

Developing a basic principles model to inform threshold concepts of public health

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Education and training is the foundation stone of effective and sustainable improvement in any discipline; public health and social care is no exception. This short communication offers suggestions for a model of public health practice to support educators, trainers and practitioners in developing and continually improving their skill.

Public health has been defined as being a science and an art (The UK Faculty of Public Health, 2010). Whilst it is true that to succeed in science one needs to be creative, this leads to particular challenges for educators attempting to foster both scientific knowledge and creative artistic application of such within the nine to twelve teaching weeks of a university semester. Public health is no exception, having a broad range of sub disciplines and skills that need to be mastered by students in order for them to become effective practitioners.

Another challenge to educators is in helping students to change and mould their view of the world. Threshold concepts have been described by Meyer and Land (2003) as representing a transformed way of understanding, interpreting or viewing something, without which the learner (or by definition the practitioner) cannot progress. Such a transformed view may represent how people ‘think’ about issues and approach problems in a particular discipline. As public health students embark upon their career from a variety of backgrounds, such a transformation is necessary if they are to be effective practitioners. For example, students may have backgrounds in person-centred disciplines such as medicine, dentistry, or psychology. Our responsibility as educators is to transform or expand their view of health from a clinical individual person with a care focus to a population risk and health protection focus.

Threshold concepts are therefore central to the mastery of their subject (Cousin, 2006). However, despite the principle being discussed for some years

and despite a systematic search, at the time of writing threshold concepts for public health do not appear to have been defined or discussed in the literature. The purpose of this short paper is to present a model which incorporates key principles of public health from an epidemiological perspective and to suggest four threshold concepts of public health. In so doing, it is anticipated that by providing a framework for learning and teaching, the model will allow educators to guide students in acquiring scientific knowledge whilst applying that knowledge, and provide public health practitioners with a framework for developing creative ways to solve public health problems.

As epidemiology is the information hub of public health, epidemiological method underpins the key components of the model. Traditional teaching of epidemiology, however, often focuses on how to do epidemiology. The way in which epidemiological knowledge is utilised to inform public health policy and practice, however, is not so well developed. For example, the identification of risk by person time place variables is well known, but how and why these differences exist, and how understanding the person risk profile can be utilised to design interventions and inform policy is often fragmented. The use of an integrated model incorporating a range of public health disciplines would be beneficial. Key open questions form the basis of the model which can be seen in Figure 1: “how” we do epidemiology is linked to identification of risk with “who, where, when”; this in turn links to “what” can be done and the “4 Ps” of priority, policy, practice and planning.

The model has four main areas that deal with methodology, identifying those at risk, interventions and policy and practice. For each area of the model a corresponding threshold concept is suggested.

Epidemiological Method: the concept of exposure and outcome

The first threshold concept of exposure and outcome is linked to “How” in the model. “How” refers to epidemiological methodology and how to investigate epidemiological trends, incidence and prevalence. Epidemiological methods investigating exposure and outcome include case control and cohort studies, randomised control trials and meta-analysis. Case control studies begin by identifying those with the population such as the same hospital. Being retrospective, this can be a simple methodology and is particularly useful when investigating rare outcomes. Cohorts, on the other hand, begin by identifying those with the exposure of interest and are particularly useful for rare exposures. Randomised control trials have a place in public health when used to evaluate a range of interventions and are not just confined to drug trials.

In such trials the exposure is the intervention. Computation of odds ratio or relative risk via a simple 2x2 contingency table indicates odds or risk of the outcome given the exposure (see (Stewart, 2010). Meta-analysis extends analysis of the contingency table by computing the pooled odds or risk utilising data from previously published studies. Such methods allow epidemiologists to uncover underlying causes and quantify levels of risk.

In line with other threshold concepts, students find mastery of these methodologies and construction of the contingency table difficult or, in Cousin’s words, “troublesome”. However, once mastered it is difficult to regress to previous ways of viewing public health issues, for example what are the

exposures that lead to risk of teenage conceptions, smoking, alcohol misuse or obesity?

Risk Profiling: the concept of different risks for the same outcome

The epidemiological methods mentioned above underpin and inform the basic principles of risk in terms of person, time and place, or who, where and when. Answers to these questions allow the creation of a pen picture of the type of person most at risk to disease, illness or accident, where they may live and

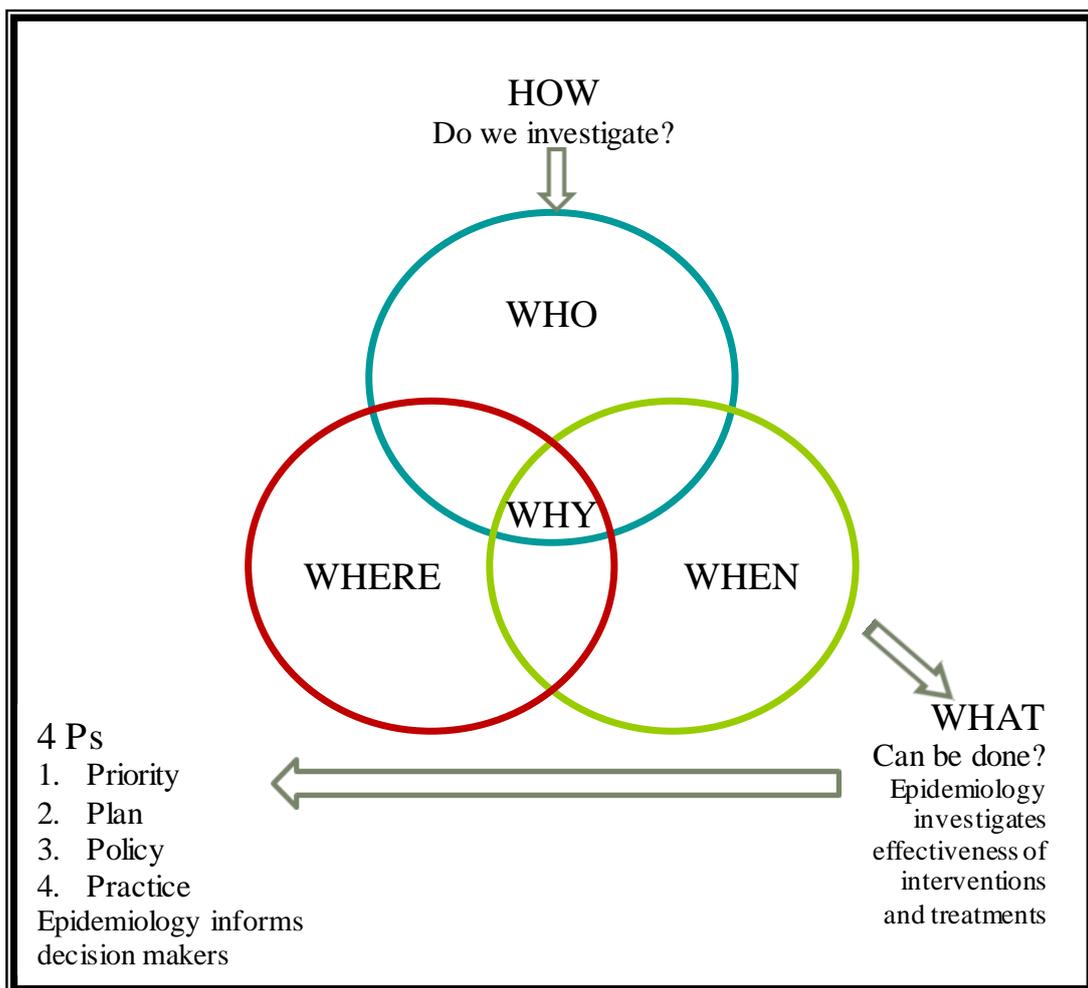


Figure 1: Key Concepts of Public Health

when risk is greatest. The interconnecting circles represent the overlap, for example, age can be a “when” variable as well as a “who” variable. The question “Why” is central to the model, as uncovering the answer is central to fully understanding the underlying reasons for public health issues and effectively dealing with the “what” and the “4 Ps” elements.

Asking why these risk patterns occur not only challenges students to think creatively for solutions but moves the student through Anderson and Krathwohl's modification of Bloom's taxonomy (Bloom, 1956; Anderson and Krathwohl, 2001) from being purely descriptive to analytical. The second threshold concept suggested is that the same outcome (disease or condition) can have different exposure or underlying causes depending upon the "who", "where" and "when variables". For example, HIV, low birth-weight, and child obesity can affect but the risk of such outcomes can be very different.

In the case of HIV risk, for example, a model of risk for a male in prison might include intravenous drug use with shared needles would be different to that of a young female in sub Saharan Africa which might include forced marriage and inability to ask for condom use. Risk factors and underlying causes of having a low birth-weight baby for a woman in Wolverhampton may include stresses associated to living areas with high levels of what Vinikoor-Imler *et al* (2011) refers to as neighbourhood incivilities, whereas for a woman in rural Nigeria risk may include malnutrition, young age and lack of access to medical care. Likewise, child obesity exists across the social spectrum for different underlying reasons such as poor diet and lack of physical exercise resulting from low income and lack of safe places to play at one end of the spectrum to poor diet resulting from affluence based excess and a shift from physical play to play with electronic toys.

Identifying these differences in risk and underlying causes enables specific and targeted design of interventions. Mastery of this threshold concept moves us from seeing outcomes as having single linear causes to seeking to understand the diversity of causal constellations.

Health protection and improvement: the concept of tailored interventions

The "what" of the framework represents the health protection and health improvement disciplines and the investigation of what can be done to reduce risk. In terms of the examples above, interventions concerned with condom use and needle exchange may be suggested for the prison population, whereas interventions concerned with changing women's status in society may take priority in sub Saharan Africa. Likewise, with efforts to reduce low birth-

weight, interventions that improve education, access to health care and reduce health inequalities would be effective for both. However, the detail of how these may be achieved would be very different. Thus, the third threshold concept suggested is that interventions need to be tailored and targeted to the population at risk.

Translating knowledge to practice: the concept of underpinning strategy

Finally, epidemiological data along with the insights from the risk analysis outlined in epidemiological method and risk profiling above, leads to tailored intervention design, informing policy, priority, practice and planning; the 4 Ps. Analysis of past and current incidence and prevalence enables prediction of future incidence, where these may be, and quantifies level of risk for different populations.

Frequently, with novice public health students and practitioners, solutions and recommendations are destined to failure as they tend to focus on the need for funding to bring the solution to fruition without thinking strategically, considering the business case for funding and how solutions are underpinned. For example, empowerment of women is deemed a solution to many public health issues, however how this is achieved, who is involved in making it happen, and what training, facilities and infrastructures are needed, is not given sufficient thought. Whilst funding may be required, creative thought linked to the information gleaned from utilising the model is essential. The fourth threshold concept to be suggested is therefore that the four Ps need to be underpinned by a strategy if solutions are to become reality rather than mere rhetoric.

Conclusion

In conclusion, this short communication presents a model and framework for teaching and practicing public health. The model gives rise to four suggested threshold concepts which, once mastered, will enhance student and practitioner thinking. The strength of the model is that it provides a framework for integrated public health practice, however it is recognised that the application of threshold concepts to public health is in its infancy. Readers' views on the use of the model and how the principles of threshold concepts can be developed for public health are welcome and invited. Please feel free to

respond to this article, the Editorial team will be happy to consider publishing your views; to do so please see guidance to authors for our contact details.

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