



## ISSUES IN PUBLIC HEALTH

## Development and organisation of an instructional course on epidemic/outbreak preparedness and response for health workers in the Eastern Cape

David L Buso, Ehi U Igumbor, Jose M Martinez, Amalio del Rio

Recent experience of repeated cholera outbreaks in the Eastern Cape<sup>1</sup> compelled the provincial Department of Health to review its epidemic preparedness and response (EPR) capabilities. This exercise revealed a number of weaknesses with regard to the overall implementation of an effective public health response to disease outbreaks in the province. Of concern was the lack of rapid response to outbreak investigation, the incoherent and poor co-ordination of the outbreak response teams, failure to report interventions properly, and general difficulty in containing disease outbreaks and epidemics. A need was identified for training of health professionals in public institutions in all health districts of the province, and this was undertaken as a first step towards strengthening the intrinsic EPR capacity of the province.

Because of limited provincial capacity the training was delegated to the Department of Community Medicine (DCM) of the then University of Transkei and organised between March and June 2005. Even though the DCM was already running courses in infectious disease epidemiology covering the principles of EPR (for undergraduate MB ChB and postgraduate Masters of Public Health (MPH) students), the emerging responsibility presented a novel task in that it called

for an instructional course on EPR properly suited to health professionals already in the field. It was envisaged that such a course would need to be theoretically sound, yet very pragmatic. It was also imagined that the differences in the backgrounds of the learners would imply establishing a common baseline for all and building thereon. Neither of these observations could be jettisoned and the DCM was committed to delivering on its mandate.

Although similar courses exist, such as those developed by the USA Centers for Disease Control (CDC), the World Health Organization (WHO) and the North Carolina Center for Public Health Preparedness,<sup>2,3</sup> none of these is available in South Africa. It was imperative that learners relate easily to the content and delivery of the course, with typical illustrations and case studies used to that end. The dearth of readily available documentation on EPR, albeit surprising, is not peculiar to South Africa as cursory attention has been paid to reporting of procedures followed during outbreak investigations.<sup>2,4,5</sup> In this article we describe the development of this instructional course and how it was organised.

### Purpose of the training course

The overall goal of the training course was to bolster the intrinsic capacity of the province in responding to disease epidemics or outbreaks. This was to be achieved by adopting a 'training of trainers' approach in which the competence and skills of course participants were strengthened, therefore enabling them to inculcate the same among their colleagues in the workplace. On completion of the course, participants were expected to be able to: (i) describe outbreak situations and control measures to be undertaken; (ii) develop questionnaires, collect and process relevant data in outbreak situations; (iii) give details on the origin and distribution of an implicated source of a disease outbreak, and identify means of public health control of the outbreak; (iv) identify possible barriers to implementation of specific interventions following an outbreak investigation; (v) describe measures that could be used to monitor the success of an intervention; (vi) describe the occurrence, signs and symptoms, and control of serious infectious outbreaks relevant to the Eastern Cape province including cholera, measles, hepatitis, rabies, meningitis and other emerging and re-emerging disease agents such as

*David Buso, BSc, MB ChB, DLSHTM, DPH, MMed, MSc, HPPF, FCPHM (SA), Professor and Head of the Department of Community Medicine, Walter Sisulu University for Technology and Science, is actively involved in curriculum development in Community Medicine and co-ordinates the Masters in Public Health training programme at WSU. His other areas of research include health systems and health economics.*

*Ehi Igumbor, BSc Hons, MPH, is an epidemiologist and lecturer in the Department of Community Medicine, WSU. His areas of research include epidemiological studies of chronic diseases, educational theories and burden of disease studies.*

*Jose Martinez, MD, MPhil, is Associate Professor of Community Medicine at WSU, where he lectures in biostatistics.*

*Amalio del Rio, MD, MSc, is Associate Professor of Community Medicine at WSU. He has been with the Faculty of Health Sciences for over 8 years and lectures in epidemiology. His research interests include infectious disease epidemiology.*

*Corresponding author: David L Buso (buso@getafix.utr.ac.za)*



haemorrhagic fevers and acute flaccid paralysis/poliomyelitis; and (vii) compile a comprehensive report on a disease outbreak.

**Methods**

Training was decentralised to district municipality level to minimise the travelling costs and time of all involved and to maximise participation by all local service areas (LSAs). The target was to train 255 provincial health personnel of different designations (Table I) by the end of June 2005. In order to achieve this, district municipalities in similar geographical areas were grouped together making a total of four groups, spanning the entire province. The four groups and respective sites of course delivery were: O R Tambo and A Nzo district municipalities held in Mthatha; Chris Hani district municipality held in Queenstown; Amatole district municipality held in East London; and Cacadu and Nelson Mandela Metropolitan district municipalities held in Port Elizabeth.

**Theoretical framework of the instructional course**

The theoretical basis of the instructional course was the cognitive flexibility theory (CFT) of Spiro *et al.*<sup>6,7</sup> The theory describes the nature of learning in complex and ill-structured domains. A hallmark of this theory is its focus on the learner's 'ability to spontaneously re-structure his/her knowledge in different ways, in adaptive response to radically changing situational demands'.<sup>7</sup> CFT is largely concerned with the transfer of knowledge and skills to learners who have already attained initial training.<sup>7</sup> It was felt that this best described the context of our learners.

**Table I. Distribution of participants by health profession/designation**

Designation	Number
Chief medical officer	2
Medical officer	4
Chief professional nurse	35
Senior professional nurse	5
Professional nurse	22
Communicable disease control programme manager	17
Environmental health officer	32
Clinic supervisor	15
Maternal child health programme manager	3
Infection control nurse	14
Health promoter	15
Co-ordinator of TB programme	5
Pharmacist	9
Information manager	10
Laboratory technologist	1
Laboratory service co-ordinator	2
Financial officer	1
Total	192

According to CFT, learning is a function of both the way knowledge is represented (along multiple rather than single conceptual lines) and the processes that operate on those mental representations (processes of schema assembly rather than intact schema retrieval). For this reason, our instructional course emphasised the presentation of information from multiple perspectives and the use of a case study approach involving context-dependent and realistic situations.

CFT also asserts that 'constructed knowledge' is more important than didactic teaching of facts.<sup>7</sup> With this it stresses that learners should be given the opportunity to develop their own representations of information in order to learn them properly. Our course was therefore designed in such a way that the learners, often in small discussion groups, identified problems in case studies and tried to analyse these, with the educators only acting as facilitators of this learning.

**Course layout and scope**

In order for the instructional course to meet its objectives comprehensively, the following learning issues fell within its scope: (i) basic principles and concepts in epidemiology and biostatistics; (ii) EPR status and disease outbreaks in the

## EXCLUSIVE TO GRADUATES



The Graduate Club invites all graduates in the **medical field** of any age to join their exclusive association where they can benefit from extraordinary travel deals and discounts.

Membership is FREE!

Call **0861 782 782** or visit [www.graduateclub.co.za](http://www.graduateclub.co.za) for further details







Eastern Cape; (iii) description of specific priority diseases commonly resulting in outbreaks in South Africa; (iv) basic principles of epidemic preparedness and response; (v) basic principles and steps of outbreak investigation; (vi) the role of the various stakeholders in EPR including environmental health workers, health educators, the National Health Laboratory Service, infection-control nurses, and information managers; (vii) general principles of disease surveillance and notification with specific reference to the Eastern Cape; and (ix) reporting disease outbreaks.

The content of the course was designed to emphasise basic elements in investigating outbreaks and provide a framework for responding to epidemics, with specific reference to the Eastern Cape. About 60% of the course period was dedicated to brief presentations of basic epidemiological concepts, including key concepts in outbreak investigation and public health response to epidemics. Emphasis was placed on the development of an understanding of both theoretical and practical concepts of outbreak investigation. Group exercises, discussions and plenary sessions accounted for the remaining 40%. Answers to questions posed in the case studies were discussed and feedback was given.

Each participant was provided with a portfolio containing handouts, guideline documents, case studies and other reading material relevant to the course, which was run over 2½ days.

## Evaluation of training outcomes

Evaluation of the learning process involved both formative and summative assessments. The formative assessment entailed ongoing evaluation of responses to questions raised in the case studies and group exercises. At the end of the course participants completed feedback questionnaires probing their perception of the effectiveness of the course in meeting its objectives, *inter alia* developing their understanding and competence in EPR. This served as a summative evaluation of the course.

The participants' views of the course were unanimously positive. They expressed a high level of satisfaction with both the depth and scope of the course, and the vast majority stated that they felt very confident regarding their competence in EPR (Fig. 1). As many as 92% of the participants mentioned that they would be interested in further training in epidemiology.

## Discussion and conclusion

The development and implementation of our nascent instructional course on EPR was a learning experience, not only for trainees in the course, but also for the DCM. Firstly, there is academic debate regarding the most appropriate pedagogical approach to adopt in different teaching-learning situations. Outrightly our faculty has implemented a problem-based learning strategy, which has been successful with first-

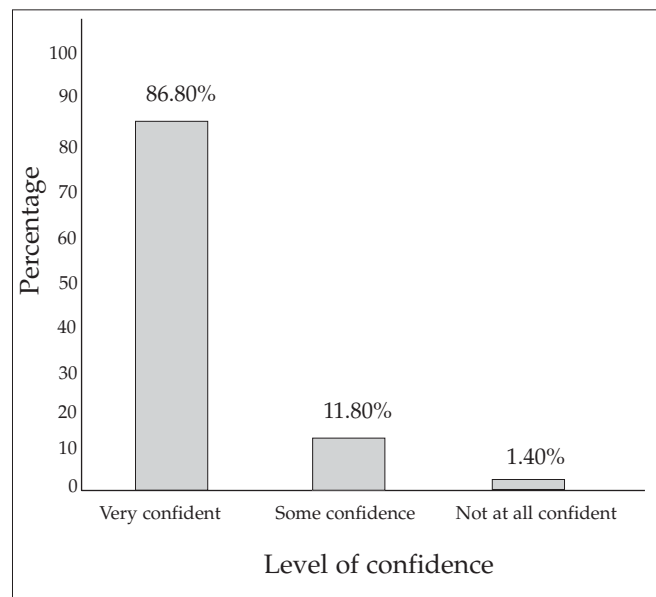


Fig. 1. Participants' feedback on their level of self-confidence in investigating outbreaks after the course (N = 192).

time learners.<sup>8</sup> The context we report on here is slightly different. Learners in our training course were not first-time learners but rather those already in the field. In principle, EPR knowledge and skills would have been among the criteria for their recruitment. If not part of these criteria, participants would have been introduced to outbreak investigation in the field, which would have given them some fundamental knowledge of EPR. They were also adult learners with varied educational backgrounds. All of these factors led to our adopting the tenets of CFT in our course. Jonassen *et al.*<sup>9</sup> previously applied this theory in designing a hypertext programme on transfusion in medicine. Our experience supports use of this theory in the development of teaching courses in the health disciplines.

Secondly, our course aroused widespread interest in further training in public health, especially epidemiology. The call for the incorporation of epidemiology training for every kind of health worker in South Africa is not new.<sup>10</sup> The former Epidemiological Society of Southern Africa made stringent efforts to train health personnel on epidemiological concepts and skills. We feel that in the short term there is an explicit demand for the reintroduction of such courses in university departments of public health, a notion repeatedly articulated by participants in our training course. A long-term solution will be reviewing curricula of all health professions to ensure that fundamental epidemiology concepts are emphasised.

In conclusion, although the ultimate goal of the course remains to be evaluated, we feel that our course could easily add to the lexicon of instructional materials on epidemiology in general and EPR in particular. The next phase in the



development of this course is to determine whether it has indeed impacted on the rapid response to disease outbreaks, the co-ordination of response teams during investigation of outbreaks, and appropriate reporting of disease outbreaks in the various LSAs in the province.

The Eastern Cape Provincial Department of Health is thanked for funding the EPR course. The authors acknowledge the administrative and logistical assistance of Mr M Noyakaza, Ms Noloyiso Maneli and Ms Nozuko Tshirana throughout the course, and Masters of Public Health students Dr Nomawetu Tonjeni, Dr Andile Nkumanda, Mr Stembele Matotie, Mr July Sibanyoni, Ms Thando Majiki and Ms Fungiwe Gqamane for their contribution to the instructional material.

1. Eastern Cape Department of Health. Cholera outbreak in Ntabankulu Eastern Cape. *Eastern Cape Epidemiological Notes* 2004 March-May (24) p. 1.
2. Reingold AL. Outbreak investigations - a perspective. *Emerg Infect Dis* 1998; **4**: (1) 1-5 (Online). <http://www.cdc.gov/ncidod/eid/vol4no1/reingold.htm> (last accessed 3 July 2005).
3. Gathany N, Stehr-Green J. Scenario-based e-learning model: a CDC case study. *Learning Circuits* 2003; April: 1-4 (online). <http://www.learningcircuits.org/2003/apr2003/gathany.htm> (last accessed 3 July 2005).
4. MacKenzie WR, Goodman RA. The public health response to an outbreak. *Current Issues in Public Health* 1996; **2**: 14.
5. Goodman RA, Buehler JW, Koplan JP. The epidemiologic field investigation: science and judgement in public health practice. *Am J Epidemiol* 1990; **132**: 9-16.
6. Spiro RJ, Coulson RL, Feltovich PJ, Anderson D. Cognitive flexibility theory: advanced knowledge acquisition in ill-structured domains. In: Patel V ed. *Proceedings of the 10th Annual Conference of the Cognitive Science Society*. Hillsdale, NJ: Erlbaum, 1988 (online). <http://www.ilt.columbia.edu/ilt/papers/Spiro.html> (last accessed 27 June 2005).
7. Spiro RJ, Jehng J. Cognitive flexibility and hypertext: theory and technology for the non-linear and multidimensional traversal of complex subject matter. In: Nix D, Spiro R, eds. *Cognition, Education and Multimedia: Exploring Ideas in High Technology*. Hillsdale, NJ: Erlbaum, 1990: 163-205.
8. Iputo JE, Kwizera E. Problem-based learning improves the academic performance of medical students in South Africa. *Med Educ* 2005; **39**: 388-393.
9. Jonassen D, Ambruso D, Olesen J. Designing hypertext on transfusion medicine using cognitive flexibility theory. *Journal of Educational Multimedia and Hypermedia* 1992; **1**(3): 309-322.
10. Katzenellenbogen JM, Joubert G, Abdool Karim SS, ed. *Epidemiology: A Manual for South Africa*. Cape Town: Oxford University Press, 1997.