An Effective Training Strategy for Communicable Disease Control Nurses

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Abstract
Communicable diseases remain the leading cause of morbidity and mortality in sub-Saharan Africa. Delivery of programmes to control priority infectious diseases is implemented at provincial and district level. This challenging task requires both technical and management skills. However, few, if any, structured programmes for training staff responsible for providing leadership in communicable disease control currently exist. A novel accredited training programme was developed in Mpumalanga province in rural South Africa, as a partnership between provincial government and universities in South Africa and Australia. This venture focused on providing an applied knowledge-base and the skills necessary to function effectively within a challenging environment. Over a four-year period two separate capacity-building programmes were designed, implemented and formally assessed. The first focused on technical aspects of disease control, while the second sought to provide applied management skills. A combination of intensive one-week residential blocks, coupled with monthly one-day training sessions and workplace application within the province was used. The programme is described and the results of an evaluation presented. The impact of the model on the control of diseases, containment of outbreaks and execution of operational research has been documented in peer-reviewed publications. For the nurses involved, the programme positively impacted on their confidence, camaraderie and professional competence, while expanding their professional horizons. The district health system appears to have been enhanced, both within and beyond the communicable disease control area. Links to web-based training materials are provided for potential adaptation and application in other developing settings. This model provided a cost-effective approach to training nurses responsible for communicable disease control programmes without disrupting service delivery.

Keywords: communicable diseases, outbreak control, training, management

Introduction
Mpumalanga is one of nine provinces established following the first democratic elections in the Republic of South Africa during 1994. It was formed in the rural sub-tropical northeast of the country from the eastern portion of the former Trans-
vaal province, and two self-governing homeland territories, Kangwane in the east and Kwandebele in the west. The Province is predominantly rural and the population of three million is heterogeneous settled on the 79,490 km² of land, with a concentration of people in periurban areas and on tribal land (Erasmus 2000). Mpumalanga shares many of the demographic features that characterise rural areas of southern Africa, including high fertility (Mpumalanga = 4.3/1,000; South Africa = 3.3/1,000), population growth (Mpumalanga = 3%/annum; South Africa = 2.4%/annum), and infant mortality rates (Mpumalanga = 45.1; South Africa = 40.2) (Chimere-Dan 1995).

Mpumalanga is one of the most historically deprived provinces and this is reflected by its ranking in relation to other provinces, where 1 reflects top performance and 9 worst performance. Mpumalanga rates for literacy, 6th for employment and 6th for dependency. The Province fares poorly when the availability of basic amenities and services is considered. Only 20% of African households have tap water available, with a similar proportion using electricity as their major source of power, and only 16% of households have any sanitation facilities. The Province has the lowest per capita expenditure on public health services, and the lowest nursing and hospital bed provision ratios in the country.

With such a low economic and infrastructure base, it is not surprising that Mpumalanga bears a heavy burden of communicable diseases. Indeed communicable diseases constitute approximately 70% of primary care contacts with the health services in the Province. Certain communicable diseases have had higher incidences in Mpumalanga historically, including malaria and measles. In addition the province is second only to KwaZulu-Natal in the number of confirmed rabies and cholera cases notified during large-scale cholera epidemics during the 1980s (Athan et al 1998). Recognition of the importance of communicable diseases to the health of the population resulted in the creation by the provincial health authority of district communicable disease control coordinators (CDCCs). Their responsibilities included training, monitoring and supervision of district clinic and hospital staff on priority infectious disease control activities and technical support for their district managers. They were expected to collate, analyse and use disease and programme data for outbreak response and programme modification. In Mpumalanga at the commencement of the training program there was one CDCC for all but one of the 21 health districts. The number of districts was later reduced to nine health districts, but the number of CDCCs was not substantially reduced with their functional success being used to advocate for their retention.

Communicable Disease Control Coordinator (CDCC) Training program

With the implementation of the new district health structure in Mpumalanga Province in 1996, a CDCC was appointed in 20 of the 21 districts to oversee the day to day running of disease control. The CDCCs were mainly black African nurses with extensive clinical or administrative experience in clinics and hospitals, but little experience in disease control and public health. CDCCs had varied backgrounds including hospital matron (1), hospital nurse (1), mobile clinic nurses (3), clinic supervisors (6), clinic nurses (4), school health nurse (1), community psychiatric nurse (1), hospital infection control nurse (1), maternal / child health nurse manager (1), and nurse tutor (1). There were 2 males and 18 females, with ages ranging between 32 and 53 years, with a median of 43 years. The fledgling communicable disease control network lacked the knowledge and skills needed to function adequately, and also lacked a coherent team identity, a situation paralleled at that time in most of the other provinces of RSA. Funding for training was obtained from the Australian Agency for International Development (AusAID) Australia South Africa Institutional Links program.

The training program had two phases. Phase 1 in 1998 and 1999 was designed to provide expert training in the technical skills and knowledge needed by the CDCCs to enable the network to effectively control communicable diseases in Mpumalanga Province.

The major aims of this phase were to:

- develop the capacity of districts to plan and evaluate in fection disease programs;
- enable district staff to appropriately respond to outbreaks of infectious disease;
- strengthen the surveillance system in Mpumalanga Province;
- develop a provincial team, comprised of district CDCCs, able to understand and optimise the use of available data sources;
- pilot this model for potential expansion to other district programs and provinces;
- design a training course of sufficient academic standard to enable the course to be academically accredited.

This initial training raised the level of knowledge and skills in disease control in the CDCC team but failed to directly enhance management skills. As the South African health system had devolved greater management responsibility to rural district level over the initial training period (1998-99), ongoing restructuring had resulted in perpetual change, and resources available for public health expenditure had become scarce, high order management skills become crucial for dis-
Phase 2 of the project was carried out between 2000-2001 and had the goal of providing the necessary management skills to the CDCCs by developing and delivering, in modular format, a course in management for health program middle-level managers. Phase 2 had the following major aims:

- Develop a modular training course in management skills relevant to middle-level health programme managers in rural South Africa;
- Use the course to raise the management skills of the Mpumalanga CDCCs and individual additional middle-level health management personnel from Mpumalanga and North-West Provinces.

In practice, Phase 2 followed Phase 1 without hiatus and was well integrated in terms of philosophy, delivery and content with Phase 1.

### Details of training

The overarching philosophy directing training was that the content should be relevant to the CDCCs disease control activities, with theory reinforced by day-to-day practice. Formal training was provided through 10 modules (see Table 1) delivered face-to-face during monthly meetings (approximately 10 per year) and in 5-day blocks (approximately 2 per year). Details of content can be found at [http://www.jcu.edu.au/school/phtm/PHTM/salinks/](http://www.jcu.edu.au/school/phtm/PHTM/salinks/). CDCCs were trained and then assisted in performing epidemiological field surveys. Formal assessment was by means of written exams and assignments, including reports generated from field surveys.

### Selected project outcomes

#### Certification of competency

Sixteen of the 18 CDCCs who completed the training programme and were successful in the rigorous but applied assessment, graduated in 1999 with University accredited Competency Certificates in District Communicable Disease Control (awarded by James Cook University, Australia & University of the Witwatersrand, South Africa) and in 2001 with Competency Certificates in Project and Programme Management (awarded by James Cook University, Australia & the Medical University of Southern Africa (MEDUNSA), South Africa). The two remaining CDCCs were issued with attendance certificates.

#### Granting of formal academic credit

The high standard of the curriculum and of the candidates is demonstrated by the fact that two leading South African universities granted credit for equivalence at Masters level of the material to CDCCs who have embarked on MPH programmes.

### Control of outbreaks

The Mpumalanga communicable disease control team was successful in containing outbreaks. For example, the 2000-2001 cholera epidemic in South Africa had minimal impact in Mpumalanga with no secondary cases while in neighbouring KwaZulu-Natal over 100,000 cases occurred in the same period. This was an excellent result given that in the 1980s cholera epidemic the region of Mpumalanga had had high numbers of cases (Athar *et al* 1998). The low numbers of cases in Mpumalanga appeared to be due to a highly effective surveillance system and the immediate and appropriate outbreak response to any suspected cholera case (Durrheim *et al* 2002). By late 2001 CDCCs in the high risk districts bordering KwaZulu-Natal had such a high level of competency in cholera outbreak control, that they were largely managing potential outbreaks themselves with minimal input from the provincial communicable disease control specialist.

### Operational research projects

Data generated by district surveys conducted by the CDCCs and assessed as part of their training was used to guide decision-making. For example, one of the earliest public

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**Table 1:** Modules developed during project, method of delivery and rating by CDCCs

<table>
<thead>
<tr>
<th>Module</th>
<th>Mode of delivery</th>
<th>Poor</th>
<th>Fair</th>
<th>Satisfactory</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Epidemiology Disease Control</td>
<td>Block</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1 (6.3%)</td>
<td>8 (50.0%)</td>
<td>7 (43.8%)</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>6 (37.5%)</td>
<td>10 (62.8%)</td>
</tr>
<tr>
<td>Outbreak and surveys</td>
<td>Block</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>6 (37.5%)</td>
<td>10 (62.8%)</td>
</tr>
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<td></td>
<td>Monthly</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting</td>
<td>0.0%</td>
<td>0.0%</td>
<td>3 (18.8%)</td>
<td>5 (31.3%)</td>
<td>8 (50.0%)</td>
</tr>
<tr>
<td>Training health workers</td>
<td>Block</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1 (6.3%)</td>
<td>7 (43.8%)</td>
<td>7 (43.8%)</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>0.0%</td>
<td>0.0%</td>
<td>3 (18.8%)</td>
<td>8 (50.0%)</td>
<td>5 (31.3%)</td>
</tr>
<tr>
<td>Computer training</td>
<td>Block</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>8 (50.0%)</td>
<td>8 (50.0%)</td>
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<td></td>
<td>Monthly</td>
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<tr>
<td></td>
<td>Meeting</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1 (6.3%)</td>
<td>10 (62.5%)</td>
<td>5 (31.3%)</td>
</tr>
</tbody>
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_Africa Journal of Nursing and Midwifery - June/July 2003 - Volume 5 No 1_
health surveys done by CDCCs proved highly informative for planning immunization campaigns with implications beyond the province and national level (Durrheim & Ogunbanjo 2000). A number of the CDCCs have successfully planned and conducted operational research projects within their districts and the province. Some of this field research has had important programme implications, both for Mpumalanga and beyond. In these individual projects, CDCCs also had the experience of authorship in peer-reviewed journals. Examples include neonatal tetanus elimination (Idema et al 2002), adverse reactions to intradermal BCG vaccination, and strategies for estimating leprosy prevalence after WHO-elimination targets are achieved (Durrheim et al 2002). Two CDCCs also presented a poster at a European scientific meeting of the International Union Against Tuberculosis and Lung Disease (Balt et al 2001).

**Evaluation of the project from the perspective of participants**

In August 2001 an anonymous survey of participants was conducted using a self-administered questionnaire. The questionnaire contained 17 questions, 4 of which sought demographic data, 8 asked for comment or assessment of experiences during the project, 2 sought comment about applicability of the project for other colleagues, 1 asked about areas for improvement and 2 questions asked about plans for further study. In-depth interviews were also conducted with six CDCCs of different ethnic backgrounds working in different health districts. The data were analysed to define analytical categories, identify and index themes.

Sixteen (2 males, 14 females) of the 18 CDCCs completed the questionnaire at a monthly meeting. The remaining two CDCCs were unable to attend due to work commitments. The loss of two of the original cohort of 20 CDCCs was occasioned by the retirement of one and a change of employment by another. One of the original cohort had recently been promoted to the position of national TB information manager, but still attended meetings. Fifteen of the 16 (94%) respondents rated the monthly meetings, week-long blocks and field projects as highly appropriate to their needs. When asked in an open question about the style of learning that suited them best, 69% (11/16) mentioned lecture/discussion, 31% (5/16) simulation exercises, 44% (7/16) group work, 25% (4/16) multimedia presentations, and 13% (2/16) role play.

Training modules were rated as good or excellent by over 81% of respondents and none were rated as poor by any CDCC (Table 1). Most CDCCs (88%, 14/16) rated the formal assessment of training as good or excellent, and the majority (69%, 11/16) also appreciated participation of colleagues in preparing and presenting training sessions, rating this as good or excellent. No CDCC rated these elements as poor.

Specific benefits stemming from the training and emphasized by respondents included:

- Improved knowledge and skills for better programmes (n=6);
- Improved management of outbreaks and important communicable diseases (n=5);
- Better use of data (n=4);
- Ability to apply what was learnt (n=3);
- Greater ability to equip district staff (n=2);
- Improved planning skills (n=2);
- Enhanced leadership ability (n=2);
- Brighter career options (n=1);
- Broader understanding of the application of field data (n=1);
- Being more assertive (n=1);
- Greater ability to do field work (n=1);
- Improved communication skills (n=1).

No negative aspects of the training were mentioned by any CDCC. However, one indicated that a few modules would have been improved if more time had been available for direct interaction with teachers.

Tangible support provided by the province, including explicit support from individual district managers, hands-on support by the provincial CDC office, and availability of certain resources, including a computer, subsidised vehicle and reference material, were mentioned as important factors facilitating application of what had been learnt. Respondents indicated that the ongoing re-structuring and attendant uncertainty about the sustainability of their positions hampered their optimal functioning. All respondents indicated that they believed that this type of program would be valuable to colleagues in adjacent provinces and countries.

To the question exploring ways in which the program might be improved, a number of CDCCs mentioned the importance of name badges stating their position, official certification, and ongoing refresher courses. These suggestions were addressed by awarding CDCCs with official badges and diplomas at the graduation ceremony. The CDC team continues to meet monthly for planning, evaluation and training.

Eleven respondents (69%) had embarked on further studies since being involved in the project, with 4 at Masters level (3 in Public Health), 3 Bachelors, and 4 nursing specialisations. Major themes that emerged from the in-depth interviews related to benefits of the training both at a personal and professional level. All CDCCs interviewed indicated that their own confidence and self-esteem had been increased through the training programme. Comments included: "I now feel important", "I am now more assertive", "No longer
feel inferior" and "I am not afraid to face problems". A particularly important quote from a CDCC in a rural under-resourced district was "My voice in the district is now worth something".

On exploring the reasons for this increased confidence, two key factors stood out. Firstly, CDCCs felt more able and competent to perform in their jobs. This related to a number of functional areas including their ability to teach: "I am able to share information, knowledge and protocols to strengthen teams", "(I am able to) develop people into a team" and "I am often used as a resource for knowledge, and for coordination, and for intervention". It became clear from the interviews that the CDCCs management expertise was also seen as a resource in the districts: "the District Manager lets me act, recognises that I am a good organiser and gives me responsibility" and "I have started many community groups because I know what steps to follow in doing projects". Respondents indicated that their functioning in communicable disease control had improved because they were better equipped to use routine and survey data for planning and evaluating their programmes, and had credible communicable disease control knowledge: "my district manager uses my statistics as a basis to help her write her own three-monthly report", "I am seen as a resource in the district; my district manager has confidence in me", "After training I understood the significance of particular diseases....what they meant in terms of lives and costs to government", "I know what to do and what not to do", and "We have been empowered greatly in (communicable disease control) knowledge. My colleagues say to me "you are like mini-doctors, specialists. CDCCs (are able to) do more than a nurse has been trained to do""

The second factor was a recognition in the district of the value of their well-functioning programmes with a resultant increase in their influence and power: "The District Manager says the CDC programme is very valuable", "I benefited a lot from the training; first my personal power as I later became an expert", "I have gained authority; I am seen as a trainer, supported resource, expert", "I have a higher profile now. This is important, particularly when dealing with doctors" and "the Communicable Disease Control programme is the top programme in the district".

Team cohesion, support and camaraderie was an important theme that emerged and this was not a fundamental objective in planning but clearly a very important outcome. Important quotations supporting this include: "members of team meet independently outside the monthly meetings", and "If I miss a meeting, (I) feel like I miss my mother, or my wife".

The quality of the training was appreciated both in terms of academic opportunities and professional advancement: "The programme is recognised by other CDC programs as being very valuable, recognised by academics", "Much of the material has helped me in my Masters (studies); statistics were useful", and "(The) training has contributed a lot to future job prospects".

The training model adopted, philosophy behind it and material developed were highlighted as key reasons for the relevance of the programme: "We were seen not just as CDCCs but with potential, and trained as managers", "Other district coordinators are just working because they are at work; we work because we want to make a difference", "I am proud to be part of this", "I had done it before but didn't understand why. Now it makes sense", "This (programme) has changed me from a theoretical person to become one who can manage", and "(I have) much more useful knowledge. After previous University studies, I was very dissatisfied. Now I can use everything learnt in this course"

**Conclusion**

This training program was highly successful. It resulted in a competent communicable disease control surveillance and response system implemented by a well-trained and highly skilled team of nurses. The health of the province benefited significantly. The CDCCs also benefited personally with improvement in self-confidence and status, progression of over 50% to additional academic training, and public recognition of their expertise and competence even in areas outside the communicable disease control area. Why was this training program so successful? Many elements appear to have contributed to this. Amongst the most important appear to be the highly relevant content, with theory and skills taught through activities that had direct bearing on their day to day roles; focussing of training on local delivery using personnel able to translate surveillance information into action; formal assessment that provided academic rigor unusual in workplace training; and enthusiastic and supportive trainers with local experts available to assist in resolving local problems. The ability to keep health professionals in the workplace while upskilling them with minimal disruption to services has been previously demonstrated to be of benefit at district level in India (John et al 1998). The approach of ongoing training in the field has two advantages; an ability to immediately achieve public health gains, and minimal disruption to the trainees' day-to-day functioning. This encourages the support of senior management during on-going training, support that may disappear more readily when personnel are removed to geographically distant locations for long periods of time for training that may not be locally relevant. The impact of the model on participants is well illustrated by a comment made by a CDCC in an in-depth interviews "Other district coordinators are just working because
they are at work; we work because we want to make a difference”.

**Acknowledgements**
Funding for this project was provided by AusAID under the Australian South African Joint Institutional Links Project with in-kind support from Department of Health, Mpumalanga, Department of Family Medicine and Primary Health Care, Medical University of Southern Africa, Department of Community Medicine, University of Witwatersrand, and School of Public Health and Tropical Medicine, James Cook University.

**References**


