

# Systems approach to analysing suicide incidents in community-based mental health care

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## ABSTRACT

Mental health services in the UK are now predominantly community-based, rather than inpatient-based. Managing patients with suicidal risk within the community setting is challenging and suicides from those currently using or having recently used these services do occur. More than half of the people who commit suicide have visited their doctor in the month before their death. In current practice within the UK health service, patient suicides are investigated as serious incidents and analysed using Root Cause Analysis (RCA) but this method has limitations in exploring deep system problems. This study reanalysed 41 of these RCA incident reports using Systems Theoretic Accident Modelling and Processes (STAMP). The analysis revealed the weaknesses within the system safety control structure and the themes around those control flaws. An inherent weakness in the control structure is the need to monitor the patient's risk without constant observation and relying on the patient to report issues and adhere to their treatment plan. Patient engagement issues are a major theme with loss of control and feedback on the patient status due to their lack of willingness to engage with services and treatment options. In some cases, patients have presented at a time of crisis but then declined the crisis support or inpatient treatment offered to them. Patients new to services present a problem where decisions on their care have to be made with limited knowledge of the patient. Certain coordination and communication issues between the multidisciplinary teams and multiple services are also found. In this study, STAMP application enabled effective aggregation of multiple incident analysis and system-wide remedial action prioritisation.

## KEYWORDS

Suicide prevention, systems analysis, patient safety

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## Introduction

Over the past 30 years mental health care has significantly changed with a transition from an institution-based care model to a predominantly community-based care model (Gilburt et al., 2014). Many community-based mental health patients are at risk of suicide with clinical risk assessments used to assess the balance between the benefits of community care and the patient's safety. Suicide rates among patients of community-based crisis resolution home treatment teams are higher (14.6 per 10,000 episodes) than those receiving inpatient care (8.8 per 10,000 hospital admissions) in England between 2003 and 2011 (Hunt et al., 2014). Within UK National Health Service (NHS) community-based mental health care completed patient suicides are treated as serious incidents and investigated accordingly. In current practice, Root Cause Analysis (RCA) is used to analyse these incidents and make recommendations to prevent similar events occurring in the future.

However, RCA tends to conceptualise incidents as a linear causal chain of events and its limitations are well documented within the field of safety science (Hollnagel, 2004; Leveson, 2004; Rasmussen, 1990). An alternative approach to analysing incidents is through understanding them as

emergent properties arising from uncontrolled relationships between a system's constituent parts (Leveson, 2004; Salmon et al, 2011; Underwood, 2012). One of the alternative approaches, Systems Theoretic Accident Modelling and Processes (STAMP) models the hierarchical safety control structure present in the system to enforce safety constraints and looks for weaknesses with inadequate enforcement of safety constraints or issues with feedback on system status (Leveson, 2012). The aim of this study is to analyse suicide incident reports using STAMP to understand suicide incidents and the related safety control structure in place and make recommendations for suicide prevention.

## Method

A total of 41 suicide incident reports from 2015 and 2016 in a large NHS mental health trust in England were reviewed and analysed using STAMP following the approach described by Leveson (2012). Out of a total of 43 suicide incident reports, 41 were selected since the other two did not concern patients that had care provided by community mental health services (community mental health teams, crisis resolution and home treatment teams, and psychological services).

The main services and teams relevant to the analysis are:

- i) community mental health team which is made up of psychiatrists, psychiatric nurses, clinical psychologists, occupational therapists, support workers and psychological services. They provide long-term community care and are split into specialisms for children and adolescents, adults, and older people.
- ii) crisis response team which includes crisis resolution and home treatment teams and mental health professionals working at emergency departments, police stations and in triage vehicles. These teams assess and treat patients during periods of crisis as an alternative to inpatient care.

The suicide incident reports had been conducted by senior mental health professionals with Root Cause Analysis used as the analytical approach. They were on average 26 pages in length.

Prior to the STAMP incident analysis, a 60-minute interview was conducted with a crisis response service manager to gain an overview of operations. The STAMP analysis was then conducted by one ergonomics researcher, the analysis and findings were discussed in two 60-minute sessions with a second researcher until the output was agreed upon. The safety control structure (Figure 1) produced in the STAMP analysis was then validated in a 60-minute group session with the crisis response service manager and two community mental health service managers.

## Results

The processes involved in suicide prevention were modelled as a safety control structure (Figure 1). The model identifies the controllers that influence the system and the control-feedback loops that enable them to change and receive information on the system and patient status. Weak feedback can result in a controller having an incorrect understanding of the system state, which can impact on their ability to make decisions. Controls can be weak and ineffective in changing the system to the desired state. The main weaknesses in the safety control structure were identified as:

- 1) An inherent weakness in the control-feedback loop in the necessity to understand and predict behaviour in patients with dynamic risk when they are not under constant observation.
- 2) Issues with patient engagement resulting in the clinician losing feedback on patient status and reducing effectiveness of controls from issues with patient adherence to treatment plans.
- 3) Treatment controls being medically indicated but not fitting the patient's desires and thus declined.

- 4) Patients new to services (with two or less appointments), so that decisions are made without a substantial body of knowledge on the patient.
- 5) Communication and coordination issues within the care process.

The control structure in Figure 1 contains downwards arrows showing the controls, a reference channel with the information necessary to impose safety constraints on the level below, and upwards arrows that show the feedback, a measuring channel with feedback returned up the hierarchy on how effectively safety constraints are being imposed (Leveson, 2015).

The analysis searched for weaknesses in the feedback channel and considered four main types of hazardous control actions (Leveson, 2012):

- Control actions necessary to enforce safety constraint are not given (control action not given).
- The necessary control actions were provided too early or too late (incorrect timing).
- Unsafe control actions were provided (unsafe control action given).
- Control action stops too soon or is applied too long (incorrect duration).

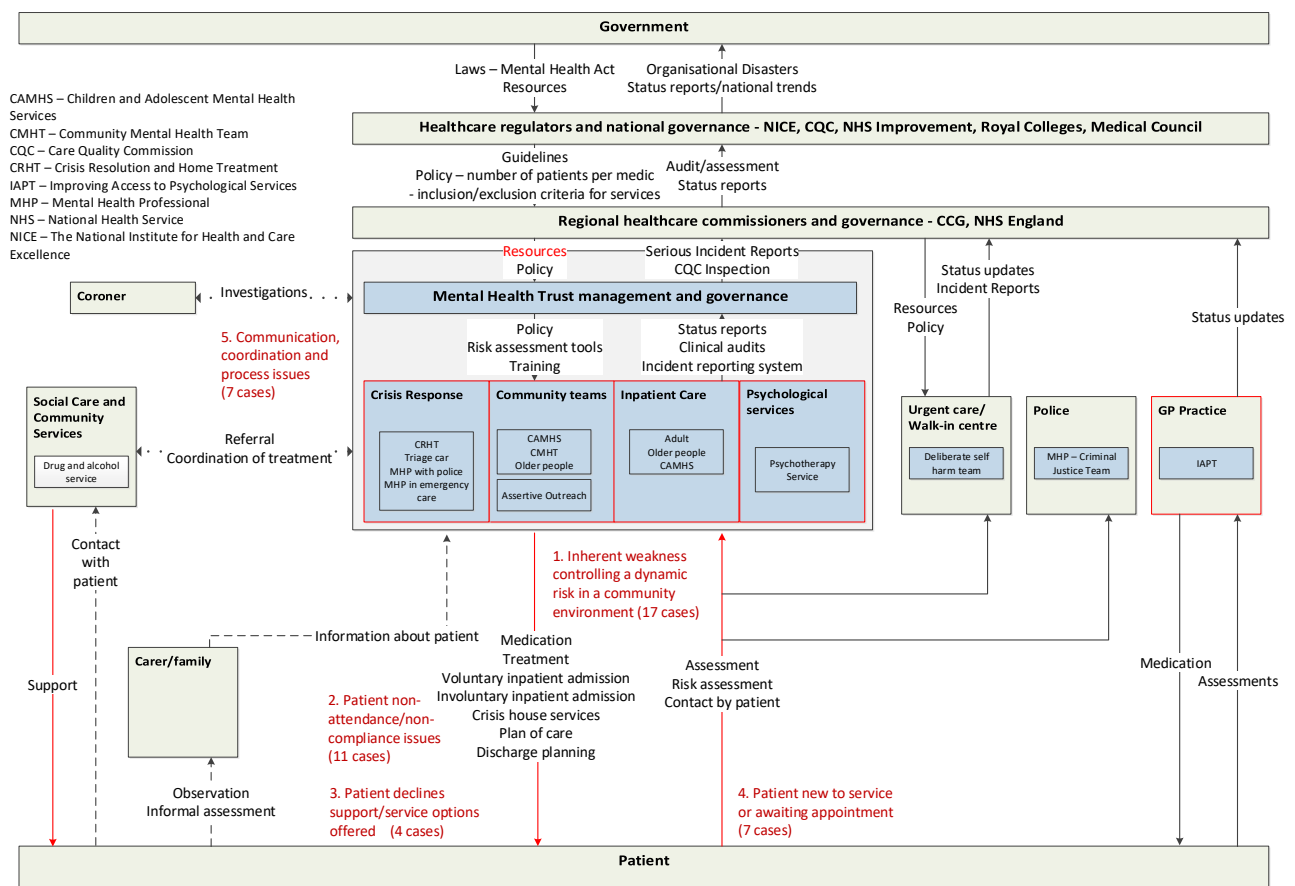


Figure 1: Safety control structure

#### 1) Inherent weakness controlling a dynamic risk in community environment

There is an inherent weakness in the control structure in patients having freedom in the community. This limits feedback with patients not under constant observation and places responsibility on the patient to adhere to treatment plans. Table 1 displays the cases where patients have committed suicide without a change in their status being detected.

Table 1: Difficulties in detecting change in patient status

Feedback	Last contact	Service
No concerns raised during previous visits	1 month	Crisis response and community team
Patient felt mood had improved and no longer in crisis	1 week	Recently discharged from crisis response
Nothing remarkable detected in recent appointments	1 month	Community team: nurse-led clinic
Planned to continue with talking therapy	5 days	Improving Access to Psychological Therapies (IAPT) Last seen by GP
Regular contact with key worker for 11 months	10 days	Children and adolescent services
Had received therapy and was continuing follow-up	5 days	Children and adolescent services
Had settled since initial presentation with 11 subsequent appointments	1 day	Crisis response for home treatment
Reviews every 3 months Presented with a similar pattern	22 days	Community team
Weekly visits	9 days	Assertive outreach team
Patient felt stable	2 days	Community team Discharged from inpatients
Review every 6 months Patient stable	4 months	Community team Residential care home
Daily visits	1 day	Crisis response
Weekly telephone assessments and home visits	6 days	Children and adolescent outpatient services
Carer had raised concerns Assessment by CPN did not identify relapse indicators	2 days	Community team Recently discharged from inpatients
Regular visits	8 days	Community team for older people
Regular reviews and visits	2 days	Community team for older people
No contact after discharge	5 months	Not open to services Discharged from community team

## 2) Patient engagement issues

One major theme in the incident reports that weakens both feedback on patient status to the clinician and the effectiveness of treatment controls is poor patient engagement. Eleven of the

reports noted significant patient engagement issues, as shown in Table 2. This includes non-attendance at appointments, declined medical advice and non-adherence to treatment.

Table 2: Patient engagement issues

Patient engagement issues	Last contact	Service
Non-attendance	6 months	Community team
Non-attendance and requested discharge	6 months	Not open to services Last seen by crisis response at Emergency Department (ED)
Non-attendance	1 day	Community team Last seen by crisis response triage vehicle
Poor engagement Discontinuation of medication Declined support from alcohol services	1 week	Community team
Non-attendance	3 weeks	Community team Last seen by police station Mental Health Professional
Non-attendance	1 week	Community team Patient declined crisis support
Only consistently engaged during times of crisis	6 days	Community team Only engaged during periods of crisis
History of poor engagement with services	1 day	Not open to services Last seen by crisis response
Did not engage with personality disorder service after referral	11 days	Community team Last seen by crisis response at police station
Continued substance abuse	12 days	Community team
Continued substance abuse Non-attendance	2 days	Forensic community team

### 3) Patient declines crisis and inpatient support

Four of the reports note that the patient recently presented in a period of crisis but did not receive crisis support or inpatient treatment. In these cases (Table 3), the patients are not admissible under the Mental Health Act and have declined crisis and inpatient treatment or agreed to continued home support from the community team.

Table 3: Crisis and inpatient support not utilised

Circumstance	Last contact	Service
Patient declines crisis and inpatient support Family insist can provide home care	1 day	Community team Last assessed by crisis response triage car after being spotted by police at railway
MHA assessment conducted, not admissible Patient declines admission	7 days	Community team Last assessed at emergency department
Patient declines out of area inpatient service	1 day	Last seen by crisis response at ED Not open to services
Presented to urgent care after an overdose but denied having suicidal plans or intent	8 days 1 day GP appointment	Assessed by crisis response at urgent care Not open to services, previously discharged from community team

## 4) Patient new to service, recent handover or awaiting appointment

There were cases of patients not yet assessed by the service they were to enter before the suicide incident or having had few appointments - in seven cases the service had two or less appointments with the patient prior to the incident, as displayed in Table 4.

Table 4: Patient new to service

Number of contacts	Last contact	Service
Awaiting first appointment	10 days	First assessment by crisis response Referred to community team
1 assessment	3 months	Community team First appointment
1 telephone assessment	6 weeks	IAPT following discharge from crisis response
1 assessment	10 days	Community team for older people
Presented to GP and urgent care while on waiting list	2 days	Awaiting start with community team Last assessed by crisis response
2 appointments with community team	1 day GP 1 month community team	Community team
2 appointments with community team MHA assessment on second appointment	3 days	Community team

### 5) Communication, coordination and process issues

Coordination between controllers is critical where care is provided by multidisciplinary teams and changes in patient status result in changes to service provision. Examples of coordination and communication issues include: staff sick leave, differences in electronic record keeping between services, administration issues in referrals and lack of required service expertise resulting in disrupted care. These cases are presented in Table 5.

Table 5: Communication and coordination issues

Control structure weakness	Last contact	Service
Disruption to care from staff sick leave	2 months	Community team and crisis response early discharge planning
Potential gaps in care with record keeping issue	2 months	Community team
Disruption to care from staff sick leave Change in patient status did not trigger change in service provision	6 months	IAPT service
No consistent support for personality disorders at inpatient care Gaps in communication between services and patient family	6 days	Community team and crisis response early discharge planning
No access to electronic patient records	6 weeks	IAPT and GP
Electronic system did not contain comprehensive risk assessment template	10 days	Community mental health services for older people and GP
Referral to psychotherapy services not sent	8 days	Community team but not open to services at time of incident

### Discussion

STAMP facilitated a systematic analysis of aggregated RCA suicide reports and revealed community mental healthcare to be a challenging environment to monitor and control suicidal risk. STAMP was effective at gaining an understanding of system weaknesses and the difficulties clinicians face in identifying and acting upon suicidal risk, by modelling the wider system and considering human decision-making within system constraints,

With finite resources and patient freedom, clinicians often make decisions based on irregular assessments with limited and ambiguous information. These inherent difficulties in observing, predicting and controlling human behaviour fit with the ultra-adaptive safety model described by Vincent and Amalberti (2016). This approach to safety is associated with work systems where seeking exposure to risk is inherent in the activity (Vincent and Amalberti, 2016). This is seen in community mental health care, where a patient's risk of suicide is potentially increased by not having them institutionalised, for the benefit of their quality of life and wellbeing in living less disrupted lives in the community. Within the ultra-adaptive approach to healthcare safety, risk management is achieved through giving power to experts. This involves peer-to-peer learning, acquiring experience, understanding individuals' limitations and increasing individual capacity to respond to demanding situations (Vincent and Amalberti, 2016).

Adaptation is a consideration in general system safety, beyond healthcare. An organisation's resilience can be considered in terms of 'the ability of systems to prevent or adapt to changing conditions in order to maintain control over a system property' (Leveson et al., 2016). The systems analysis has identified weaknesses in the community mental healthcare system's ability to adapt to patient engagement issues and patients presenting in crisis but declining the support offered. The issues with patient engagement suggest the services: struggle to adapt to patient behaviour and need; and may not have the capacity to do so. Community teams have a strict Did Not Attend policy which can result in patient discharge and may not suit those patients with severe engagement issues.

To have adaptive capacity in a system such as community mental health, buffers would need to be built into the system, with extra capacity available when needed. This capacity may not be utilised consistently but would be kept for demanding situations such as patients turning up in crisis at emergency departments. A bed, observation and psychological help could then be provided at the point of contact, rather than assessment and referral to another team and location. The same can be said for long-term care in community teams, where a change in patient status can result in offers of referral to crisis support or inpatient services. This is sometimes declined and there is a question as to whether continuing support in a bed space within the same team and environment the patient is used to is more appealing to the patient. Along with political pressures and austerity measures, there is a current uptake of lean philosophy in UK healthcare but it is not clear if lean thinking can include the concept of adaptive capacity.

Certainly, patient engagement and service design is a huge area deserving of further research. Within community mental health services engagement is a known issue and efforts are made to deal with these problems. But there are conflicting trade-offs in being patient-centred and using resources most effectively. Designing services to fit with the needs of patients with a range of diagnoses including personality disorders, psychosis and mood disorders is challenging. And there is variation in need beyond medical diagnosis, with differences in home, family, employment and social behaviour.

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