcare (Peerally et al., 2016; Shojania & Thomas, 2013; Vincent & Esmail, 2015) and could lead to the next incident (Vincent, 2004), as also explicitly pointed out by a practitioner: "RCAs do not solve all problems, particularly complex interpersonal interactions which is the main source of errors in my area of medicine" (Braithwaite et al., 2006, p. 397). The complex interactions in healthcare are in general overlooked in the effort of enhancing Patient Safety (Vincent & Esmail, 2015).

Some studies pointed to the social and political aspects of the incident investigation in healthcare where it become platform for instating governance legitimacy leading to unfortunate dynamics between stakeholders ranging from ignoring the process to manipulating it (Nicolini et al., 2011; Singh, 2018). Choosing the course of learning seem

to be incompatible with other agendas that are strongly present in the highly competitive healthcare environment. The tools developed to be used for reviewing incidents in healthcare has to be more contextualized (Nicolini et al., 2011) to account for all possible "political hijacks" (Peerally et al., 2016) and embed techniques that are tailored for complex socio-technical system and by-design resist oversimplification. Additionally, Healthcare organizations also might need to get more comfortable with the time that a comprehensive review require and avoid the trap of quick reviews that necessarily leads to quick fixes or weak solutions (Peerally et al., 2016).

| **Some critical findings from the literature demonstrate healthcare's failure to understand its system as Complex Adaptive System (CAS)** |
| --- |
| • Assuming system reliability and human fallibility (Hibbert et al., 2018; Kellogg et al., 2016; Peerally et al., 2016; Sujan et al., 2017);<br>• Assuming the perfection of the rules, policies and procedures (Kellogg et al., 2016);<br>• Focusing solely on sentinel events (Chuang et al., 2008; Sujan et al., 2017);<br>• Assuming system linearity (Chuang & Howley, 2011; Peerally et al., 2016). |

*Table 1: Healthcare assumptions on the system nature*

## 2.2. Emergence of Safety and incidents in everyday clinical work (ECW)

Healthcare repeatedly borrows tools and techniques from other High-risk industries but fails to adapt them to its context (Peerally et al., 2016; Robson, 2015; Shojania & Thomas, 2013) or to understand the difference between the two contexts and what aspect from the lending industry make it successful there (Carroll et al., 2002). Some would argue that the success of the RCA in other industries is due not only to the fitness to the system at study but also to the fact that it is conducted by engineers whose brains are wired to think systems(Chuang et al., 2008; Chuang & Howley, 2011). It is critical for healthcare organizations to understand the nature of their operational system and how safety and failure are emergent properties.

### 2.2.1. Healthcare as complex adaptive system (CAS)

This section explores what a complex adaptive system is and how Healthcare manifests the CAS characteristics. A number of principles and characteristics have been identified to define a CAS (Mcdaniel, Driebe, & Lanham, 2013; Reiman, Rollenhagen, Pietikäinen, & Heikkilä, 2015; Sweeney & Williams, 2011), the following list summarizes the most common and easy to illustrate with Healthcare examples:

- Non-linearity: refers to the indirect mechanism through which the input influences the output. In CAS, there are not directly proportionate, there are several interlinked feedback loop that have major or no effect (Lipsitz, 2012). In CAS, “all effects have several parallel contributing factors, instead of one or few causal chains as in linear systems" (Reiman et al., 2015, p. 82). For instance, medication prescription from acute care doctor for a patient with chronic illness, it can seem sequential simple process from prescribing to dispensing to the medication to the patient. However, with multiple stakeholders intervening in the electronic patient record, it happened that the medication got cancelled in the process of medication reconciliation in a primary care clinic.
- Open systems: unlike a closed system, opens system have flexible, dynamic boundaries which enhances the unpredictability of the system output. Eoyang & Holladay (2013) have described this feature as an *infinite game* in which "the boundaries are unclear [..]. There are still rules, but the rules can change without notice. There are still plans and playbooks, but many games are going on at the same time, and the wining plans can seem contradictory" (p.4). The management of pandemic diseases illustrate very well this feature of CAS (Robson, 2015).
- Self-organizing: is the most visible feature of CAS. It is the result of highly dynamic interaction between system agents. It is seen in hospital areas that are dependent on interactions and where the patient volume or conditions are unpredictable such as Emergency department, Neonatal Intensive Care Unit, etc. In these cases, safety - which is achieved from the order resulting from self-organizing- must be seen as a "result of the properties of the system itself rather than an intentional achievement of an external controller" (Reiman et al., 2015, p. 82);

- Emergence: is a result of the highly dynamic self-organizing processes (Lipsitz, 2012; Reiman et al., 2015; Robson, 2015). Reflecting this concept into Healthcare would mean that both safety and incidents are emergent properties of healthcare system, there both rooted in the same adaptation of the complex system (Hollnagel, 2014). Hence, Healthcare as CAS has to move from blaming or praising individual performance since Safety and Incidents are emergent in complex interdependent socio-technical systems (Dekker, 2014).

Most of our strategies to manage Safety in Healthcare do not reflect any of the CAS characteristics and consequently fail short to improve system safety (Cook, 2000b; Dekker et al., 2011; Reiman et al., 2015).

### 2.2.2. Implication of understanding Healthcare as CAS for LFI

The implications of understanding healthcare as a CAS and appreciating how the common features of CAS influence our learning from incidents are two-pronged: 1) implication for the process of incident reviews and 2) implications on the improvement recommendations.

I argue that the challenges facing the learning from incidents highlighted above could be all traced to the underlying belief that the system can be broken to its components that could be assessed and fixed, this is possible for simple or complicated systems but is not valid for learning from an emergent phenomenon in a CAS (Cook, 2000b; Dekker, Bergström, Amer-Wåhlin, & Cilliers, 2013; Reiman et al., 2015). Reiman et al (2015) suggests that incident reviews would benefit from understanding and learning from the trade-offs made instead of the linear looking at latent and active failures. Improved safety - which is supposed to be the ultimate goal of incident reviews - depends on understanding and making visible those trade-offs and adaptations made continuously to cope with demand and ambiguities in the system (Cook, 2000a; Hollnagel, 2012; M. D. Patterson & Wears, 2015; Sujan et al., 2017). In other words, it means moving away from looking at causalities to focusing incident reviews on understanding the context and the gap between the work-as-imagined (as redesigned and regulated by the blunt end) and work-as-done (as it is happening in the sharp end) (Hollnagel, 2014; E. S. Patterson, Cook, Woods, & Render, n.d.). This entails assessing and learning from the resilience capabilities of the

system agents that work on routine basis on coping with the rules and policies that do not necessarily match the complexity and dynamic of their everyday work (Cook, 2000a; E. S. Patterson et al., n.d.; M. D. Patterson & Wears, 2015; Reiman et al., 2015).

The quest of system resilience is a quest for understanding of both work-as-done and work-as-imagined and the realities of the stakeholders at the blunt end (policy makers, regulators, executives) and those at the sharp end (practitioners and first level managers). Johnson & Lane (2017) raise awareness on the "sharp reality of life at the blunt end" and suggest that care delivery is happening at all levels of the continuum of care with different scopes and different timescales, while the clinicians have focus on a patient/family and take decisions in seconds, the executives view the whole organization and decisions might evolve over months. One of the benefits of viewing that both blunt end and sharp share the same purpose is that it has the potential to foster a healthy learning environment where all levels collaborate and engage in the learning (Lukic, Margaryan, & Littlejohn, 2010) with the same goal to enhance Safety.

A key success factor for orienting the process of learning from incidents to understanding the dynamic adjustments and trade-offs made at the sharp end is to appreciate that the accurate reconstruction of the story is unlikely, rather gathering the maximum of information around the event and valuing different accounts would enable a richer data for learning about system dynamics, strengths and vulnerabilities (Dekker & Breakey, 2016). The data gathering step is critical in many ways, it sets the tone, the depth and breadth of the incident review (Lukic et al., 2010). As learning from incidents is also a social process (Allen, Braithwaite, Sandall, & Waring, 2016; Le Coze, 2013; Sujan et al., 2017), attention should be given to the variety of stakeholders involved in both the data gathering and analysis (Lukic et al., 2010; Macrae, 2016) with high quality conversations that foster trust and good relationship (Lanham et al., 2009; Mcdaniel et al., 2013).

The output of any incident review is expected to be recommendations for improvements. Reflecting the understanding of the healthcare system as a CAS in improvement interventions has been demonstrated to be more effective by shifting the focus "from patterns of stability, bureaucracy, and control to those of flexibility, self-organizing, and

learning" (Orlikowski, as cited Mcdaniel et al., 2013, p. 8). While the traditional approaches to learning from incidents often recommend compliance with the policies and rules, understanding Healthcare as a CAS implicate reviewing the fitness of the policies and procedures to the context and as appropriate, recommending those that support resilience by promoting and learning from effective performance variability instead of constraining it by ideal scenario policies (Sujan et al., 2017). All recommendations resulting from incidents reviews in CAS should be considered as ideas for change that need to be tested (Trbovich & Shojania, 2017), the Model for Improvement is a good tool to proceed with an improvement project as it incite to test, measure and learn from implementing the change in different contexts while considering balancing measures for the processes that are not directly involved in the change but might get impacted by it (Langley et al., 2013).

Another aspect worth considering in tailoring recommendations that fits CAS context is pointed out by McDaniel et al. (2013) who reviewed a number of studies that tackled improvement interventions considering healthcare organizations as CAS and they concluded on a common key success factor which is attention to relationships. Relationships, often considered as 'nice to have' have shown to be instrumental for quality care delivery as highlighted also by Lanham et al. (2009) in their study of the influence of trust, mindfulness, heedfulness, respectful interaction, diversity, social/task relatedness, and rich/lean communication among clinicians and non-clinicians in improving the quality of care, particularly in enhancing agents and teams abilities of reflection, sense-making and learning. Improvement interventions that embodies such insights enables teams and organizations to foster their resilience capabilities, moving from being overconsumed in 'coping' to more 'foresight' (Jeffcott, Ibrahim, & Cameron, 2009). By the same token, Sujan et al. (2017) incite organizations, in their process of LFI, to build on their experiences by promoting the informal learning processes and investing in learning from what goes well. Often, we relate learning from success to solely learning from everyday clinical work while it is opportune to incorporate learning from success in the process of learning from incidents.

## 2.3. The value of learning from success in incident reviews

As shown in section 1, only sentinel events drive executive attentions and are subjected to structured comprehensive reviews, near misses and other incidents are more looked at in numbers and statistics (Macrae, 2016; NHS, 2016; Shojania & Thomas, 2013) while learning from safe outcomes during incidents reviews is rare (M. D. Patterson & Wears, 2015; Sujan et al., 2017). Some system-oriented models on learning from incidents in healthcare hints to the need of looking at what goes well during the incident review but without imbedding any mechanisms in the approach (Duchscherer & Davies, 2012). We acknowledge the increasing interest to study everyday clinical work and learning from success in healthcare (Wears, Hollnagel, & Braithwaite, 2016). However, the literature here is not as abundant as those covering the learning from incidents and very few addresses the need to learn from what goes well in the process of learning from incidents (Sujan et al., 2017).

System analysis post incident would benefit from adding learning from success at two levels: 1) successful actions during the event and 2) successful outcomes in everyday clinical work of same processes involved in the incident.

### 2.3.1. Success during the events

Learning from incidents through a resilience lens is two-fold, "to understand how failure is avoided and how success is obtained" (Jeffcott et al., 2009, p. 256). The CAS that is healthcare is filled with unpredictable conditions that requires constant cognitive efforts from practitioners and teams who continuously assess the conditions and adapts to the foreseeable and unforeseeable changes (Hollnagel, 2014; E. S. Patterson et al., n.d.; Sujan et al., 2017; Woods, 2009). During events, teams display coping mechanisms and also recovery ability that is often overlooked in incident reviews. As matter of fact, to foster these resilience capabilities, there is a need to make them visible and learn from them (E. S. Patterson et al., n.d.; Wears et al., 2016), consequently, incident review needs to look at:

- Teams' foresight: this means looking at how the team displayed the ability to predict the event and/or its precursory conditions (Jeffcott et al., 2009; Woods &

Hollnagel Erik, 2006) and how well they communicated the real time assessments of the situation;

- Teams' coping: this means looking at how much complexity the teams are facing (E. S. Patterson et al., n.d.; Rasmussen, Nixon, & Warner, 1990; Woods & Hollnagel Erik, 2006) and how they have adjusted as the event was unfolding to prevent the situation from becoming worse (Jeffcott et al., 2009);
- Teams' recovery: this means looking at the ability to bounce back immediately after the event (Jeffcott et al., 2009), in the cases where harm happened, incident reviews need to extend the clock event beyond the adverse event to learn from how patient and families were supported and taken care of and how staff needs were responded to as well (Dekker & Breakey, 2016).

There are more comprehensive frameworks to evaluate resilience capabilities, however, for incident review, 'foresight', 'coping' and 'recovery' are obvious abilities to look for when studying team resilience during the event.

### 2.3.2. Success in everyday work

The value of learning from everyday work is widely discussed and proven to be valuable (Wears et al., 2016), however, progress for this kind of initiative remain slow in healthcare.

Incidents create a sense of urgency for learning and often drive executive's attention that would be difficult to get for learning from ECW that is not triggered by an event at least in the current context where the healthcare system struggles with resources globally (World Healthcare Organization, 2005). At the same time, LFI solely from the event perspective is limiting the learning and bears the risk of drawing the wrong conclusions (Shojania & Thomas, 2013; Sujan et al., 2017; Trbovich & Shojania, 2017). Embedding learning from EW to the process of LFI mitigate the later risk and provide visibility to the value of learning from everyday work (Sujan et al., 2017).

The evaluation of everyday clinical work should be approached through lens of resilience principles which will require additional strategies to ‘meetings’ and ‘interviews’ that are common strategies for data gathering in the traditional incident reviews methods (eg,

RCA). For example, incorporating everyday clinical work by simply asking the question: "how does usually this work?" during interviews would not be sufficient to get in-depth analysis of the system vulnerabilities (Trbovich & Shojania, 2017), other strategies such as observations of complex interventions, mapping staff/patient/ documents flows (spaghetti diagram could be a useful tool), equipment history and design review (Carayon & Wood, 2009) must supplement the review with richer data.

Learning from ECW requires from the reviewer the ability to engage stakeholders in discussions, draw patterns and connections, sense subtle difficulties. This kind of cognitive processes often neglected in LFI in healthcare helps a comprehensive learning (Le Coze, 2013)

This chapter provided a literature review of learning from incidents, the current challenges around the methods used and the promise of the most contemporary approaches to safety such as System thinking and Safety II.

The research question is: how system-focused incident reviews[1] that embed the new view of human errors and Safety II could have any impact in bridging the gap between "work as imagined" and "work as done"?

[1] The System-Focused incident review method used in that organization is explained in the Appendix

# 3. Research Study methodology

This study is conducted using a qualitative approach to explore the perceived value of system focused incident from front line staff and policy owners. Some quantitative data could be initially extracted to see how much recommendations relate to policies and how much of those are actually being addressed. Important to note that in this context, policies refer to all documents that regulate a task or activity, including Standard Operating Procedures (SOPs), Protocols, Guidelines, etc.

## 3.1. Study objectives

The thesis aims at exploring how the system-focused incident reviews, that embed the *New View* to human errors and Safety II could contribute to bridging the gap between the "work as imagined" and "the work as done". The study focuses on recommendations related to policies/procedures/guidelines and how those are addressed by policy owner and perceived by the frontline staff. The recommendations at study are from incidents reports, which were the results from reviews that incorporate the double-loop learning. These reviews questioned the whole background of the event including reviewing the policies and procedures.

### Primary objective

The primary objective for this study is to explore whether the factors in the process of learning from incidents, enables or hinders reconciling the work-as-done (clinical practice) and the work-as-imagined (policies & procedures development) by mainly exploring policy owners and frontline staff experience with the process of incidents reviews.

### Secondary objective

Considering policies are mainly documents developed by blunt end to regulate the work at the sharp end, this study secondary objective is highlighting how those documents are perceived by the frontline staff.

## 3.2. Data collection

To achieve the objectives of the study interviews were conducted with 4 policy owners responsible for addressing recommendations from incidents reviews and 5 frontline staff involved in the incidents that were reviewed. The focus of the interviews was to probe how those recommendations were perceived and how the interviewees experienced the process of incidents reviews and the process of policymaking. The 9 interviewees were identified from the staff who were involved in incidents.

| | **Policy owners** | | | | **Frontline Staff** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Current Occupation | Dentistry Director | Nursing SME[2] | Pharmacy SME | Radiology SME | Dental assistant | School nurse | Nurse 1 | Nurse2 | Radiologist |
| Background | Pediatric dentist | Nurse | Clinical pharmacist | Radiology Technician | Hygienist | Nurse | Nurse | Nurse | Radiology |
| Work location | Head office (4days) Clinical practice at the health center (1day) | Head office full time | Head office (4days) Clinical practice at the health center (1day) | Clinical practice at the health center | Clinical practice at the health center | Clinical practice at the school | Clinical practice at the health center | Clinical practice at the health center | Clinical practice at the health center |
| Years of experience | 18 | 19 | 33 | 26 | 12 | 9 | 8 | 15 | 26 |

*Table 2: The informants' profiles*

The interviews were semi-structured and lasted 30-60 minutes. The interviews were audio-recorded, all participants consented to the recording. The recorded interviews were then transcribed.

The interview questions are designed as follows, other questions emerged during the interview depending on the discussion.

[2] SME (Subject Matter Expert) is a title that used in the organization for a professional who has responsibilities of policy making and planning of the area of their expertise. They generally work at the Head Office. Some of them maintain the clinical practice once a week in which case, I will refer to them in the text by their both titles.

### *Frontline staff interview questions*

1. You have a number of policies that regulate your work. How do these document support or not your daily work?

Rational**:** to understand how front line refer to policies in their daily work and how these documents support or not the work delivery

2. What kind of contribution you ever had in policy review? How much involvement is sought from you or your colleagues in policy development or updates?

Rational: to explore if they are involved in policy making and reviewing and understand what kind of contribution is being made, is it more related to the context and operational workflow or the clinical practice, etc.

3. What do you think policy owners needs to know further about your work to develop policies that support it?

Rational: To assess if the staff see potential or possibility to bridge the gap between the work as imagine and the work as done.

4. You have contributed to a system review for an incident, tell me about your experience and involvement in the review process.

Rational: to understand how front line experience the review process and how they contribute to it, how much is asked from them in this process and what makes them actively engage or not.

5. Have you received the resulting incident review report? How the resulting incident review report addressed the reality of the situation and of your context?

Rational: to understand and assess if the incident review process is reflecting the context and real conditions or is it another work-as-imagined?

6. Since you were involved in the incident reviews mainly in the initial phase which is the data gathering, how the resulting recommendations are coherent with the discussions you had with the reviewer?

Rational: to assess what expectation the frontline staff have when they contribute through the interviews and how these expectations are met or not in the report

7. Any enhancement you think would make the review process more effective?

Rational: to explore ideas of improvement from front line staff perspective.

### *Policy owners interview questions*

1. Tell me in general about your experience developing and updating policies?

    - What kind of mechanisms you utilize to reflect the context in the rules and regulations?

    Rational: to understand how the process is usually carried out. This information could be eventually contrasted with the one related to the policy review that is triggered by the incident review to identify if there is any difference in the process of the policy review that is scheduled and the one that is triggered by an incident review.

2. Tell me about your experience being responsible of addressing a recommendation for policy change in an incident review report.

    - How do you approach the incident report when you receive it? Do you go directly to the recommendation addressed to you or do you take it section by section?
    - How did you first perceived the findings or gaps for which the recommendation for policy change has been made?
    - What information in incident review prompted your action (or discouraged any action)?
    - How do you decide on the scope of the policy review?
    - What aspect of the incident review report informed your policy review?

- When you started your policy review, did you your initial perception of the recommendation change?
- Do you face any challenges addressing the recommendation in the incident reports?
- Did you ever felt the need to clarify the recommendations with the reviewers? How did it go?

Rational: to understand how the policy owner live the full experience of the incident review and what perception they have of the recommendation that relate to a policy they own and if there perception evolve through the process of updating the policy. This should help identify the key factors that help or hinders actions from policy owners.

3. Any enhancement you think would make the review process more effective?

   Rational: to explore ideas of improvement from front line staff perspective.

4. How did you work on updating / reviewing policy? And who contributed to that process?

   Rational: to understand how mechanism are used to inform the change in the policy: do they walk the process? Do they invite frontline staff to contribute? Those mechanisms could be compared with the outcome of question 1 to assess of there is any difference.

### 3.3. Data analysis

To make sense of the Data transcribed from the interviews, the data was coded into themes using the Applied Thematic Analysis method because “thematic analysis is still the most useful [approach] in capturing the complexities of meaning within a textual data set. It is also the most commonly used method of analysis in qualitative research” (Guest, MacQueen, & Namey, 2012, p. 11).

A significant part of the interview – as indicated by the interview question was focused on exploring with informants their perception of the process of learning from incidents and how the process of incidents review is or is not enabling the learning. For this part, three subcategories were identified from what was transcribed from the interviews; of what the staff are expecting from this process, the factors that enable and facilitate the learning in this process and the limitations of the process of learning from the incidents.

As I was exploring how Incident Reviews address the gap between work-as-imagined and work-as-done, I was curious to understand how the policies (or procedures and guidelines) are perceived by frontline staff and by policymakers [3]. Making policies is considered part of the clinical governance. The aim is commonly understood to be ensuring high standard of care delivery. Between 2015 and 2018, 20% of the recommendations resulting from the incident reviews were related to policies whether the policy failed to provide the needed guidance or the compliance with policy was not feasible. Hence, recommendations were made to update that regulating document or to make one when regulations was needed and not available. This part of discussion lead to four subcategories; policies as a source of guidance, the conflict of complying with the policy or addressing patient need, the context variety & dynamism not captured in the policies and the interdependencies between different processes under different lines of responsibility.

During the interviews, I also tried to understand how policymakers decide on the breadth (in terms of who to involve) and depth (in terms of how much the context matters and how context information is collected). Frontline staff involvement in policy development was identified as a main category under which three subcategories were trending in the information collected; Frontline staff knowledge of the context, their expertise & experience and the enablers & constraints to frontline staff engagement in policymaking.

In summary, the emergent themes are classified into three high level categories, under each one a number of sub-categories as defined in Table 3. The statements under each

[3] Policymaker in this document is the person who is responsible for or involved in formulating policies, procedures or guidelines within the organization, in the statements they are identified by their titles (SME or Director).

theme are analyzed in Chapter 4 and the results are discussed in light of the relevant literature. The conclusion summarizes the study findings and its strengths and limitations.

| Category | Sub-category | Description |
|---|---|---|
| **Learning from incidents** (could it shed light on the gap between WAI and the WAD and help reconcile it) | **Staff expectations** | This includes information related to what the staff expects from the process of learning from incidents whether those expectation are met or not by the current process. |
| | **The enablers for learning from incidents** | This includes information that emerged as factors in the current process that are promoting and facilitating the learning. |
| | **Limitations of the process of learning from incidents** | This includes information that emerged as factors that are hindering the learning or making it difficult. |
| **Policy fitness and utility** (where is the gap between the WAD & WAI) | **Source of guidance** | This includes information that refers to the benefit of having policies as reference documents and useful regulatory documents. |
| | **Goal conflict** | This includes information that puts forward the dilemma staff are facing when Safety and Efficiency are contrasting in the policy and reality. |
| | **Context variety & dynamism** | This includes information highlighting how the local context is different in time (from the time the policy is drafted) and in space (between the different sites the organization governs) |
| | **Interdependencies** | This includes information that shows the element of interdependencies between different processes and how does it affect policies |
| **Staff involvement in policy making and updating** (could they be the agent bridging the WAI/WAD Gap) | **Context knowledge** | This includes information that refers to the importance of involving staff in policy making because they are most aware of the context of where the care is delivered (sharp end) |
| | **Expertise & Experience** | This includes information that refers to the importance of involving staff in policy making because of their expertise or experience. |
| | **Enablers & constraints** | This includes information that support staff involvement in policymaking and the information around factors that interfere with including frontline staff as active actors in policy making. |

*Table 3: Coding frame with definitions*

## 3.4. Ethical considerations

Qualitative studies require reflection throughout the research process which make one's own biases impossible to avoid; rather, researchers should understand and be aware of their position and subjectivity and make them clear to the reader (Sutton & Austin, 2015). In this regard, as the researcher of this study, I disclose that I am employed by the organization where the study is conducted. I am also the one who developed the approach used for incidents reviews in this organization; however, my employment by this organization does not depend on the result of the study whatsoever. In addition, I have no power relation whether direct or indirect with the informants and their career do not depend on me nor does it depend on the study result. The motivation of the study is assessing the impact of the approach locally to improve it. I have no commercial interest in this work.

A research application was submitted to the Primary Health Care Corporation where the study took place and the approval of the study was granted.

# 4. Results & Analysis

The emergent themes from the transcribed interviews are classified into three high level categories: 1) Learning from incidents, 2) Policy utility and fitness, 3) Staff involvement in policy making and updating. These categories constitute the headings of this chapter and under each chapter, the analysis of the informant statements is organized as per the codes define in table 3.

## 4.1. Learning from incidents

### 4.1.1. Staff Expectations

Both Frontline Staff and Policymakers identified incidents as organizational learning opportunities requiring analysis and actions to be taken to improve the system. Frontline staff particularly expects the organization to take actions to understand that mistakes happen due to multiple factors and to improve those aspects. The below statements refer to these needs:

> *I reported my own mistake, I hated to expose myself, but I wanted something to be done. As much as I am sad to be the one who committed the error as much as I wanted this to be avoided for other patients. Incidents are reality check for our conditions, rules and regulations and should be enough evidence that those need review. (Nurse 1)*

> *The school health policy recommended in the incident report would help me and give me guidance how to manage my patients, enable me to manage my time also, because I waste my time when I search for somebody to help me. Also, I will not have to wonder if I should double check with another colleague in case of conflicting advices. (School Nurse)*

> *I sense that the staff feels a sense of responsibility to report; the burden of learning becomes organizational this way. Also they saw actual corrections in the electronic system and workflow that benefited them directly, they feel the learning benefit when systemic actions are taken. (Pharmacist & Pharmacy SME)*

> *Incidents show us that we can do better and we should use this signal to learn more about how the next patient will get harmed. (Nursing SME)*

However, some frontline staff and practicing SME highlighted the need of unit-based learning where they learn as peers rather than corporate level learning from incidents. They

expressed that this is safer and more empowering for them. While this will not necessarily enable cross system improvement, it would enable those improvements that the unit has control over in addition to experience exchange between the peers:

> *The systemic review of incidents is very helpful as it give us the eye bird view on where the gaps are, however, it is inconceivable that this kind of exhaustive review will happen for all incidents. Most of the learning in pharmacy at least happen at individual level and team level. (Pharmacist & Pharmacy SME)*

> *We are not aware when you do a system review, we favor learning as a team, we share the incidents in our team meetings and we discuss how we could avoid it in the future. It is easier and more practical for us to share with colleagues than to an external department like Risk Management. (Dental Assistant)*

> *Maybe teach us how to learn from incidents so we can do those system review ourselves, for those incidents that are not reported and we know about. (Radiologist)*

There was general agreement that incident reviews cannot capture all the issues or solve the patient safety problem, no matter how systemic or comprehensive they are.

> *We try a lot to enhance medication safety, but it will never be safe 100%, because this is the reality all over the world, I attend yearly the international pharmacy leadership summit and we all face the same challenges. Many errors could happen at our end that are induced by the labeling of the medication which is out of control of healthcare organizations, let's say Adenosine 3 mg per 1 mL, but the package is 2 mL, meaning the base quantity is 6 mg, finally the international recommendation is not for pharmacist to mitigate as often made but it is for the manufacturer companies, to give the full concentration. The double dose and in high-alert medication with narrow therapeutic index, this is fatal. For example, in case of adenosine, it could cause death. (Pharmacist & Pharmacy SME)*

> *What affecting most patients is sometimes the lack of compassion and this is neither in policies nor in incident reports. This is in our staff heart either they have it or not (Radiology SME)*

These comments highlight dimensions that are overlooked by incident reviews but are at the core of Patient Safety. The scope of incident reviews is often limited to the organization remit. Although organizations could decide to inform an external provider of potential safety concerns with their products or a regulator of a limit of its policy; this is generally not happening. On the importance of compassion, many organizations acknowledge it by

setting it as one of their organizational values but indeed it won't necessarily be assessed in incidents.

In addition to the expectations, the discussions on learning from incidents revealed what aspects of that process were valued by staff and policymakers and the aspects that could be considered as limitations or obstacles to learning from incidents.

### 4.1.2. The enablers for Learning from Incidents

The communication style used in the process of learning from incident seemed to matter to both policy owners and frontline staff; whether how the questions are asked during the interviews for the data gathering or how the analysis report is written. One of the nurses - who cried as she was speaking about an adverse event- mentioned:

> *I trusted the incident review was for learning rather than blaming because of the type of questions asked and how they were asked, I remember it was therapeutic to me because I was blaming myself a lot for that error. (Nurse 1)*

Similarly, for policy owners who need to act on the recommendations, how the information is communicated in the report had an importance. In the statement below, I include a statement from the radiologist as well, although he was interviewed as frontline staff - because he is actively involved in policymaking for Radiology:

> *The description of the situation in the incident report is factual and the use of data makes the finding less arguable than when it is merely opinions, even an expert opinion can be argued, data tends to be less. (Radiologist)*

> *We always address the incident recommendations because it is clear to us how you came to the conclusion. The report reflects that lot of work was done to gather information I must say*. (Nurse SME)

In all the discussions except the one with the radiologist, the staff used the words "them" and "us" suggesting frontline staff and management are disconnected groups. This might explain why "reflecting the context" in incident review is appreciated. Because the expectation is that management is not aware of the hassles experienced at the sharp end, so, when some of this reality is reflected in the report, it was emphasized by the frontline

as something highly appreciated. The following statements reflect the feeling of seeing a piece of work-as-done in the incident review report:

> *I trusted the recommendations because the analysis in the report described the workflow as we live it and how it is different from a HC to another (Nurse 2);*
>
> *I have seen some changes like in the EMR, we can't open more than one chart at a time, the nurses orientation is scheduled in the first days of joining. Most of those gaps were identified in my discussion with the risk management so I concluded, there were some recommendations in this sense. (Nurse 1)*

Using contextual information in the incident report was also useful to policy owners or contributors like the radiologists who are frontline staff but are often engaged in policy development in Radiology and in improvement projects in Radiology.

> *The incident review highlighted a gap for us because there was an assumption that from 2:00 to 4:00 is the period where there is no appointment and low number of walk-in patients so this period was not covered by radiologists schedule. (Radiologist)*
>
> *I remember one incident review report that I was reading with certainty that it is a problem of non-compliance with the vaccine policy while the report highlighted that there was no gap in the practice, rather the policy does not reflect the conditions of the different shifts. The staff verified the temperature of the fridge once per shift, so an incident happened, there was a fridge failure that went unnoticed; the morning shift staff mark the temperature in the beginning of the shift. In the evening shift, the staff discovered the failure at the end of the shift. So they kept the fridge unmonitored for more than 12 hours. The incident reviewer looked at the previous records instead of the missing record of that night; the finding was that the evening shift staff did not miss the monitoring but they were doing it as usual at the end of the shift. It was eye opener to me; they indeed complied with the statement of ounce per shift. As policy maker, I did not think that each team might choose different timing. I assumed that all will do first thing as they start the shift. I learnt from this incident review that in policy making we need to account on how regulation would apply to different shifts, transition between shift and the staffing during each shift. (Pharmacist & Pharmacy SME)*

In the light of hindsight, the decision/action or absence of action often seem so unreasonable for incident reviewers but when the discussions with staff are intended to get to their sense making at the time of the incident, this logic could defeat the hindsight effect even for the recipient of the report as suggested by the below statement:

*The technologist seeing a mass and not measuring it or not being able to measure it is not a case I have ever heard of. We could have stopped there and consider it a gap in competency and that was the case until we received the report. The incident analysis showed that the technologist judged that this case could be cancer and would be better done by a radiologist, he didn't expect that the patient would leave while he is trying to seek a radiologist advice and then that it will be hard to contact the patient and the ordering physician which had led to incomplete procedure, incomplete report and delayed diagnosis. (Radiologist)*

The incident review reports provide an analysis for more than one event in addition to providing a number of occurrences and descriptions of similar incidents to show the extent of the problem. This was the part of report that urges policy owners to act on the recommendations as per the comments below:

*The frequency of the incident urges us to act because it is not just an isolated breach of the policy. (Radiology SME)*

*When the incident review report provides the analysis of multiple similar incidents, I understand that we have to improve the guiding documents, which is something I would avoid upon a single incident analysis, we would often think that staff had to comply with the policy. The historical data and the recurrence rate are elements that make the report credible in my view. (Pharmacist & Pharmacy SME)*

*Having a report that provide an analysis for two similar cases shows that the gap has to be addressed because the failure is not a one of. (Nursing SME)*

The incident review reports result into recommendations. The recommendations are calls for actions for different departments to address specific gaps. Although, the recommendations assessed in the interviews were the ones related to policies, it is worth sharing that the stakeholders cared to mention how important for them to have high-level recommendations that do not restrict "how" they will address the recommendation:

*I am the expert in my area more than the incident reviewer who I appreciate they the expertise to uncover the system gaps. I appreciate when the recommendation is high level and give us the flexibility to explore multiple practical ways to address the findings. For example, in one of the report related to the incident of the wrong vaccination, the recommendation is to put a process in place that requires the pharmacy check before dispensing to the nurse without mentioning how it should be done. This allowed us to meet as subject matter experts and explore options and test them. (Pharmacist & Pharmacy SME)*

The conversations with policy owners on their experience with recommendations from the incident reviews has shown that learning goes beyond what they need to address in the recommendation addressed to them. Most of the policy owners said that they take the recommendation on policy as a trigger for a complete review of the policy not just the aspect relative to the incident. Some have shared that they benefited from the information in the incident review report that had changed some aspect of their work.

> *Also when it mentions the related policies, the different policy statement or procedures part that are owned elsewhere and interfere with the one we have. This is valuable because it helps us see further the interdependencies of our work. The value of this kind of learning goes beyond addressing the recommendations to give us critical information that we use in other work. (Pharmacist & Pharmacy SME)*

> *The recommendations that are made to review a policy creates a sort of snow ball effect since the administrative process of policy update is exhaustive once it is triggered by an incident review report we expand on all what is covered by that policy to ensure it addresses the gap highlighted but it also up to date with latest International best practices (Radiology SME)*

> *When it comes to policy update we don't address only the scope of the recommendation but we review all the aspects regulated by that policy (Nursing SME)*

The incident review reports are anonymized[4] and shared in the intranet. This strategy aimed at spreading the learning. The stakeholders who need to act on the recommendations often argued about the timing of making the reports accessible to all favoring that it is shared after they address the recommendation.

> *The whole organization receives the incident review report and all are aware that there are recommendations to management on some changes. This puts pressure on us to address the recommendations because if a similar incident happen again will be look at from the staff and the management (Nurse SME)*

### 4.1.3. Limitations of the process of Learning from incidents

Some criticized incident reviews to focus on what can be hardwired or appear to have a known solution with little importance given to the human-to-human interactions. This

[4] Without any name, neither people involved in the different incident nor the sites names nor the reviewer name.

could be associated to either the avoidance of the incident reviewer to get trapped in judgmental subjective findings or the challenge of understanding the complexity and dynamics of human interactions. This suggests that important factors that contribute to patient safety events are missed in this kind of incident reviews as raised by the below comment:

> *Some system improvement recommended are great opportunities like the one related to the electronic notification. This have additional benefits to reducing the rate of paper missed or lost however, emphasizing on radiologists-physicians communication is as important and this is not in the incident review report (Radiology SME)*

The discussion on the limitations has revealed that the report is targeting more work–as-imagined, design, policies, staffing and that even the report was not directly shared with the frontline staff involved. At this point of the analysis, we could conclude that the incident reviews shed light on the on gaps between the work-as-imagined and the work-as-done in the work processes behind the event analyzed, however, the report dissemination and communication process of recommendations are another work-as-imagined. The frontline staff are not included in this step. The report is made available on the intranet and the assumption is made that the information will reach them this way. Not only the staff will never know when the review was completed but most importantly the learning is not just about acting on the recommendation, it is about understanding what is happening and what could happen, and this information would benefit everyone in the organization specially frontline staff who valuably contributed in the process of the incident review. The statement below affirms the staff disappointment from not receiving the incident analysis report:

> *I haven't received the report but I have seen the changes, so I concluded it came from the incident report. I would have appreciated to receive the report though. (Nurse 1)*

Despite the organizational policies emphasizing the value of incidents as learning opportunities, the anonymous reporting system and the system-focused approach for incident reviews at corporate level, the staff still feel unsafe to report and reports subtle blame that can happen at the sharp end as let to be understood by bellow comments:

*there is a focus on the system at least for those incidents that are reported and reviewed at corporate level. (Radiologist)*

*Although I wasn't blamed directly and although the incident review resulted in system improvement. It was hurting that I wasn't assigned to the WBC for over year. Until this happened that I could say I felt trusted again and regained trust in myself. (Nurse 1)*

*Although the reporting system is made anonymous, it can be easily retrieved, especially if you put in the area, dental clinic, we're only six assistants in the clinic… and six doctors, so they would easily find out who reported or if not we will be all look at as the one who betrayed the department (Dental assistant)*

*Although the organization encourages the reporting and back it with policies there are still some unit managers who respond badly to reported incidents and discourage the staff to report. (Nurse SME)*

These commentaries explain the need to learn how to review incidents locally at the units that was raised in the previous section on Staff expectations with regards to learning from incidents. The blame is not just hierarchical; it could be also horizontal, from a colleague to another or a department to another. Although it wasn't explicitly labeled as blame, but it was referred to as a concern for relationships with colleagues as suggests the statement below:

*Maybe, there would be a conflict with different departments, because Nursing head and dental head are different, and the CSSD is under the nursing head. We want all the staffs work in harmonious relationships; we will avoid reporting something that went wrong at their end because they will interpret negatively. But if it is a critical point for safety we will raise it verbally to them, it is easier and more accepted. (Dental Assistant)*

In every conversation, it was expressed whether directly or indirectly that learning from incident is insufficient for Patient Safety. This was captured in some statement shared in the section on staff expectations similar to the below:

*The recommendations do not cover all the issues we face everyday, not even* 10%. (School Nurse)

More specifically on addressing recommendations related to policies, policy owners raised how much of the approval process is slow and exhaustive. Since it is a document regulating

the work, the accountability is shared between those department heads concerned by the piece of work to be regulated which makes the process is tedious:

> *Approval process of policies is painful. (Radiologist SME)*

> *The most frustrating & discouraging part when I see a recommendation related to updating a policy is not the revision itself but the approval process (Nurse SME)*

The frontline staff interviewed have repeatedly mentioned the variety of their context and the dependencies with other departments. The dependencies are also reflected in the process of policy development or more precisely in the approval process as highlighted above. These discussions have led the inquiry to how frontline staff perceive policies, their utility and fitness and how policy makers are concerned about the challenge of regulating a highly complex and dynamic work.

## 4.2. Policy utility and fitness

### 4.2.1. Source of guidance

Both frontline staff and policymakers expressed the importance of having policies as reference documents that supports staff in their daily work. However, in the rush of work, when faced with an unfamiliar situation, frontline staff expressed that the immediate action would be to ask senior colleagues. The driver for this approach is either, because "it is inconceivable to remember all details in all policies" or because some areas are overlooked by policymakers assuming "the clinical judgment" is sufficient. Despite how "quick and resourceful to ask senior colleagues", Staff felt safer with a document that the organization approved as conveyed in the following statements:

> *Policies protects us, it is our safety at work. Working based on policies and written guidelines that are evidence-based makes me feel confident and safe in the practice. In addition, it helps standardization between health centers, it easier when I am called to work in another health center. (Nurse 2)*

> *As a dental assistant, I need often to refer to the IPAC officer and sometimes infection control officer 1 is not consistent with 2 and with 3. Some would give practical advice considering the pressure of back-to-back appointments and other will focus mainly on the need of being extra cautious with preventing infections*

*which is not always feasible. We have no time for extra rigor, we always have overbooking. (Dental Assistant)*

*As I don't have policy that reflect my context as a school nurse, I cannot solve my problem by myself, and I should ask my manager, I should ask my colleagues nurses in other schools who have more experience in school context, and everyone tell me something different. (School Nurse)*

*A lot is left to the dentist judgment, as a practitioner, I value the trust in our clinicians' judgment but as responsible of the clinical governance in dentistry, I see discrepancies in judgment that can be fatal. For example, I have a little instrument that got swallowed or inhaled by the patient, we don't have a protocol for that. Each dentist will handle the situation based on his previous experience and where he comes from. We end up following bits and pieces from other countries standards like UK, United States, Canada, whatever. We need to have a protocol for such situations. We need to assess where are the areas that we need protocol, where are the areas that we leave to the dentist's judgment. (Pediatric Dentist & Dentistry Director)*

The nurses particularly emphasized the utility of policies to justify a decision or action to clients. It seemed from the discussion that when patients question a decision, the decision becomes more credible if backed by an organizational policy. The two following statements reflect when the policy was available and supported in that aspect and the second when there was no policy to give support to the clinician decision and help justify it to the client:

*If there are patients complaints in triage, I can support my assessment of a patient priority by the algorithms and criteria from the policy. (Nurse 1)*

*When I face a problem in school, there is nothing to back me, like policy for school nurses, for example, the school principal asked me to accompany a student in the ambulance, when I called my manager, she said the student is now under the paramedic responsibility but the principal was still unhappy. (School nurse)*

Policies were also referred to as a critical tool to keep practice up-to date. Policies and guidelines are trusted to be updated to reflect the discoveries in the field that is continuously evolving with technology and research as suggest the following statements:

*Dentistry is one of the practices that is updated very fast, with the new advancement of material and technologies. We cannot afford to sponsor all dentists to attend all*

*conferences, we try to make the new science accessible in our guidelines (Pediatric Dentist & Dentistry Director).*

*Every Diagnostic imaging process is regulated by a policy or a guideline and this is very important to ensure we are delivering services that are up to the international standards. Policies are also a reference for us to improve our work given that they are updated continuously as research in our area is constantly evolving. They are an improvement tool; a new policy or a new update means to us an improvement of the practice (Radiologist).*

This sentiment of trust that the radiologist has into the concurrent policy updates with the latest research in their field was not common among the frontline staff interviewed from other occupations. This could be explained by the fact that Radiologists are small group comparatively to other clinicians, they are 14 and they all contribute to drafting policies that apply to their work.

### 4.2.2. Goal Conflict

In contrast, policies were criticized to be sometimes more focused on efficiency rather than safety.

*Although we are governed by same policies and guidelines, each Health Center have its own unwritten rules. For example, in one of the Health Centers, they systematically do Spirometer Test for asthmatic patients in Triage as part of taking the vital signs, which is not part of the guidelines but that the Health Center judged it is important for patient safety to consider this test before assigning a priority for the patient. In other Health centers, this test would be done only if ordered by the doctor. (Nurse 1)*

*For example, the step of cleaning the instruments, the policy do not specify what water to use, in which case, it is assumed normal running water, but some Heath Centers will consider it is safer to use distilled water, others filtered water and others will use normal running water from the tap. (Dental Assistant)*

*Sometimes when there is no policy the practice will be safer than with the policy, for example, 15 years ago, there was no guideline, before each penicillin injection we will do a test dose to ensure the patient won't have an allergic reaction, but now we have a policy that says that the test should be done only if the patient is having the injection for the first time. I have experienced twice patients that had taken the injection long time ago and when I have given them the injection the patients got a reaction. Complying with this policy make us feel uncomfortable specially that it happened with other nurses, the patient can become allergic at any time, I think we should always test before the injection. (Nurse 2).*

The above statements show the dilemma that the frontline staff face when efficiency prevails in the policies. The practitioners feel responsibility towards patients and tend sometime to go beyond what the policies dictate to ensure Safety.

### 4.2.3. Context variety and system dynamic

The discussions revealed that system complexity remains a challenge for policymaking. In this context, the organization governs 25 Health Centers. The staff consistently referred to how their context is different from what might be thought by the policymakers. In addition to the difference between Health Centers, the context within the Health Center is also changing from the time the policy was drafted. Below statements highlight the context variety and system dynamic:

> *School health is a service that is not provided with the Health Centers, The nursing policy are not covering our needs, the school is different from the health center, different cases, cases that the Health Center might never see. The HC do not receive heart patient, do not receive metabolic patient. But for me, in school, I have all those hard cases. If they have an emergency, I need to assist them, I haven't worked with cardiac patient, sometimes I don't know what to do. Because I don't have policy or guidelines for those cases since they are not cases that are treated in the HC. (School Nurse)*

> *Policies has to be assessed continuously because our context change all the time with staff leaving, recruitment issue, different patients, new services opening…(Nurse 1)*

> *Our area is constantly evolving; policies are useful only if they are continuously updated (Radiologist)*

The policymakers have shown awareness of how the context is dynamic, however without having an answer on how policies could keep up in richness with the context variety or in pace of updating with the context dynamism.

> *Healthcare delivery is not a repetition. Every situation is different. The patient who walks through the door today is not the patient who will walk tomorrow, not the patient who will walk after two hours or three hours. (Pediatric Dentist & Dentistry Director)*

*No one can predict what will happen in the future, we have to make policies with the best knowledge we have now and update them as we become aware of changes. (Pharmacist & Pharmacy SME)*

The above statements testify to the challenge of capturing the current present changes in the current and future context. In addition, policymaking in this context is pressured by the need to unify the practice as the organization employ -on contracts- clinicians from all over the world:

*We are all expatriate coming from different places in the world, how we do certain procedures in New Zealand is different from UK, US, …and each doctor feels his home country is the best. Now to get a consensus on a procedure and have our local common way here is not easy (Radiology SME)*

### 4.2.4. Interdependencies

From both policymakers and frontline staff perspectives, there was a significant emphasis on the interdependencies that make not only the outcomes unpredictable but also the regulations inaccessible for staff. As an insider in the organization, I know that just in the 5 minutes that the patient is assessed in the triage room, the nurse takes the vital signs that are part of clinical assessment guideline that is governed by Medicine Directorate; then take medication history as part of medication reconciliation that is regulated by a policy owned by the Pharmacy Directorate; they also have monitoring role for the vital sign equipment defined in the medical equipment preventive maintenance owned by the Biomedical department; and of course they need to document everything in the electronic medical record which is looked after by Health Intelligence department. The frontline staff get overwhelmed by the number of policies that regulate bit and pieces of their work as shown by below statements:

*They are too much to remember but I can access the information as needed, we can easily connect to the policy's portal. You can find everything. If I want to know about IPAC, I just press and search IPAC, and all IPAC policies will be available. However, from different department, which one applies to me, maybe all [laughs]. (Dental Assistant)*

*There around 66 policies that apply to Nursing. I couldn't read them all, but I can confidentially say that over the years I got to know most of the content. (Nurse 2)*

*Everybody is regulating the nurse work, almost every policy has something for nurses even non-clinical policies. Even me who is responsible of the clinical*

*governance in nursing as a full time job, I cannot be aware of all, how about the nurses who are full time with the patients. (Nursing SME)*

*Medication management is the type of work that is affected by all other processes and is the one that is most regulated, the highest numbers of policies are related to medication management, on the other hand is the riskiest and where you find the highest number of incidents worldwide. No one can predict what will happen in the future, but we have to make policies and update them as measure to ensure quality and safety (Practicing Pharmacist & SME)*

In summary, policies and all regulating documents are perceived as important by the frontline staff helping them feel equipped, guided and "safe" in their practice. However, this general positive perception about policies was toned down when they were probed on the relevance of policies to their specific context and different situations. The statement shared above put forward the conflicting pressure the staff can face in addition to the interdependencies, context variety and dynamic that defies the intent of policies sometimes. These aspects challenge how much policies could fit the context and the different daily realities at the sharp end. It became relevant in the discussions to explore with the informants how the policymaking could be more context-sensitive and catering for the reality of the work-as-done. The most commonly endorsed idea was to involve frontline staff in policymaking.

## 4.3. Frontline Staff involvement in developing and updating policies

The discussions with both frontline staff and policy owners have revealed the importance of including frontline staff in policy development for different reasons.

### 4.3.1. Context knowledge

The frontline staff have context knowledge, context that is often different from what policy owners imagine. This was the most repeated idea during the interviews. The following comments sum it up:

*the Headquarter can't know everything unless they ask us. (Nurse 1)*

*It is critical to involve the frontline staff, we are the ones living the practice on daily basis and this reality is different form the books. The clinical practice is*

*often different from the one written. So, I think it's better if the clinical and the theoretical join the ends, I think it will make policies clearer. (Dental Assistant)*

*I had to raise the concern that the policies for our department are hospital based and leaving it to each radiologists to make the interpretation for the primary care setting is not practical. (Radiologist)*

*Those managing School Health need to visit the schools and see what kind of situations we handle. They could also take time to ask us. (School Nurse)*

*Most of policy makers have field experience, however, as frontline staff we have the current experience of what's happening now. (Nurse 2)*

Context Knowledge entails also knowledge of situations of conflicts or conflicting goals. Those scenarios are important to be known when regulating a process of work because those are what might cause non-compliance or defeat even the purpose of the policy. This kind of information cannot be fully or accurately "imagined" as implies below statements:

*we are the ones in the work environment, so we know what are the problems… we will have a good contribution because we have encountered conflicts, we have experience with conflicting demands, we also know how to get by them. I think it's just right that frontline staff should be involved in policy making. (Nurse1)*

*We have to reach a certain number of patients in a day, 30 minutes per patient, but sometimes, there are patients that take longer or some doctors are slow, so they will get all the thirty minutes and then how many minutes I will take to clean, and call the patient outside, and then I have to wear the gown, check expiry dates of some products and indicators for instruments,...For sure, there are things that will drop, at times because all these IPAC protocols are not accounted for between appointments. (Dental Assistant)*

*Just today, before I came here, I called both father and ambulance for a student who lost consciousness, the father told us to not send his daughter by Ambulance. The student is not oriented with severe low blood sugar. Every minute is critical. Shall I go by the father recommendation or by my clinical judgment, if she gets brain damage, even the father might claim he could not understand over the phone the criticality of the situation. School Health Management are not aware of those conflicting situations we face. (School Nurse)*

*Not only I need their input, I need their different perspectives. Just the last review of the vaccination policy, we have one recommendation from the WHO with regard to mulitdose vaccine, because of the international shortage of these vaccines. So the NHS in the previous policy mentioned that when the vaccine is*

*returned more than three times, you have to discard it, because of the temperature change, but based on the new WHO recommendation, if the vaccine is still under the cold-chain condition and have the Vaccine Vial Monitor and is not immersed in water, you can use it until the end of the expiration date, and some companies mentioned in their pamphlets that their vaccine can only be used for 6 hours after opening only. So, here I have many instructions for different conditions. Here the confusion will start. The approach was to detail an algorithm with some frontline staff and assess with others to ensure how it will be read and translated into practice. (Pharmacist & Pharmacy SME)*

*Frontline staff know the context and can foresee the impact of the new policy or rule. Sometimes they tell us " good luck with that policy, it won't work for us". (Pediatric Dentist & Dentistry Director)*

### 4.3.2. Expertise and experience

In addition to the context knowledge, policy owners who have involved frontline staff in making policies have stressed the need for their expertise and experience.

*Generally, we involve the staff based on the expertise and interest they have shown in a specific area whether they have a managerial role or not. In some cases when the context is important like home care, we would favor a frontline staff. (Nurse SME)*

*No one can have all diagnostic imaging expertise and it is not reasonable to hire in management all those expertise so, to ensure the practice is standardized and up to date, we involve the most senior experts in the area we need to author the policy for. In Diagnostic imaging, the practitioners are very much involved. (Radiology SME)*

*The frontline staff bring a lot of value to this process, they usually have the sense of practicality, what's applicable for patients and what cannot be done, what's applicable for the staff and what cannot be done. I value their experience. (Pharmacist & Pharmacy SME)*

The above results indicate that frontline staff could be agents to reconcile the gap between the work-as-done and the work-as-imagined when they are involved in regulating the work. The reasons explained above for seeking frontline staff contribution in developing policies remain valid for also designing and planning for the work since this also require context knowledge. The work-as-imagined would be less "imagined"

when it gets inputs from those who do the work. However, this does not come without challenges.

### 4.3.3. Enablers and constraints to frontline staff involvement in policy making

The interviews revealed some enablers and some constraints. The leadership support was main enabler:

> *Including frontline staff in the policy making is not an option for us, The Director mandates it and would verify it in the policy development or review plan. (Pharmacist & Pharmacy SME)*

All the policy owners interviewed report to the same executive who mandate frontline staff involvement which makes it happened in every policy development but the level of frontline staff engagement will depend on the interest viewed from the policy owners. Some policy owners who are practicing as clinicians once a week were the most inclined to involving practitioner in making policies although they are themselves practitioners. They explained that this one-day practice makes them aware of how much they don't know about the context variety.

> *I go to the clinic once a week. I don't have enough immersion in the frontline. I find myself in constant need to rely on my colleagues on what usually is done. I come once a week. I don't have full exposure at all. (Pediatric Dentist & Dentistry Director).*

> *When you are in administrative role and also practitioner you are very much aware how much the context is important and variable. (Pharmacist & Pharmacy SME)*

In contrast when policymakers are not practitioners and have no exposure to the sharp end, they tend to perceive the staff input on context challenges are not relevant to policy development as testified below:

*Staff are always bringing in operational issues and challenges. We cannot account for all the cases in a policy or procedure. They resist change and often new policies dictate a new way of doing specific work. (Radiology SME)*

This above statement gives an idea of the kind of interactions in policy drafting meetings between frontline staff and policymakers. This reveals that frontline involvement is not sufficient, more important is what is the motivation behind involving them, for the above policy owner: “we involve them as it would help compliance”. This could limit the frontline staff motivation to provide input.

Other constraints were related to frontline staff availability and language barrier as a significant number of frontline staff are not proficient English speakers.

# 5. Discussion

Incident reviews are significant components of Safety Management in an organization. The literature review in the first chapter of this thesis displays how this process in Healthcare has been often criticized of looking linearly at causes and making weak recommendations that fail to lead to system improvements. This study aimed at exploring how a system-focused review could be any different and contribute to Patient Safety bridging the gap between the work-as-imagined and work-as done. The analysis of the interviews conducted with frontline staff and policy owners has shed light on some aspects that could be enforced as enablers for learning and others that could be improved to achieve further the learning purpose.

While incident reviews are often evaluated based on the impact of the resulting recommendations or their implementation, the discussions revealed that the process of incident review itself is as important and even an influence on some aspects of Patient Safety like trust. For instance, the statements similar to the one made by the nurse who linked the questions asked (and how the incident reviewer asks them) to the trust she could put on the process. This trust was then fostered when she noticed the changes in the electronic system and scheduling of the nurses' orientations[5]. On the other hand, the opportunity of acknowledging her contribution to the review and sending her the final report was missed. A staff experience with the process of incident review will influence her view of Safety Management in the organization and maybe other colleagues' views. In case of positive influence, this would turn the adversity of the incident into a learning opportunity and trust building opportunity between the staff and Safety Management in the organization. Rollenhagen et al. (2010) found that out of 108 investigators they interviewed 98 stressed the positive effect of the incident review process on Safety providing both the reviewer with insights on the reality of the context, interdependencies, etc. and the interviewees with insights about Safety and Safety Management in their organization.

[5] Orientation provides the new employee with information around the organization mission, vision, strategy, structure, policies, etc. The orientation day was not consistently scheduled in the first week and some nurse would work for three month before they receive an invitation. When highlighted as a gap in the incident review, the scheduling became mandatory during the first week of employment

Policymakers have emphasized the value of having the extent of the problem reflected in the reports whether by referring to the precedent of near misses or by reviewing multiple similar incidents. This kind of information drive their actions in the recommendations. Roed-Larsen & Stoop (2012) has raised the concern of single-cases approaches to accident investigation as one of the challenges facing incident investigations in most high-risk industries.

On the recommendations resulting from the incident reviews, it was noted that the stakeholders who need to address the recommendation appreciated high level or flexible recommendations that are outcome oriented rather than telling them how to make that outcome happen. They highlighted that this allows for testing different options, which is plausible since the recommendation should remain as "hypothesis" until proven otherwise (Trbovich & Shojania, 2017). In contrast, the recommendations were criticized to focus on what could be fixed leaving important elements such as teamwork and relationships as expressed by one of policymakers: "*emphasizing on radiologists-physicians communication is as important and this is not in the incident review report*". This statement is quite similar to one referenced as a critic to RCA in the first chapter: "*RCAs do not solve all problems, particularly complex interpersonal interactions which is the main source of errors in my area of medicine*" (Braithwaite et al., 2006, p. 397). This indicates it is not intrinsic problem to RCA but might be one inherent to incident reviews in general. This might be due to the conscious efforts made by incident reviewers to move away from individuals' behavior to system failures and vulnerabilities. Rollenhagen et al. (2010) found that among the investigators they surveyed, the Patient Safety group was the group who focused less on individual behavior. This could be also explained by the fact those aspects are hard to act on as evidenced by Lundberg et al. (2010) who found that in the incident investigations, "Pointless fixes are not suggested such as demanding that people change their attitude" (p 2136). The Incident reviewer might avoid addressing Communication and Teamwork because it could be an outcome of all incident reviews; "Communication is the most consistent pre-condition and consequence in any incident" (Fryer, 2012). Having said that, teamwork and communication are indeed critical to improve. On the other hand, system thinking approaches don't necessarily support with

tools and techniques for translating all the incident data into prevention strategies (Goode, Read, van Mulken, Clacy, & Salmon, 2016). In addition, what is defined as a system and what is looked at as interdependencies relevant to HF/E analysis could be debatable, often, "we analyse a "person-device-person" interactions or even a "person-device-device-person" interactive network rather than interface or a device alone" (Wilson, 2012, p. 3864). This does not cover the bulk of interactions in Healthcare that are "person-person". The social part of the socio-technical system in healthcare is significant considering both the workforce and the clients (patients and their families) with all sort of diversities (age, gender, discipline, literacy, culture, beliefs and needs) that contribute to the complexity of dynamic.

This raised further questions that could be subject for another study: Would it be judgmental to address team communications, relationships, compassion in incident reviews? Would it be more accepted when compassion and good team work is there rather than when it is not there? How about when the patient raises it as lacking? Would a system-focused incident review be considered judgmental if it voices patients on lack of compassion?

The complexity of the system and its dynamic interactions continue to challenge the regulations (policies, guidelines, etc.), designs and plans. So, it does for incident reviews. While the system-focused incident reviews are appreciated to have helped shed light on many vulnerabilities and gaps between work-as-imagined and work-as-done, the discussion revealed that the gap itself is quite dynamic. Vincent & Amalberti (2015) argue that this is quite unique to Healthcare as improvements are made at what is perceived as a gap or Patient Safety concern and this changes as well. By the same token, since incident reviews would not capture all issues, some of the staff emphasized the need for local learning processes where they feel safe from potential blame at the same time they can timely learn. While the local or unit-based learning are important and has to be enabled, the two different reasons evoked are worth discussing:

1. Avoiding blame: it is an unfortunate reality that despite the structural efforts for a just culture reflected in policies, system-focused incident reviews and success

stories of self-reported incidents that led to system improvements, the blame and fear of the blame remain a persistent reality. The blame takes different forms; as seen from one of the informants that suffered from subtly be assigned to every other duty except administering vaccines for a year after the incident of wrong vaccine administration or the dental assistant who would avoid reporting sterilization issues to not get blamed by other colleagues in the Sterilization room. "Attributing blame to people is a fundamental psychological tendency" (Holden & Holden, 2009, p. 34) that might need massive education effort for all healthcare workers since anyone can affect the learning environment with its "natural human tendency to blame".

2. Timely local learning: local learning from incident underpins resilience as the reflexive approach there and then is part of recovery and the learning generated would enable further foresight or anticipation capabilities (Hollnagel, 2011). A similar study by Sujan (2015) pointed to similar need for learning with peers: "such discussions represent opportunities for building awareness, for sharing lessons, for alerting colleagues to mistakes and discussing these without fear of repercussions." (Sujan, 2015, p. 50).

On exploring the staff perception of policies which is the second objective of this study, they commonly stressed the importance of having organizational regulations that they can utilize as reference and also as "protection". On the other hand, when the policies focused on efficiencies, staff acted collectively to add their own rules for the benefit of Patient Safety trading off compliance. This effort remains local and does not climb the hierarchical ladder to become an organizational learning or inform improvement of the policy. This shows that different types of trade-offs happen at the sharp-end that wouldn't be captured and learned from unless learning from everyday work becomes as important as learning from incidents in Healthcare organizations.

While exploring the gap between the work-as-done and work-as-imagined from Policy perspective, the discussion with frontline staff revealed that the information on the gap is at the sharp end and those practicing at this level have to be involved in developing policies to ensure context-sensitive regulations. Interestingly, policymakers who were also

practitioners endorsed frontline staff involvement in policymaking because one-day practice shows them "how much situations are different every day and with every patients". The idea was explored in the process of policymaking but the arguments make sense for design and planning as well. The other important player, often absent in management process whether design and planning or policymaking is the patient who holds a unique perspective to healthcare processes that are meant to serve him (Accreditation Canada, 2015). Staff, patients and families are the agents that could help reconcile the work-as-imagined and the work-as-done. Some studies have shown tangible healthcare service improvements when frontline staff, patient and families are contributing to service planning and improvements (Baker, Fancott, Judd, & O'Connor, 2016; Straus et al., 2018). Same could be explored for policy making and incident reviews.

# 6. Conclusion

This study aimed at exploring how learning from incidents can uncover and bridge the gap between work-as-done and work-as-imagined from a policy perspective. Initially, a literature review was conducted on the process of learning from incidents in Healthcare, its limitations and promising concepts in Safety science as a background to a qualitative study that explored the perspective of frontline staff and policy makers on the process of incident reviews and policies in a primary care organization.

The results show that system-focused incident reviews shed light on context variety and dynamic in contrast with available regulations that are not context-sensitive. This prove to uncover some gaps between the context lived in work-as-done and the one assumed in the work-as-imagined. The interviews included discussions on policies and showed that regulations are perceived as important but sometimes questionable in their fitness to the context. The common resolution suggested is to include frontline staff in policymaking so, they can impart the knowledge of the sharp-end reality for more resourceful regulations. Once policies revised with frontline staff input, the approval process prior releasing the policy is found to be lengthy and challenging. In an evolving context, this hinders the policymaking process from keeping up the pace with the context dynamic.

The frontline staff find the process of incident reviews meaningful when it reflects their reality and values their contribution while policy owner find the process of learning from incident meaningful when it studies more than one incident giving them extent of the problem. Policy owners appreciated high-level recommendations that gives some degree of freedom in addressing the gap.

The learning generated from system-focused incident reviews were unanimously found valuable but not reflective of all the problems and challenges faced at the sharp-end. The main limitations discussed was the absence of aspects like compassion, communication and teamwork in incident reviews. Those aspects that are more person-oriented are not surfaced in system-focused reviews whether the one under study or RCA as mentioned in literature review in chapter 2. This raises the question how this social aspect (important to the work-as-imagined) is considered in the policymaking, planning and design (work-as-imagined). There is a need of more studies on systems thinking that would consider the unique context of healthcare as sociotechnical system where the social part is significant and diverse; includes the client (patient and families) as important and influencer part of the care team and hence the system.

Corporate level efforts to embed system thinking to incident reviews and to consider learning as the ultimate objective are not always translated or embraced at unit level where staff could suffer subtle forms of blame when an incident happen whether from the head of the unit or from peers. Local unit-based reviews were suggested as timely safe learning opportunities. This could be considered jointly with the corporate level reviews. Frontline teams could seek support for areas that are out their remit and seem affecting their work, which would open up opportunities for engaging collaborative work between the micro and macro level of safety management in the organization.

*Strengths and limitations of this study*

By reviewing published articles that evaluated Learning from incidents, this research identified what is known about current methods and what concepts from safety science could be beneficial to be embedded in learning from incidents. This study exposed the dilemma resulting from shifting the focus from human to system in incident reviews

leaving critical patient safety aspect related to human-human interactions such as compassion, teamwork and communication.

Only few studies were discussed in the light of the results of the analysis providing little knowledge about “how” to optimize system-focused incident review to include human-human interaction as part of the system without reverting to human-focused incident review.

The study being conducted by an insider have both strengths and limitations; the main strength lay on benefiting from organizational context knowledge allowing for more focused discussion with informants to dig deeper into the how the policy are lived by and how incident reviews are perceived. The main limitation lay in bias of the researcher being responsible of the incidents reviewers’ team and having developed the approach utilized.

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Appendix

# System-focused Incident Review (SFIR)

The SFIR focuses on looking for learning opportunities whether they contributed to the incident or not. The SFIR translates the contemporary concepts in Human Factor science (mainly New View to HE, Prospective Analysis, Safety II, Resilience Engineering) in every single step of the review process, not just in the steps taken to improve the system, but even more critically in the phase of data gathering.

The SFIR method should be carried out by an identified and trained team that engages different stakeholders and members of the staff to ensure that all necessary knowledge and expertise is made available for this process. The method comprises a set of simple, yet thorough, interrelated and dynamic steps:

## 1. Data Gathering (considering the local rationality and the context historical data)

In this critical first step, the SFIR explores the event or incident as it happened from the perspective of all those involved through interviews that engage them in discussing the event. The event is then examined within an organizational context that assesses the current processes in their daily usual performance, where there were no system failures as well as when system failures were imminent but were successfully avoided (near miss). This step aims to gather the facts about the event and the organizational context within which it happened.

### *1.1. Interviews (shifting from interrogations to engaging discussions)*

One of the major assets of any organization is its manpower, and in healthcare this asset is comprised of highly educated and trained professionals who can be instrumental to the process of learning from incident by engaging them in meaningful discussions. Interviews should be conversations that seek to understand and learn rather than question and judge. It is important to remember at this stage of data gathering that the depth will be enabled if interviewees are feeling safe and free from any liability and that they are trusted in their intentions to provide safe quality care. The interviewers have to be well trained and periodically assessed for their communication and facilitation skills.

### *1.2. Background Examination (shifting from the incident as the analysis target to the incident as a trigger for system analysis)*

Background Examination (BE) includes three main areas: 1) scrutiny of all regulating documents whether policies, guidelines, accreditation standards, national laws and regulations, etc; 2) similar incidents/near misses and previous reports that looked at the same processes involved in that event.

*The value of reviewing the regulating documents.*

The documents that regulate specific activity or care processes are traditionally used in incident investigations as leverage for blaming individual of non-compliance with rules. The examination of the regulating documents in the SFIR assesses the extent to which those documents are valid in practice and how much guidance they provide to the ECW. Most of such documents are written by people distant in time and space from the actual work the documents purport to regulate. Also, it is not uncommon to find multiple policy documents authored by different groups to regulate different aspects of work processes, in which case contradictions and confusion can occur. A pattern found from examination

of over 100 of policies and procedures regulating clinical and non-clinical work in past two years of applying this method is the use of ambiguous language and framing procedures using statements that are significantly different from those used by the practitioners in the organization. BE in SFIR looks at the ambiguities, the contradictions, and more critically at the fitness of the regulatory documents to the organization's context.

*The value of near misses and similar incidents in the review.*

Many adverse events are preceded by multiple near misses. Looking at all similar incidents and near misses provides reviewers with understanding of the extent of the problem. This exercise supports the approach of getting away from the human error to getting more information on system resilience capabilities at the micro level that enabled those similar events to be averted as near misses or mitigated to incidents of lower severity. The framework used to examine the resilience capabilities: foresight, coping and recovery. In addition, this step has shown instrumental in getting leadership buy-in for system improvement initiatives as it gives the findings robust grounds compared to single incident review.

### *1.3. Observations: looking at everyday work with similar conditions*

Meetings and interviews are useful strategies for data gathering in incident reviews and are the sole method used in traditional approaches (eg, RCA). They are, however, not sufficient to get in-depth analysis of the system failures and vulnerabilities. The SFIR promotes the engaging discussions as described above which are more likely to allow the reviewer to gain insights into the complexity of interactions in a specific intervention or a problematic flow that becomes a candidate for observations in everyday work. During the

observations, the reviewer is mapping the flow and documenting the interactions. Walking the processes involved in the incident in the daily operations provides further information on the system resilience capabilities in addition to providing truthful information about the context-sensitivity of the policies & procedures and how those regulating documents are lived by at the sharp end instead of the snapshot that the incident provides.

## 2. Hybrid Analysis (retrospective and prospective)

Healthcare is a complex adaptive system where accidents emerge due to the numerous highly dynamic interactions and the need for instantaneous decision making, which renders the linear thinking of " cause and effect" inappropriate for such a system. The hybrid analysis in SFIR is both retrospective (looking backward from the incident) and prospective (looking forward from the incident). The retrospective analysis, instead of looking at root causes, is focused on studying the gaps between the work-as-done and the work-as-imagined and the prospective analysis is looking at risk identification.

### *2.1. Retrospective Analysis focused on gaps between the work-as-done (WAD) and the work-as-imagined (WAI)*

In this part of the analysis, the information collected in Background Examination is utilized in further assessing structure and process elements around the event being reviewed, the following are examples that can be expanded or modified as necessary:

- Structure aspects including:
    - Physical layout: Is the design fit for purpose? How does the physical space affect the process of care? Is it used as per the intended design? Have potential

changes to the scope of service been considered in the physical space planning? Etc.

- Electronic systems design: are configurations and business processes context-sensitive? Are the interfaces user friendly? Are all potential system integrations explored? Etc.
- Medical technology use (whether medical equipment or instruments): are those resources used optimally? Are they maintained in a timely and proper manner? Are they properly stored and are within easy access to the user? Etc.

- Process aspects including:
  - Process flow from patient/staff/document perspectives: this requires walking the process with different patients, staff, or documents and drawing the spaghetti diagrams to visually record how patients, staff, or documents move through the process. This kind of representation of the flow enables reviewers to identify different constraints faced by system agents and sometimes make the process error-prone and what improvement opportunities could reduce the error-proneness.
  - Process maps: mapping the steps from the policies and procedures and mapping the process as observed might offer insights that in combination with agents motions and interactions mapped in spaghetti diagrams allow for better understanding of the gaps between the work-as- imagine and the work-as-done.

By contrasting the information collected in Background Examination phase from the observations of the everyday work and from similar incidents with the regulating and planning documents, the gaps between the WAI and WAD are surfacing.

| | The work-as-done | | | The work-as-imagined | | |
|---|---|---|---|---|---|---|
| | The event | Similar incidents | ECW (same processes involved) | Planning and design documents | Regulating documents (SOPs, P&P, guidelines,…) | Accreditation criteria/standard |
| Physical layout and design | | | | | | |
| Electronic systems design | | | | | | |
| Technology use | | | | | | |
| Process steps | | | | | | |
| Process flow | | | | | | |
| Internal & external interactions observed from mapping agents flow | | | | | | |

**Table 1: The SFIR matrix**

The subsequent step of the analysis examines how the alignment can best be achieved; modifying WAI or WAD, or both. This is a critical to framing meaningful actionable recommendations that aim not only at avoiding similar failures but also at building on the resilient capabilities that emerged from the same context.

### *2.2. Prospective analysis - Risk identification (how might the next event happen?)*

Incidents in high risk complex system are considered in the contemporary Safety science as risk management failures. Addressing the factors that have contributed to the incident is not sufficient and is unlikely to avoid reoccurrence of similar incidents in highly dynamic system. It is critical for incident reviews to assess how the system could fail next.

In SFIR, the reviewer is engaged in risk identification as a facilitated process with subject matter experts and the risk owners, prompting their thinking of the ways that the process and needed interactions could fail. This continues throughout the analysis steps as well as in planning for implementing the recommendations of the review.

In our experience, this part of the analysis has shown to be instrumental in helping teams and different actors from both management and frontline strengthen the system resilience at both foresight and recovery instead of overconsuming the resource in coping. An additional benefit for prospective analysis that was observed is that it supports an interactive approach to safety efforts instead of a top-down one. It brings administrators, practitioners, and risk managers in a safe context (there is no one to blame) with the focus being the future event.

## 3. Actionable Recommendation

This part is the output of all other parts of the review that are necessarily iterative. The recommendations should enable system improvements, translating an event into organizational learning. It is critical to articulate the recommendations in a language that shifts the focus from the individual performance to system improvement, and from safety I, which focuses only on what went wrong, to safety II, which learns from what went wrong as well as what went well. The SFIR team continues to work with process owners

and stakeholders at all levels to facilitate the translation of these recommendations into improvements that are implemented and to measure the impact on improving safety.

### *3.1. Improvement recommendations*

Table 1 informs reviewers on most of the gaps which guides prioritizing the improvement projects that the organization will need to put in place as well as the areas that require further assessment or monitoring. Those identified gaps need to be understood in the context of a complex system, so that the recommendations consider and address potential interdependencies with the areas that are not included in the review.

### *3.2. Risks to prevent and/or to mitigate*

The step 2.2 results in a number of risks that need to be addressed which should be reflected in the actionable recommendations. Additionally, prospective consideration of risks related to the changes that need to be implemented to ensure that these changes have proper controls that allow for smooth and sustainable implementation.

### *3.3. Successes to strengthen and learn from*

A SFIR reviewers who are looking for understanding and are genuine in their inquiry, should be able to identify different perspective on how the process perform in different conditions, will get the insights on the complexity of the system and its resilience capabilities. At this point, some successes might have already informed the recommendations related to the system improvements, but there will be other aspects that are not necessarily linked to an improvement project but are worth highlighting. For instance, the extraordinary coping mechanisms that make agents come together orderly to avoid escalation of the incident or harm to the patients. Those resilience capabilities are often overlooked in traditional incidents reviews. In our experience applying SFIR, the positive findings from incident reviews have the benefit to serve as organization success stories that are included in training programs. Another experienced benefit is increased trust of frontline staff in safety reviews which encouraged incident reporting.

## 4. Report dissemination

Literature has shown the importance of sharing the findings of incident review reports. SFIR reports are disseminated with a thank you message to all stakeholders who participated in the analysis. These include:

- The reporter who should be able to see the results of his initiative. If unknown, the managers of the area when the event occurred thanking them for enabling a culture of safety and encouraging the staff to offer the organization with learning opportunities such as reporting that event.
- Those who collaborated in the data gathering through interviews;
- Area leads and managers who facilitated the observations, etc.
- Support department who provided planning and design documents and engaged the sense-making of the event circumstances such Health Information teams, Biomedical Engineering teams, architects, etc
- Those who need to work on the recommendations, process and risk owners;

The positive spirit around the report dissemination and the acknowledgement of the participants creates a sense of community around the analysis and ownership. The same people continue to work together for the actions. Trust and relationships that are known to be instrumental to the effectiveness of learning from incidents are enabled by the multiple learning-focused interactions that take place during the analysis.

As a second stage, SFIR is made accessible to all staff to spread the learning.