

Making knowledge exchange between theory and practice a reality: A practical model to enhance road casualty reduction on a decreasing budget

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ABSTRACT

In the UK there is a statutory requirement on local government to aid road casualty reduction. While Cornwall Council was successful in reaching their 2010 casualty reduction targets, it had no evidence to suggest which initiatives contributed to this achievement and which did not. Much of the research in traffic psychology is unused in Road Safety, and much 'best practice' in road safety is based on intuition rather than evidence. Cornwall Council recognised an evidence-based approach was required to meet future targets and ensure interventions were gaining the best possible return on investment. There is a framework within the UK, for partnership between business and academia known as 'Knowledge Transfer Partnership' (KTP). The KTP is a government funded project that puts a recent graduate in the workplace with supervision from their employer and a University. Cornwall Council has used this mechanism to embed an evidence-based practice into road casualty reduction. The approach begins with case studies of priority risk groups. The research and collision data is critically appraised and an understanding of the implications for road safety interventions, in terms of relative need and effectiveness, is developed. Change management groups are formed with road safety practitioners, engineers, and police, where recommendations from the research can be embedded in practice. The groups allow evidence to be communicated effectively from researcher to practitioner, allowing a sustainable, affordable mechanism for bridging the gap between theory and practice.

1. INTRODUCTION

Much of the research in traffic psychology is unused by Road Safety practitioners, and much 'best practice' in road safety is based on intuition rather than evidence. Evidence on cost vs. benefit and the relative worth of different interventions is difficult to come by in the road safety field and evaluations are quite often unsystematic. While Cornwall Council was successful in reaching their 2010 casualty reduction targets, it had no evidence to suggest which initiatives contributed to this achievement and which did not. Practitioners in these areas work with considerable autonomy yet do not make systematic use of research evidence in the way that would be expected for example in the health care sector, for example; interventions are often developed based on what feels right, rather than what evidence points to as successful. Consequently determining the appropriateness and effectiveness of interventions for road safety practice without an evidence based approach creates tensions in a culture where everyone is an 'expert' in road safety and 'knows it all'. Particularly, any challenge to accepted practice and ideas are difficult to argue without sound evidence. Cornwall Council's Road Safety team realised they lacked the knowledge and skills to transform itself into an evidence based organisation which they recognised would be required in order to meet the further challenges of casualty reduction. With an ever decreasing budget, Evidence Based Practice is now even more important to ensure maximum value for money.

EBP is the integration of professional expertise, patient values, and the best research evidence into the decision making process. Professional expertise refers to the clinician's cumulated experience, education and clinical skills. The patient brings to the encounter his or her own personal preferences and unique concerns, expectations, and values. The best research evidence is usually found in clinically relevant research that has been conducted using sound methodology. (Sackett, 2002)

There is a convenient framework within the UK for partnership between business and academia known as 'Knowledge Transfer Partnership' (KTP). The KTP is a government funded project that puts a recent graduate in the workplace with supervision from their employer and a University to work towards strategic objectives of the employer with backing from a University. Cornwall has used this mechanism as a means to enhancing its road casualty reduction performance and adopting an evidence based practice approach. KTPs aim to improve productivity, performance and better use of knowledge within the UK knowledge base. It allows the Council to gain support from academics at the University with experience and expertise in road safety research. The objective was to ensure that interventions are carefully chosen and delivered in ways which evidence suggests will be effective.

2. THE KTP METHOD

2.1 WHAT IS KTP?

A KTP is a relationship formed between a company and an academic institution ('Knowledge Base' partner), which facilitates the transfer of knowledge, technology and skills to which the company partner currently has no access. Each partnership employs one or more recently qualified people (known as an Associate) to work in a company on a project of strategic importance to the business, whilst also being supervised by the Knowledge Base Partner. Projects vary in length between 12 and 36 months. The Associates are postgraduate researchers, university graduates, or individuals qualified to at least NVQ (Level 4) or equivalent.

The aim of Cornwall Council's KTP was to improve Cornwall's road safety programme delivery through evidence and research led practice, specifically focusing on fatalities within the elderly, the young and motorcyclists. The rationale behind this project was to enable Cornwall Council to embed an evidence based approach to inform decision making and particularly to focus on fatalities within the KSI (Killed/Seriously Injured) statistic. Whilst serious injuries were reducing, fatalities remained constant. Strategically Cornwall Council wanted to investigate the reasons for this disparity, particularly across three specific groups whilst determining links to areas of deprivation. This would enable future interventions to be founded on evidence and statistical based research, and designed to reduce fatalities, road casualties and collisions in Cornwall.

2.2 WHAT IS EBP?

EBP is 'practice supported by clear, up-to-date rationale, taking into account clients preferences and using your own judgement' (Aveyard, 2009). It is 'the conscious, explicit and judicious use of current best evidence in making decisions about the care of individual clients' (Sakett, 1996). EBP requires three aspects; professional judgement, client preference and research evidence. Inherent to the concept is that research evidence is a valued part of the decision-making process. The use of evidence does not replace skills, judgement and experience but provides another dimension to decision making along with client preference. EBP therefore, is a structured method to working practice and decision making rather than relying on intuition and unsystematic rationale.

The EBP process is a complex one but can be broadly broken down into 5 areas:

1. Formulating an answerable question – it is important to be clear about what you want to find out and define a suitable question in order to enable identification and understanding of a problem;
2. Finding evidence from research – it is important to do a comprehensive and systematic search of the evidence from databases and other sources using key terms relevant to your question;
3. Appraising evidence for validity and usefulness – the research you find needs to be valid for the client groups you are working with and useful in terms of the organisations practicalities;
4. Implementing change – based on the research findings;
5. Evaluating performance – determine whether the change has increased performance by evaluating outcomes before and after the change.

When referring to best available evidence we mean scientific studies with the highest reliability and internal validity. Reliability has to do with the consistency of measurement: the extent to which the study yields the same results on repeated measures. Internal validity is an indicator of the degree research results may be biased. It refers to the extent alternative explanations for the study's results are possible. However, evidence-based practice is about best "available" evidence. With regard to studies assessing the effect of interventions, the best evidence would be a randomized controlled longitudinal study. In most cases, however, such studies are not available, which leaves us with quasi experiments, correlation studies, surveys or case studies as being the best available evidence. Which, from an evidence-based point of view, is still far better than no evidence at all.

Management decisions, actions, or interventions can have direct or indirect consequences for an organization's stakeholders/clients. Stakeholders and clients will also have valuable insight, views and ideas into what will be most effective for them. For example, a Road Safety intervention targeting young drivers will have a direct effect on young people. It is therefore important to get their views, motivations

and intentions prior to the intervention to enable the intervention to be developed and delivered in the most effective way for the target group. It is also beneficial to get stakeholder thoughts after a decision, action or intervention has been delivered. For example; a focus group with the target client to identify successes and any improvements that can be made. Attending to stakeholder issues is a key feature of evidence-based decision practices, highlights potential unintended consequences, and is part and parcel of evidence-based practice.

Clinical judgement uses previous experiences and knowledge about the client and local surroundings to make decisions. Evidence is not answers. Evidence doesn't tell you what to do, but helps you to make a better decision. Skills and past experience are therefore vital for determining whether the evidence applies to the individual organization (division, team), and clients at all and, if so, how. The evidence does not always refer to the specific client we are looking at so a judgement is needed as to the relevance for the particular context and individual.

There are many benefits of EBP including:

- Informed decision making;
- Helps ensure policy/activity is responding to the real needs of the client;
- Helps to secure and account for funding;
- Ensure decisions are made in a consistent way;
- Priorities can be chosen to produce the largest possible return on investment;
- Increased confidence in investing in long term products, services and technology;
- Increased professional accountability.

2.3 TRANSFERRING THE EVIDENCE

Cornwall's KTP was developed after a successful KTP in Devon County Council with Plymouth University. This KTP focused on developing the evidence base for all collisions and effective interventions for older driver, driving to work, and young drivers. Cornwall's KTP built on this by focusing on KSIs and examining the reasons for the differential trends between fatalities and serious injury collisions, and building an evidence base for behavior change techniques. The KTPs developed a specific methodology in order to embed EBP into Road Safety teams, and transfer theory into practice:

- Examination of evidence;
- Synthesis of evidence and recommendations;
- Formation of change management teams;
- Integration of recommendations into practice.

Priority groups were chosen based on Cornwall's casualty statistics; young drivers, motorcyclists, and older road users. Due to casualty trends in Cornwall showing serious casualties were steadily reducing but fatal casualties remained constant, the difference between fatal and serious casualties were examined. The link to deprivation was also an area of investigation. In depth analysis of casualty data, including when, where, who and contributory factors, and examination of international and national research was analysed in to order to determine trends and risk factors for each priority group. Global evidence for effective interventions for each group was also examined. Once all the research had been collected the evidence was synthesised and appraised for validity, reliability and usefulness in Cornwall's local situation. Recommendations were then written specifically for Cornwall Council to ensure they were framed in an accessible way to meet the needs of the local authority. The recommendations outlined ways to adapt current interventions to

increase their effectiveness and the development of new interventions that have been supported by evidence in other areas.

Once a research report with recommendations had been written a Change Management group was formed. These groups included road safety practitioners and partners from health, engineering, charities and other professionals with an interest in the specific risk group. The Change Management groups allowed communication between researcher and practitioners to ensure the evidence was translated correctly, such that the recommendations could be embedded within practice and delivery. Change Management teams allowed practitioners to feel included in the process and gave them a feeling of ownership over the research which led to changes in practice being more readily accepted and understood. Once a report had been written and change management team established the process could then be used as a catalyst for further change, demonstrating what could be achieved by EBP.

2.3.1 Deprivation case study

An exploratory analysis of Cornwall's collision data was undertaken to examine whether the link between deprivation and collisions exists in more rural areas and how it may differ from industrialised urban findings. The findings showed:

- Area (area in which collisions occur) and person (residence of the blameworthy individuals) deprivation was linked to increased pedestrian fatalities and serious injury collisions.
- Area and person deprivation was linked to increased collisions involving drivers aged 26-54.

Evidenced demonstrated many collisions occur in residential areas, and speed was a main factor in the cause of the collisions.

From this research, 20mph zones were being introduced in deprived residential areas in Cornwall. Initial evaluation demonstrated average speed had reduced in these areas after the 20mph zones were introduced compared to before. Long term evaluation of casualty statistics is still ongoing. Child pedestrian training programmes have also been targeted in areas of deprivation. Evaluation of this initiative demonstrated a 34% increase in skills in finding a safe place to cross, a 36% increase in skills in crossing between parked cars and a 31% increase in skills in crossing at junctions after the initiative compared to before.

2.3.2 BCT case study

The research into Behaviour Change Techniques identified

- It may be particularly beneficial to include techniques derived from Control Theory in behavioural change interventions. Specifically those prompting self-monitoring of behaviour may improve the effectiveness of an intervention.
- It may be beneficial to include at least one other technique, alongside the self prompting of behaviour, derived from Control Theory:
 - Goal setting
 - Action planning.
 - Prompting review of goals
 - Providing feedback on performance
- The number of BCTs used in an intervention do not influence its effectiveness; therefore, it may be more beneficial to focus on enhancing the quality of a few BCTs and focus these on the aims of the intervention, rather than attempting to use numerous BCTs in a specific intervention.

From this research all Cornwall Council's Road Safety interventions have been adapted to include the prompting self monitoring of behaviour and at least one other

technique derived from the control theory. For example; Cornwall's young driver intervention; Learn2Live, now asks all participants to set a goal after the intervention and encourages the monitoring of one's own behaviour through checklists. The participants are also revisited 3 months after the intervention as a reminder of the goals they set. This BCT initiative won the Prince Michael International Road Safety Award (2012), and has been adopted by other local authorities

2.3.5 Motorcyclists case study

The research suggested males aged 30-49 years who ride for leisure purposes are most at risk of collisions on bikes over 125cc, and young males (under 25 years) who ride for commuting purposes are most at risk of collisions on bikes up to 125cc. It was found bikes of different sizes also have different types of collisions. A recommendation therefore was that different initiatives could be developed for different bike sizes and therefore different collision types. Research also suggested risky riding behaviour, for example speeding, is considered an enjoyable activity for some riders, and these riders often tend to overestimate their abilities. Therefore, education and publicity initiatives should give consideration to rider intentions, motivation and attitudes towards riding.

From this research, an awareness campaign was developed with a different focus targeting different types of riders, depending on their motivations and attitudes. For example, one targeted younger riders, focusing on the money implications of a collision. Another targeted leisure riders, focusing on the implications for families after a collision. **Awaiting Results**

2.4 EMBEDDING EBP

In order to further embed an EBP, training was developed and delivered to all Road Safety staff, other Council staff and external staff. The training focused on Evidence Based Decision Making, Behaviour Change Techniques (BCT), Evaluation, and Questionnaire Design. This allowed the EBP way of working to be left behind once the KTP had finished. There was also a BCT and questionnaire design toolkit developed to aid people when developing a new initiative and deciding which BCTs to use and how to evaluate it. An evaluation and monitoring group was also set up to develop evaluations for all new interventions and monitor evaluation results, making recommendations for the future, on current interventions to ensure they are achieving what they aimed to do.

Dissemination of the work from the KTP has been delivered at national and conferences, including Road Safety GB and MAST.

3. RESULTS

Transferring theory into practice by embedding evidence based practice has significantly improved the resource targeting and outcomes for road safety interventions. It has, also, established Cornwall Council as a role model in this field regionally, nationally and internationally. This model has enabled the Council to respond to road user needs with greater confidence as they have a sound basis on which to make decisions. The in depth research on each priority group, benefitting from the expertise of the University's Psychology and Statistics specialists, together with the invaluable access to the University's research literature has provided the evidence to support the Council's direction of strategy.

The recommendations from the reports have been fed into the Cornwall Road Casualty Reduction Strategy and Cornwall's Alcohol Strategy. The recommendations have also been disseminated through the Change Management Teams to partner agencies influencing their operational strategies as well. The Community Safety service in which Road Safety now sits have begun to adopt the Behaviour Change Techniques and have been trained in evidence based practice thus enhancing their strong existing data led approach to targeting resources. The Health sector locally have also expressed interest in learning about our approaches which is likely to result in delivery of road safety policy through their service providers.

The process has provided the opportunity to generate income. Other local authorities are seeking professional help and advice on Cornwall's methodologies, especially with regards to the application of the BCTs. These are being provided on a commercial basis either through direct income generation or through exchange of services and expertise with other professionals. In addition to income generation and 'like for like' professional exchange of services, the KTP has already begun to save money through providing reliable information/evaluation of existing provision, prompting Cornwall's Road Safety team to cease specific aspects of delivery or entire activities/ programmes which could not demonstrate meaningful returns. With ever increasing pressures on the public purse the ability to make rational, informed decisions about what works will prove invaluable in securing on-going funding due to the teams ability to evaluate projects with statistical and behavioural confidence in the outcomes achieved. Fortunately, whilst there has been no increase in spend Cornwall's Road Safety team have not seen a reduction in base budget. They would attribute this, in no small part, to the fact that the professional approach undertaken through the KTP process and the evidence based decision making it has facilitated has ensured they are able to justify strategy and associated costs.

The council staff now have improved research methodology having been trained and supported in the embedding of evidence based practice into their every day approach to delivering services for casualty reduction. Two team members have received higher-level training in this, in order to maintain expertise and momentum beyond the completion of the project. In addition to this, during the final 'training/up-skilling' phase of the KTP, the Associate provided training in Logic Modelling to further aid the decision making process with regards to inputs (available resource), outputs (activity/service delivered), outcomes (tangible results and/or statistically reliable evaluation), and impacts (causal links/probability to casualty reduction). This will dramatically affect the team's ability to prove their worth and defend funding.

The KTP has strengthened collaboration between Plymouth University academics. This strengthened collaboration has built upon the previous KTP with Devon County Council and has resulted in a joint grant application to the NIHR as well as 2 joint publications and further publications in preparation. The strengthened collaboration has also resulted in Plymouth University successfully winning a PhD studentship in the area of road safety. Future grant applications and additional papers are expected to arise.

The work conducted during the KTP has formed an important component of the Impact Case Study to support the School of Psychology REF bid. An impact statement will make up 5% of the School's submission and will therefore potentially contribute 5% of the income resulting from the REF. The impact statement will be required to evidence knowledge transfer from academic research to the development and implementation of public policy. There are many such examples arising from the

KTP. Additionally, the KTP has forged collaborative links between the academics and commercial partners beyond the original partnership. These relationships may lead to the development of placement opportunities for students, research opportunities for students and CPD courses. These developments enhance the reputation of the academics as providers of applied expertise and opportunities for students.

The curriculum of the MSc module Research in Applied Settings has been updated to include a session on Evidence Based Practice as a result of the work undertaken during the partnership, and has been developed to include material on behaviour change techniques. Additionally material that came to light during the partnership, road safety examples and examples from the STATS19 database, have been used to illustrate various issues around applied research and design on this module. Some of the research from the KTP has also been included in a published academic paper in the American Journal of Public Health. (Rollison, 2012)

Reports applying the evidence to promoting safe behaviour in Older Road Users (2011), Young Drivers (2011), and Motorcyclists (2012); The Influence of Deprivation on Safe Behaviour (2011) and Behaviour Change Techniques (2012) were published on Road Safety Knowledge Centre (2266 subscribers, 1386 views a month) . These reports are disseminated to road safety professionals nationally and continue to influence practice.

Overall, these results demonstrate a practical model for enhancing road casualty reduction performance on a decreasing budget. By implementing and embedding EBP, resource can be prioritised on the areas most at risk and the areas that are going to produce the best value for money.

References

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Speaker Profile - Paula Wellings

Paula Wellings, MCMI, MIRSO, didn't know when she began working in this field over 25 years ago that it would be a vocational career.

During 2010 Paula identified a need to improve Cornwall team's evidence base particularly in relation to the high risk road user groups, their relationship with deprivation and how to maximise behaviour change. In conjunction with Plymouth University and Knowledge Transfer Partnership Paula recruited and managed Laura Hurst as KTP Associate to build an evidence base in key areas and embed this new way of working into Cornwall's casualty reduction partnership.

Paula admits that she and her team have by no means 'cracked it' but they are, more than ever, focussing on the need to be able to evidence effective outcomes, through structured evaluative processes, as well as demonstrate value for money and return on investment especially through working in partnership.

Author Biographies

Laura Hurst, has had wide experience of evidence based practise and evaluation within Road Safety and other areas in the public sector. This has including building evidence bases in key risk areas and managing change management groups to implement findings from the evidence. She implemented an evaluation group within Cornwall's Road safety team and now drives a service wide initiative and evaluation process in the Council. Laura has developed and delivered training in Evidence Based Practise, Evaluation, Questionnaire Design and Behaviour Change Techniques. Her work in implementing behaviour change techniques won a Prince Michel award in 2012. She is now working on similar projects within the wider Community Safety directorate, with a particular focus in drug and alcohol treatment

Elizabeth Hellier (EH), University of Plymouth. EH is a Psychologist with research interests the determinants of safe behaviour, with a specific interest in the determinants of road safety behaviour and the effectiveness of road safety interventions. EH has built strong collaborations with Devon and Cornwall County Councils road safety teams. EH has a strong research reputation, evidenced by both publications and research funding exceeding £1.6m.

Poppy initially started working in road safety through a two year Knowledge Transfer Partnership between Plymouth University and Devon County Council. The aim of this role was to embed an evidence based practice culture in the road safety and travel awareness team. This involved working with various partners and creating a course to encourage and provide skills in evidence based practice. Following the work in Devon, Poppy moved to the Transport Research Laboratory to work as a Psychologist. Since her time at TRL, Poppy has been involved in a variety of projects in the area of road safety for both private and public organisations. Poppy sits on the judging panel for the Prince Michael International Road Safety Awards and has been invited to present at a number of conferences including the International Conference on Driver Behaviour & Training, Parliamentary Advisory Committee for Transport, Royal Society for the Prevention of Accidents and The Institution of Highways and Transportation advising local, national and international policy.