



Queensland University of Technology
Brisbane Australia

This may be the author's version of a work that was submitted/accepted for publication in the following source:

[Shannon, Hugh & Parker, Tony](#)
(2012)

Sustaining a healthy workforce.

Australasian Mine Safety Journal, 3(8), pp. 76-81.

This file was downloaded from: <https://eprints.qut.edu.au/49124/>

© Copyright 2012 [please consult the author]

This work is covered by copyright. Unless the document is being made available under a Creative Commons Licence, you must assume that re-use is limited to personal use and that permission from the copyright owner must be obtained for all other uses. If the document is available under a Creative Commons License (or other specified license) then refer to the Licence for details of permitted re-use. It is a condition of access that users recognise and abide by the legal requirements associated with these rights. If you believe that this work infringes copyright please provide details by email to qut.copyright@qut.edu.au

Notice: *Please note that this document may not be the Version of Record (i.e. published version) of the work. Author manuscript versions (as Submitted for peer review or as Accepted for publication after peer review) can be identified by an absence of publisher branding and/or typeset appearance. If there is any doubt, please refer to the published source.*

<http://ebook.aprs.com.au/issue/52244>

Sustaining a healthy workforce

Mr Hugh Shannon and Professor Tony Parker

Institute of Health and Biomedical Innovation

Queensland University of Technology, *Brisbane, Australia*

A rationale for occupational health promotion

The changing demographics of the mining workforce and the increasing demand for skilled workers increases the importance of sustaining a healthy workforce now and for the future. Although health is strongly related to safety, the two areas are not well integrated and the relationship is poorly understood. As such there is an important need to raise the profile of health within the Occupational Health and Safety (OH&S) domain.

The mining industry carries health and safety risks, often greater than other occupations. Whilst the mining industry is regulated by stringent OH&S controls, the very nature of the work and environmental influences expose employees to a greater number of injury risk factors than many other industries. In contrast to its excellent safety record, compared to most other industries, the mining workforce has a high proportion of chronic health problems. These problems can be exacerbated by the ageing of the workforce, regional location of sites and organisational issues influencing work demands.

A major focus has been on the treatment of these conditions with relatively limited attention to prevention strategies. An important prevention strategy is the raising of awareness among the workforce of health issues and the significant increase in the volume of health related information has provided an excellent opportunity to access relevant information. Unfortunately, this information is of varying quality, may not be evidence based, and may provide the wrong guidance to the development of interventions designed to improve health. Limited time of most employees and potential lack of knowledge of ability to differentiate quality information presents additional problems or barriers to increasing awareness of health issues. Additionally, some external providers or communicators of such information although often excellent promoters of their knowledge base may not always provide evidence based information thus reducing the potential benefits of health related communications.

The collective health status of employees has an important impact on the industry in terms of productivity and economic expenditure. A healthy workforce has been shown to be more productive, with reduced absenteeism and presenteeism and with significant cost benefits. Unfortunately, the lack of reliable and accurate health information and inadequate evaluation of health interventions makes cost benefit analyses difficult. In addition to these potential benefits, employers that support workplace health promotion initiatives demonstrate to their personnel and the wider community that they value their employees. Establishing a healthy workforce requires health education methods that effectively communicate information and support positive and lasting effects on health related knowledge, attitudes, values and behaviour.

The workplace has been identified as one of the most important settings where health promotion can occur due to the potential for efficiencies, success and sustainability (Egger, Spark & Donovan, 2005; Bilski & Wierzejska, 2008). Despite this potential, many occupational settings do not facilitate health promotion programs or develop inappropriately planned, unstructured or unsustainable programs that are not appropriately evaluated (Egger, Spark & Donovan, 2005). Opportunities exist for the establishment of sustainable health promotion actions by addressing risk factors and barriers, enabling positive health behaviours and building social capital (World Health Organization, 1998).

In a mining industry setting, significant potential for workforce health improvement lies across a range of priority health conditions such as cardiovascular disease, musculoskeletal (M/S) injury and disorder, obesity, sleep disorders, fatigue and mental health. All of these conditions are interactive suggesting that there is no single solution to developing intervention to prevent or treat them. For example, chronic M/S conditions may involve both biophysical and psychosocial health issues and the condition may be exacerbated by overweight and obesity. Adopting a forward thinking perspective requires an understanding of why health problems arise and the development of proactive and context specific initiatives based on current evidence based knowledge. In order to gain a complete understanding of health issues, it is necessary to consider the determinants of health and their positive or negative impact on health status.

Increasing the health profile within the OH&S framework

A holistic and whole of company approach is required to identify key factors which impact on the health of the workforce and opportunities for improvement of health surveillance systems and interventions. Commitment of leadership to short and longer term health of the workforce is essential for successful implementation of health initiatives. Organisational, environmental, training and individual behaviours are also key areas which impinge on health outcomes and potential barriers to successful implementation of health initiatives in the industry.

Effective communication is a fundamental element in addressing these issues and in providing a coordinated and consistent framework to promote the key performance indicators in the area of health. Greater understanding of the underlying requirements for effective communication is required together with the need for new and innovative evidence based solutions and strategies which recognises the uniqueness of the mining setting and culture.

Communication practices in the mining industry

Miners are normally required to undertake compulsory health and safety training when entering the workforce and throughout their careers. A range of approaches to workplace health and safety training are currently used in the mining industry, to varying degrees of success (Cullen, 2008). Of equal concern is the absence or high variability of evaluation methods applied to health and safety communication practices within the industry (Parker, Hubinger & Worringham, 2004). Mining operates on very tight time schedules, influenced by pressures associated with meeting production targets. Communication methods therefore need to be efficient and well planned.

There are a range of potential barriers to effective health communication that can emerge within complex and challenging work environments such as mine sites. Health related information delivered during crib room talks that include too many topics and other competing foci such as safety briefings are likely to be ineffective. In this situation, attention will normally be devoted to the immediate priorities rather than longer term issues resulting in key messages being lost. The timing of information delivery is therefore essential. The use of information and communication technologies can present opportunities for efficiencies and convenience. If workers however are not familiar or confident with using the technology or do not have personal access to it, this may present yet another barrier to the communication process.

The manner in which information is presented also requires careful consideration. Diversity in the workforce can present communication challenges which require context specific solutions. Mining workers in English speaking countries with low literacy levels, a non-English speaking background or English as a second language may become lost in the detail if they are bombarded with a lot of information or do not have sufficient time to interpret and understand written or spoken language.

Adults demonstrate higher levels of motivation when they understand the purpose and relevance of information (Knowles, Holton & Swanson, 2005). This life-centred orientation is also supported by cognitive neuroscience research. The limbic system of the human brain includes the amygdala which screens sensory input and appears to support an affective association with experience (Zull, 2002). This plays an important role in the process of neural plasticity, contributing to the way in which information is encoded within the brain (Azmitia, 2007; Will, Dalrymple-Alford, Wolff, & Cassel, 2007). Humans gain knowledge and meaning from experiences and learning is a social process supported by shared individual perspectives (Vygotsky, 1978; Bruner, 1996). Vicarious learning, which

involves understanding the experiences of other people can also produce powerful, motivating and lasting effects (Schunk, 2008). Empirical research conducted by Sharot and Phelps (2004) has demonstrated that experiences which produced an emotional response resulted in stronger recall which persisted or improved over time as the period between learning and testing increased from hours to days. Experience therefore serves as a valuable resource for adult learning (Osborne, 2005).

Adults also demonstrate a need to be self-directing, problem-solving and independent learners (Knowles, Holton & Swanson, 2005). Communication processes therefore need to allow workers to understand and evaluate information in their own context. The work environment should also support active use of this knowledge and key messages should be reinforced to promote ongoing positive behavioural responses.

A framework for understanding, planning and evaluating communication

Communication of information should have an impact on not only knowledge, but personal attitudes, values and most importantly health behaviour. Bandura, through his social cognitive theory (1986) emphasised that a person's behaviour is a result of interaction between three elements: personal characteristics, behavioural patterns and the social environment. The combined influence of these three elements represents Bandura's triadic reciprocal causation model (1997) which is depicted within figure 1.

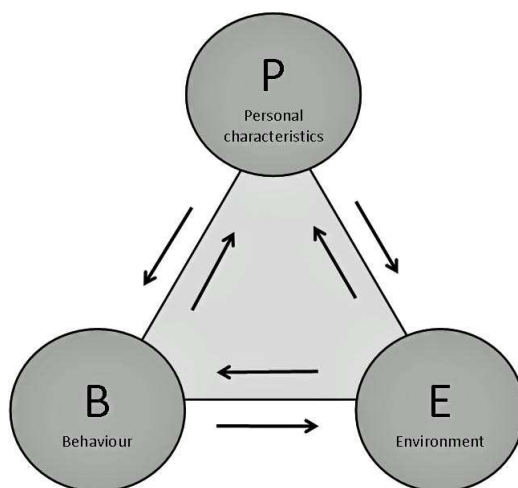


Figure 1: Bandura's triadic reciprocal causation model

Through this model, health behaviour can be understood in the context in which it occurs, either within or outside of the work environment. Another concept that should also be carefully considered when attempting to understand and evaluate communication, knowledge acquisition and health behaviour is health literacy. The concept of health literacy has evolved over the last forty years from an individual, literacy driven focus in clinical settings to one associated with a contemporary approach to health promotion. The World Health Organization has defined health literacy as *'the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health'* (World Health Organization, 1998, p. 10). The conceptual evolution of health literacy has seen a shift beyond a functional orientation to also recognise cognitive, behavioural and environmental influences. This more comprehensive view of health literacy acknowledges factors like efficacy, motivation, self-efficacy, autonomy, social support and empowerment. A health literate workforce could present benefits for the employee and employer.

Nutbeam (2000) developed a comprehensive health literacy model that identifies and distinguishes three different types. This model recognises differing levels of autonomy and empowerment as individuals demonstrate higher level capacity and action. A summary of the model is presented in figure 2.



Figure 2: Comprehensive health literacy model

Worker centred communication methods are developed with the audience in mind. This approach acknowledges factors that may impact on the responsiveness of the employee. In addition to this focus, worker centred communication methods should also present context specific information and emphasise relevance to facilitate engagement and motivation. Workforce indicators of health literacy include the effective use of information, active discussion, finding health information, applying critically evaluative skills, achieving control and helping others.

While the concept of health literacy can be considered from both planning and evaluation perspectives, it is necessary to develop a process for facilitating such action. The five step process by Springett (2001) presented below provides an example of how a systematic and integrated approach to evaluation can inform future practice. A process such as this should be used to ensure that impact can be determined and used to inform future practice.

1. Identify project objectives
2. Develop evaluation questions
3. Decide how questions will be answered
4. Collect and analyse information
5. Draw conclusions and make recommendations

Conclusion and recommendations

Health literacy is recognised by the World Health Organization as a capacity building health determinant. The Workforce Health Innovation (WHI) group based within the Institute of Health and Biomedical Innovation at Queensland University of Technology is developing an understanding of health literacy in the mining industry with the aim of improving health communication strategies and enhancing health related behaviour. A health promotion focus within a broader occupational health and safety orientation supports workforce sustainability. If a workplace goal is to enhance workforce health, a focus on communication methods and health literacy is essential as they are associated with the acquisition of knowledge and the way people think, feel and act in relation to their health or that of others.

There is a need for carefully planned and evaluated communication methods. Potential barriers need to be identified through a context based assessment. Principles of adult learning include purpose, relevance, experience, self-direction, problem-solving and independence. These principles are supported by cognitive neuroscience research and should be considered when developing communication strategies for the mining industry. Bandura's triadic reciprocal causation model identifies the associations between a person, their health behaviour and the environment. Communication methods should primarily develop knowledge, however to be truly effective they

should also influence attitudes, values and health behaviour. Development of increased autonomy and empowerment occurs as higher levels of Nutbeam's health literacy model are reached.

Communication methods need to be efficient, high impact and timely to be effective in the complex and challenging mining environment. Strategies used should prioritise quality of information over quantity. Reinforcement and a supportive environment are essential for motivation and achieving positive and lasting effects. Communication methods should present a clear rationale to support worker engagement and motivation. Context specific and worker centred strategies should be used to emphasise relevance and encourage introspective review of health related knowledge, attitudes, values and behaviour. A positive workplace health culture supports discussion of health issues and can be strengthened by feedback receptive attitudes. Evaluating health communication methods in the workplace requires carefully designed, evidence based procedures. Appropriate identification of health literacy indicators requires specialised knowledge coupled with an understanding of the mining industry context.

Acknowledgement

The QUT Workforce Health Innovation research group have conducted a range of projects with Downer EDI Mining and appreciate the involvement of the company and workers at the sites visited.

Correspondence

Professor Tony Parker – *QUT Workforce Health Innovation research group leader*

Phone: + 61 7 3138 6173

Email: t.parker@qut.edu.au

Mr Hugh Shannon

Phone: +61 7 3138 3577

Email: h.shannon@qut.edu.au

*The **Workforce Health Innovation research group** led by Professor Tony Parker is an interdisciplinary team of researchers, working within QUT's Institute of Health and Biomedical Innovation. The group is working to provide solutions to priority health issues in the mining industry such as prevention of musculoskeletal injury and disorder and associated conditions such as overweight and obesity and mental health. Members of the group have conducted research in the mining industry for more than 12 years with regular engagement at all levels of the workforce. Effective communication of health issues across the workforce is also a major area of activity. The group is currently conducting a 4-year 'enhancing workforce health' program in mining in collaboration with Downer EDI Mining.*

References

Azmitia, E.C. (2007). Cajal and brain plasticity: Insights relevant to emerging concepts of mind. *Brain Research Reviews*, 55 (2), 395–405.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. New Jersey: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.

Bilski, B. & Wierzejska, E. (2008). Occupational health promotion for healthcare workers. In R. Pierce & R. Schwartz (Eds.), *New perspectives on knowledge, attitudes and practices in health* (pp. 27- 37). New York: Nova Biomedical Books.

Bruner, J. (1996). *The culture of education*. Cambridge: Harvard University Press.

- Cullen, E. (2008). Tell me a story: Using stories to improve occupational safety training. *Professional Safety*, 53 (7), 20 – 27.
- Donoghue, A. (2004). Occupational health hazards in mining: an overview. *Occupational Medicine*, 54 (5), 283 – 289.
- Egger, G., Spark, R. & Donovan, R. (2005). *Health promotion strategies and methods*. (2nd ed.). Sydney: McGraw-Hill.
- Knowles, M.S., Holton, E.F. & Swanson, R.A. (2005). *The adult learner: The definitive classic in adult education and human resource development*. (6th ed.). London: Elsevier.
- Nutbeam, D. (2000). Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15 (3), 259 – 267.
- Osborne, H. (2005). *Health literacy from A to Z: Practical ways to communicate your health message*. London: Jones and Bartlett.
- Parker, A., Hubinger, L. & Worringham, C. (2004). *Survey of Occupational Health and Safety practices and issues in New South Wales and Queensland coal mines*. Brisbane: Queensland University of Technology.
- Schunk, D.H. (2008). *Learning theories: An educational perspective*. (5th ed.). New Jersey: Pearson.
- Sharot, T., & Phelps, E. A. (2004). How arousal modulates memory: Disentangling the effects of attention and retention. *Cognitive, Affective and Behavioural Neuroscience*, 4 (3), 294–306.
- Springett, J. (2001). Appropriate approaches to the evaluation of health promotion. *Critical Public Health*, 11 (2), 139 – 151.
- Vygotsky, L.S. (1978). *Mind and society: The development of higher mental processes*. Cambridge: Harvard University Press.
- Will, B., Dalrymple-Alford, J., Wolff, M. & Cassel, J. (2007). The concept of brain plasticity – Paillard’s systemic analysis and emphasis on structure and function. *Behavioural Brain Research*, 192 (1), 2-7.
- World Health Organization. (1998). *Health promotion glossary*. Retrieved 29 August, 2008, from; <http://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf>.
- Zull, J.E. (2002). *The art of changing the brain: Enriching the practice of teaching by exploring the biology of learning*. Stirling: Stylus.