The Psychology of Accidents

AIMS
This session examines the psychological causes of accidents, and particularly traffic and medical accidents. It also looks at how this understanding can be used to reduce accident rates.

DEFINITIONS
Accidents are events involving unintended harm. More than 80% involve ‘human error’ rather than purely mechanical or system failure. However, the error often occurs in a context where risk is inherent and reasonable precautions to avoid it are not taken. Features of a system which promote or fail reasonably to manage risk of accident are known as ‘latent failures’ while the immediate causes of the accident are called ‘active failures’. A classic example of a latent failure is a workplace culture in which safety violations are tolerated (e.g. not wearing hard hats on a building site, not washing hands between examining patients on a ward). Another example is a failure to have in place backup systems for error-prone activities or activities where the consequences of error are catastrophic.

Accidents in principle can occur through 1) lack of skill or knowledge, 2) carelessness, 3) recklessness or 4) bad luck. Where knowledge or skill falls below what can reasonably be expected we generally regard it as ‘incompetence’. Carelessness can be defined as an unintentional failure to take reasonable precautions but not actual risk-seeking; recklessness can be defined as wilfully ignoring risk or even actively seeking it. Negligence encompasses carelessness and recklessness together with incompetence.

WHY ACCIDENTS HAPPEN: THE BASICS
Accidents occur when the latent risks in a system combine with circumstances to produce unintended events and harm ensues. There are many ways in which psychological factors can be involved in this process. They can be involved in:

- the design of inherently unsafe systems or practices
- a failure to detect and correct unsafe systems or practices
- the commission of errors through lack of knowledge or skill
- the commission of errors through carelessness or recklessness

TRAFFIC ACCIDENTS
- Traffic accidents are rare on a day to day basis but the risk accumulates over time. The average car driver will be involved in about 5 accidents in his or her lifetime.
- Traffic accident rates (controlling for miles driven) are positively linked to: being male, young and inexperienced. They are not linked to social class.
- Drivers are quite consistent over time in their accident risk. Having been involved in an accident in a given year doubles the driver’s risk of another accident in the following three years, controlling for demographic factors.
- This means that ‘accident liability’ (enduring traits of drivers that make them more or less risky) is a genuine phenomenon.
- Accident liability has been found to relate to the broad behavioural traits of: social deviance and lack of thoroughness in decision making. For example, drivers with a criminal conviction for non-traffic offences
have three times the risk of being involved in a road accident.

- Accident liability does not appear to be linked to the personality traits of extraversion or neuroticism (trait anxiety).
- Accident liability has been found to relate to just one aspect of driving skill: ability to detect and respond quickly to potential hazards. It does not relate to general speed of reactions or psychomotor skill. Neither does it relate to general intelligence.
- Accident liability is linked to permissive attitudes to unsafe driving practices.
- Accident liability has been found to relate strongly to a tendency to drive faster and to violate the highway code.
- There is a strong positive association between blood alcohol concentration and risk of traffic accident. This risk function is detectable at BAC of 0.05%. The current UK legal limit is 0.08%.
- The link between drink driving and accidents is strongest among young, novice drivers even though it is older drivers who tend to drink and drive more. This may be because novice drivers are less able to cope with the impairment caused by alcohol or because young drivers drive more recklessly when intoxicated.
- Improvements in car design and the addition of safety features such as air bags have reduced the death and serious injury rate but probably not affected the accident rate.
- Accident rates can be reduced by measures aimed at reducing speed, and tougher drink driving restrictions on younger drivers. Educational campaigns do not appear to be effective. It remains to be seen whether introduction of a theory test or ‘hazard perception’ test as part of the driving test will make any difference.

MEDICAL ACCIDENTS

- Medical accidents are quite common, and the numbers killed or injured are far greater than for traffic accidents.
- In an analysis of the case notes from 30,121 hospitalised patients in the US it was found that errors occurred with about 1 in 50 hospital admissions leading to prolongation of stay, disability or death. The chances of a hospital admission resulting in death from error in management was found to be 1 in 300.
- Less is known about the UK situation but one study involving 1014 patient records found that errors occurred in 1 in 40 admissions leading to at least moderate disability; avoidable deaths occurred in about 1 in 200 admissions.
- Thus in the US it is estimated that up to 100,000 deaths may be caused by medical accidents in hospital while in the UK the figure is put at around 13,500.
- There have been numerous analyses of errors in more specific medical situations. For example, an analysis of quality of care prior to admission into intensive care in 100 consecutive cases revealed that 54 cases received sub-optimal care.
- Another study examined causes of death in 149 patients who died in intensive care and found that in 42% of cases there had been errors in diagnosis, most commonly involving undiagnosed infection.
- A study in Europe found that approximately 1 in 100 of all hospital admissions were caused by avoidable adverse drug reactions.
- Almost no research has been conducted in general practice but an Australian study recruited 324 GPs to report ‘critical incidents’ over periods of up to 18 months. During that time 805 incidents were reported of which 79% were judged to be preventable and 27% were judged to have the potential for long-term or permanent harm.
- Errors in screening are well documented in the press although systematic study of the rates of these is absent.
- In one hospital in Switzerland it was found that errors of one kind or another occurred in 27% of drug administration cases. These were mostly errors in timing of doses, administration technique and preparation.
- A study of pharmacists found that 72% reported knowing of an undetected dispensing error in the past 6 months.
- The behavioural causes of medical accidents have been subject to considerable analysis but relatively little systematic research. Examination of individual accident scenarios has tended to dominate and these tend to be descriptive rather than analytical.
- Prescription errors are more likely in inexperienced doctors and in obstetrics and gynaecology and surgery and anaesthesia services.
- A study followed up 314 medical students and explored links between problems they experienced and their standard of care. It was found that newly qualified doctors who reported higher stress levels also reported...
making more mistakes. There may be some confounding because the doctors were also more self-critical and so there may be a reporting bias involved.

- Another study found that a stress reduction programme for clinicians in a hospital reduced malpractice claims compared with a control hospital.
- A study of interpretation of abdominal CT scans found significant differences between the error rates of five radiologists supporting an accident liability concept.
- Much has been written about ‘sick doctors’ (i.e. those with psychiatric problems or alcohol and drug dependence) but there is little research on links between these and error rates or on factors that predict problem behaviour in clinicians.
- One study in the Northern Health Region of England found that, in a five year period, 6% of medical staff had raised concerns among colleagues sufficient to warrant consideration of disciplinary action. The largest single cause was poor attitude or irresponsible behaviour followed by lack of commitment to duties and inadequate knowledge. However, as with sick doctors, we do not know about the extent of associations with patient harm nor has there been systematic study of factors that lead to this behaviour.
- A study of 427 US surgeons found that those whose membership of a physician-owned malpractice trust was terminated because of a high rate of negligence claims against them were less likely to have completed fellowships, belong to clinical faculties or professional societies, have graduated in the US or Canada, have specialty board certification or belong to group practices.
- There is evidence of a relatively stable ‘claim liability’. Thus one study of 8247 US physicians found that having a malpractice claim between 1975 and 1980 increased the odds of a paid claim in the years 1981 to 1983 threefold. However, a study of 3686 Florida physicians found that malpractice claims were related to markers of greater rather than less medical knowledge.
- The problem with using litigation as a marker of error is that the correspondence between the two very low. For example, examination of case notes suggests nine cases of negligence for every successful claim and many claims are unfounded. Moreover, claims appear to have more to do with a poor doctor-patient relationship than error. Also, claim rates appear to be affected by the area in which doctors practice.
- Medical accidents can be reduced by more rigorous monitoring of error rates, undertaking more analysis of predictors of accident rates (as per traffic accidents), reducing major sources of latent failure, recognising the potential importance of personality and attitudinal factors and addressing these in undergraduate and postgraduate training and assessment.

CONCLUSIONS
General themes to emerge are:
- Accidents occur when risks inherent in a system combine with circumstances to cause an unexpected set of events from which harm ensues.
- Latent failures in systems are important contributors to accidents.
- Active failures most involve human error rather than purely mechanical breakdown.
- There is evidence that some individuals have a consistently higher accident liability than others.
- While accidents are rare on a day to day basis, the accumulated risk over a lifetime or in large populations is very high.
- In traffic accidents, this appears to relate more to personality and attitudinal variables than knowledge and skill. Social deviance features particularly strongly.
- In medical accidents the same may be true but this has not been researched as thoroughly.

BIBLIOGRAPHY


