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Reproductive Health Matters 2008;16(32):32–40
0968-8080/08 $ – see front matter
PII: S0968-8080(08)32403-3

REPRODUCTIVE HEALTH matters
www.rhmjournal.org.uk

Achieving effective cervical screening coverage in South Africa through human resources and health systems development

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Abstract: *South Africa's cervical screening policy recommends three free Pap smears at ten-year intervals for all women over 30 years of age, aiming to achieve 70% coverage by 2010 by targeting the age group most at risk of developing pre-cancerous cervical lesions. Attaining wide coverage requires an adequate supply of motivated and supported public sector health workers with appropriate training and skills, working in a functional health system. Given the dearth of doctors in South Africa, professional nurses were tasked with performing the bulk of Pap smears at primary care level. Coverage remains sub-optimal and a significant proportion of women with precursor lesions do not receive treatment. Further, health system strengthening – essential for cytology-based screening – has not happened. Research to evaluate alternative screening technologies has proliferated in recent years, but regrettably, strengthening of the health system required to make the new technology work has not received similar attention. Using the South African experience, this article argues that technological interventions and innovations alone are not sufficient to improve cervical screening programmes. Task-shifting is limited unless other human resource concerns (e.g. training, increasing demands on personnel, attrition, and skills mix) are concurrently addressed within a comprehensive workforce development strategy, alongside work to make the health care delivery system functional.* ©2008 Reproductive Health Matters. All rights reserved.

Keywords: cervical screening and cancer, coverage, health systems, human resources, task shifting, South Africa

SCREENING is a cost-effective cervical cancer control strategy with proven effectiveness. Organised cytology-based screening programmes achieving high coverage rates employing Papanicolaou smears and treatment of pre-cancerous lesions led to significant reductions in cervical cancer incidence and mortality in developed countries.[1,2] These successes have not been replicated in developing countries, which bear a disproportionate 83% of the global cervical cancer burden.[1,3] The inequities are stark; developed countries have an average screening coverage of 63%, compared to 19% in developing countries.[4] Sub-Saharan Africa, one of the most affected regions, has access to only 5% of global resources for cervical cancer prevention.[2,5]

Cervical screening in South Africa

South Africa, one of the better-resourced countries in sub-Saharan Africa, historically provided opportunistic screening, largely in urban centres to specified groups such as contraceptive service users.[6,7] The consequences were differential cervical cancer incidence between race groups, urban and rural, and wealthier

and poorer women; and low screening coverage.[7] A national prevalence study showed only 20% of eligible women had ever had a Pap smear.[8] In response, in 2000, the National Department of Health formulated a cervical screening policy, recommending three free Pap smears (in the public sector) at ten-year intervals, for all women over 30 years of age; and referral of women with high-grade squamous intra-epithelial lesions (HSIL) or malignant lesions to appropriate facilities for diagnosis and treatment.[9] Based on resource considerations and the best available evidence, the policy adopted a public health approach by targeting the age group most at risk of developing high-grade, precursor lesions of the cervix. The policy conformed to World Health Organization (WHO) recommendations for screening in resource-limited countries.[2]

The policy aims to achieve 70% coverage of the target age group (women 30 years and older) within ten years.[9] Thus, approximately 5.5 million new Pap smears, or 550,000 per year, should be performed in the target group by 2010; and about 23,600 women per year will require referral for diagnosis and treatment of HSIL or invasive disease.[10] Attaining high coverage rates in the target group and treatment of all women with precursor lesions is essential for programme success, and is an immense challenge. Several elements are required: a reliable screening method, mechanisms to educate, inform and invite women for screening; health facilities; cytology laboratories; personnel to perform screening tests, read smears, and interpret and inform women of results; communication between service sites and laboratories; systems to follow-up and refer women with precursor lesions or invasive disease; facilities for diagnosis and treatment of pre-cancer and invasive cancer; mechanisms to recall women according to national screening schedules; and monitoring and evaluation systems.[11] In summary, a functioning health system is required.

Health systems should establish all these elements as it is unethical to offer screening without ensuring that follow-up and treatment services are available for women with abnormal smear results.[12] South Africa has not invested sufficiently in health system strengthening, however, nor in building the management capacity to co-ordinate and monitor the screening programme.[13] The severe shortage of health workers is a further limitation. In 2001 there were 32,000 registered medical doctors, 25-27% of them in the public sector; and just over 196,000 nurses (51% were professional nurses, the rest enrolled nurses and enrolled nursing auxiliaries),* representing doctor and nurse workforce densities of 0.77 and 4.08 per 1,000 population, respectively.[14,15] These densities are significantly lower than in Europe and the USA (particularly for doctors) and comparable middle-income countries, but higher than other southern African countries.[14] Given the HIV epidemic and the more recent initiation of HIV treatment programmes, nurses have an increased workload.[17] Aggravating the shortage, only 59% of nurses work in the public sector.[14]

Response to screening policy needs

Several solutions are required to overcome these challenges. Ensuring high coverage rates in the target population is an important first step; unless women get screened, there is no opportunity for early detection and treatment of precursor lesions. Thus, the question of whether there are enough health workers to provide Pap smears and the location of these health personnel is important. The imperative to increase access to services, the dearth of doctors, and the greater cost-effectiveness of nurse-led services prompted the National Department of Health to designate professional nurses as the preferred provider of screening services at primary care level; a decision consistent with the policy shift to a primary health care approach.[18] The task-shifting decision was strengthened by estimates that there were sufficient professional nurses in the public sector to achieve 100% screening coverage of the target group in ten years.[10] These

*A professional nurse has four years of training, and is "educated and competent to practice comprehensive nursing, and assumes responsibility and accountability for independent decision-making in such practice". They may take responsibility and accountability for the care of people with unstable and complicated health conditions. An enrolled nurse (staff nurse) provides basic nursing care and treatment of persons with stable and uncomplicated health conditions. An enrolled nursing auxiliary provides elementary nursing care, including assistance and support for activities of daily living and self-care.[16]

estimates however predated the public sector HIV testing and treatment interventions and were ignorant of the impact of the global human resource shortage on nurse migration.[19,20]

Another response to screening policy challenges has been in the research arena. The failure of weak and under-funded developing country health systems to establish successful cytology-based screening programmes has spurred a quest for alternative screening methods.[5,21] Research to evaluate alternative screening methods, particularly visual inspection with acetic acid (VIA) and humanpapilloma virus (HPV) testing, has proliferated in recent years in South Africa and elsewhere. The motivation is that these alternative technologies perform as well as or better than cytology, and, requiring fewer resources and infrastructure, have the potential to increase the feasibility of cervical screening implementation in low-resource settings.[22] However, this implicitly suggests that technological solutions alone will address the poor-performance of screening programmes in developing countries.

While promising, neither of these solutions is sufficient to improve screening programme performance. This article argues that health inputs alone – task-shifting to ensure sufficient health workers for screening, and a reliable screening technology – are necessary but not sufficient to improve screening programmes, and do not inevitably result in better health outcomes. These issues are discussed in reference to cervical cancer screening services at the primary care level in South Africa.

Task-shifting alone is insufficient

Due to task-shifting, Pap smear provision, previously the exclusive domain of doctors and family planning nurses, was extended to all professional nurses in the public sector.[7] This led to greater availability of screening services. All nine provinces in South Africa have since established screening services to varying degrees and indications are that significantly more first-time Pap smears are being done. Screening statistics at a national level are not readily available, but for example, Gauteng province experienced a four-fold increase in new smears in women 30 years and older; from 14,609 in 2001 to 58,305 in 2005.[23] Data regarding the adequacy of Pap smears are unavailable but sorely needed for quality assurance, and to monitor the impact of task-shifting on smear adequacy rates. Significant increases in screening, however, still fall far short of targets; for example, KwaZulu Natal and Gauteng provinces performed only 25% and 45% of their respective annual targets during 2005/2006.[5] While there is progress, many smears are still done on women less than 30 years. For example, in the Western Cape Province, 37% of smears in Montagu (1996) and 50% in Mitchell's Plain (1998) were in the appropriate age group;[24,25] compared to 84% of smears in Mitchell's Plain and 70% in Brakpan (Gauteng province) in 2002.[26] This shows that despite an increase in the proportion of smears performed in the correct age group, 16-30% of screening smears are "misplaced" and do not contribute to the attainment of high coverage rates.

This underscores a limitation of focusing solely on the number of health workers available for service delivery. We suggest several reasons why task-shifting is not a sufficient response, and highlight the importance of concurrently addressing other human resource development concerns, coupled with health system strengthening.

Insufficient attention to health systems development

Making professional nurses the primary cervical screening providers is logical, given the need to increase access to services. However, this solution fails to recognise that a screening programme entails more than just taking Pap smears and has several components that should be well-coordinated, including facilities for diagnosis and treatment of precursor lesions.[27,28] Due to human resource and infrastructural constraints, diagnostic and treatment services are not available at primary care level in South Africa. Though the screening policy recommends all women with high-grade precursor or malignant lesions be referred to appropriate facilities, not enough has been done to strengthen referral systems to ensure screen-positive women get to available diagnosis and treatment services.[13] Consequently, a sub-optimal proportion of women who need it, receive treatment for cancer prevention. A study in three provinces showed up to 50% of women with HSIL do not access colposcopy clinics largely due to poor referral systems

and the lack of reliable mechanisms to follow women up.[13] In routine service delivery settings the proportion of women with HSIL or malignant lesions who are successfully treated is unknown. For example, in Gauteng province, 1,814 women had a HSIL Pap smear result in 2005,[23] but the proportion who subsequently received treatment to prevent cervical cancer is unknown, as the routine patient information system does not collect data to determine this.[29]

Declining production of nurses

Earlier estimates regarding the adequate number of nurses available for screening may require revision as the production of professional nurses has not kept up with population growth, increasing demands for health services, and nurse attrition.[16] There was a decline in the absolute number of professional nurses trained by nursing colleges and universities from 2,629 in 1996 to only 1,716 in 2004.[14,16] Nurse training is funded from provincial health budgets; and most provinces reduced the funding in the face of competing priorities, resulting in fewer entrants into training programmes. Projections indicate that the production of professional nurses has to increase threefold in order to meet national requirements.[16] The National Departments of Health and Education should collectively address this; making nurse training a national function may be a way of ring-fencing funds to increase production of nurses.[30]

Maldistribution of nurses and poor skills mix

South Africa's health workers are poorly distributed, being concentrated in urban areas, the private sector (especially doctors), and hospitals.[14,30] Provider-to-population ratios often mask such maldistribution. Maldistribution of health workers between rural and urban areas has important equity implications. Evidence from southern Africa shows that the richest districts have 700% higher doctor densities and 100% higher nurse densities than the poorest.[31] Poorer and understaffed districts (invariably rural areas where the need is greatest) thus achieve worse health outcomes, as higher health worker densities are associated with better coverage of health interventions and population health outcomes.[32] Ensuring an appropriate skills mix at clinics is also necessary to optimise efficient utilisation of professional nurses. To underscore this point, it was found that professional nurses in facilities with shortages of lower cadre health workers often performed tasks meant for lower skilled workers resulting in inefficient use of human resources.[30] The maldistribution of nurses in South Africa thus needs to be addressed for efficiency as well as equity reasons.

Attrition of nurses from the public sector

The South African health sector's inability to retain nurses contributes to their dwindling numbers in the public sector, thus reducing the available public sector workforce for screening and other priority programmes. The public sector nurse attrition of almost 70% has been attributed largely to emigration, and AIDS-related illness and mortality.[16] Though the impact of HIV and AIDS on the South African health workforce has not been adequately quantified, the literature suggests that AIDS is an important cause of health worker attrition in sub-Saharan Africa.[33] For example, 38% and 44% of nurses trained annually in Malawi and Zambia, respectively, died from AIDS-related causes in a single year.[34] Further, globalisation has made labour migration easier, and the increasing demand for well-trained nurse professionals in developed countries, themselves facing human resource shortages, is a significant pull factor.[19,35]

Retention strategies should take into consideration why nurses leave. Current South African public sector retention strategies prioritise financial incentives,[36] and yet research demonstrates that although significant, salary is neither the only nor the most important factor influencing retention.[37] In a study assessing maternal health nurses' choices about where to work, nurses ranked improved working environments and conditions (such as good facility management and adequate equipment) as high as, or higher than, salary and financial incentives.[38] Other evidence suggests that financial incentives alone are insufficient to improve health worker motivation, which is a significant determinant of retention.[37] This suggests that a mix of financial and non-financial incentives is required to address nurse attrition. Investing in a functional health care system in which nurses feel motivated to work is an important part of human resource planning.

Increasing demands on a shrinking workforce

As demands on primary care nurses increase (such as the expansion of HIV testing and treatment), coupled with declining production and attrition, fewer nurses are available to do the additional work. This affects their motivation and capacity to perform their work well. For example, nurses are reluctant to integrate Pap smear provision into their portfolio of work, fearing this would create extra work.[25,26] Strategies to reduce the burden on nurses are urgently needed. Discussions regarding the creation of new cadres of mid-level health workers have been introduced in South Africa, but are unresolved.[30] Mobilising existing less-skilled cadres of nurses for cervical screening (i.e. enrolled nurses and enrolled nursing auxiliaries) should be explored. Their training is cheaper and quicker than that of professional nurses, and emigration is less likely as their training is not internationally-recognised.[39]

Expanding the roles of auxiliary health workers has been tested for Pap smear provision in South Africa. In a multi-site study to determine the prevalence of pre-cancerous lesions, lay health workers were trained to perform Pap smears in one study site. Ninety per cent of smears in this site were (adequate for cytological assessment), comparable to or higher than some sites where only nurses and doctors performed the smears.[8] Similarly, in a rural Indian district where auxiliary nurse-midwives were trained to perform Pap smears, 96% of them were adequate for cytological examination.[40] These and similar experiences provide useful information for discussions regarding integration of lower-cadre nurses into cervical screening provision in South Africa. However, caution is advised, as these nurse cadres will not provide a good service in a sub-optimal health care system where they will experience the same frustrations and demotivation as the professional nurses.

Inadequate attention to nurses' knowledge, skills and attitudes

The screening policy anticipates that all primary care level nurses in South Africa will conduct screening, but this has not materialised, partly because nurses have not been equipped with the necessary knowledge and skills.[13,25] In 2002, a study in 21 primary care facilities in three districts found that only 58% of nurses were trained to provide Pap smears (in the rural district only 14%); and only 35% of all nurses were performing Pap smears.[26] Many were unwilling to provide screening because they disagreed with the policy recommendation on the screening interval and target age for screening. Nurses' ability and willingness to provide screening increased after an intervention trained them to perform Pap smears and explained the rationale for the policy. After the intervention, 86% of nurses were able (trained) to provide Pap smears, and 61% were doing so, resulting in a three-fold increase in coverage in one year and an increase in the proportion of smears done in the target age group.[13,26] This highlights that shifting screening functions to nurses must be accompanied by interventions to address quality concerns (knowledge, skills, attitudes and willingness to provide services).

A related concern is that nurse graduates are not sufficiently equipped with the knowledge and skills to perform Pap smears, as cervical screening has not been integrated into the nursing curriculum. Acquiring this capacity after graduating is not always feasible because continuing professional development for cervical screening is not readily available, and a formal continuing professional development system for nurses has yet to be implemented.[36] This is a gap that should be addressed as a matter of priority. The Nursing Council is an important actor that needs to be engaged to make the curriculum relevant to disease burden and health policy.

Technology inputs are necessary but not sufficient

The quest for alternatives to the Pap smear is justifiable, given the complexity of implementing cytology-based screening in low-resource settings.[5] Technologies like human papillomavirus (HPV) DNA testing and visual inspection with acetic acid offer a number of opportunities, including: easy to perform (HPV testing); improved test performance (HPV testing); an increased range of available screening options; less infrastructural demands on laboratory and health services (VIA); immediately available screen results, allowing for one-visit screen-and-treat approaches (where nurses perform cryotherapy), and overcoming the need to recall women for results, thus reducing loss to follow-up (VIA).[41–44]

However, these methods also have constraints: the approved HPV DNA test is simple to perform

and increases screening sensitivity when combined with cytology, but requires a second clinic visit and costly laboratory infrastructure, making it unaffordable for low resource settings.[45] In South Africa, HPV DNA testing is available only in the private sector where profit considerations are paramount, so this will not benefit those most in need of screening. Given their relatively low cost and infrastructural needs, visual methods could potentially increase the cost-effectiveness of screening programmes. However, they are associated with over-treatment, the extent and consequences of which are as yet unknown.[45] Ablative therapy consequent on presumptive diagnosis is reminiscent of a particular attitude to women's bodies that saw and still sees removing a uterus when it has no further use as acceptable medical practice. Further, though efficacious in research settings, the impact of these alternative screening methods on cervical cancer incidence and mortality is yet to be proven. The World Health Organization recommendation is that, pending further evidence, their use should be limited to demonstration sites in settings without resources for cytology-based screening.[45]

Regrettably, while the quest for alternative methods has progressed, strengthening of health systems, which is required to make new technology work, has not received similar attention.[13] Replacing the Pap smear with alternatives will not overcome the need for a functional health system, particularly for referral, follow-up, and monitoring and evaluation. Experience demonstrates that technology inputs alone do not improve population health outcomes; combined approaches ensuring both the availability of inputs and health systems strengthening are recommended.[46] Thus, the South African screening programme's skewed emphasis on Pap smear availability must shift to encompass other programme elements. This is an imperative for improved health outcomes, and an ethical obligation to guarantee women who present for screening to accrue the benefits.[12]

South Africa is better placed than most sub-Saharan Africa countries, but will not attain a successful screening programme without significantly increased effort. An enabling policy environment is a good start, but much more is required to translate intents into actions that lead to improved health outcomes. Locally developed, context-specific guidelines for programme managers are available, with recommendations for strengthening the screening programme using a health systems development approach.[27] Further afield, the experience of Chile is a good learning point. Chile, a developing country of similar middle-income status to South Africa, achieved more than 50% increase in screening coverage and close to 50% reduction in cervical cancer mortality. This was done by translating strong political commitment into action, establishing a trained and motivated public sector health workforce, improving the organisation of services, and strengthening its health system.[47]

Future directions

Task-shifting alone has not improved Pap smear coverage and screening programme performance in South Africa sufficiently because the human resource components of a comprehensive workforce development strategy (production, distribution and training of nurses, demands, attrition, and skills mix) have not been addressed concurrently. To optimise the potential benefits of task-shifting for the cervical screening programme, these issues should be addressed within a national workforce development strategy. In this regard, capacity building of nurses should include not only increasing numbers, but also address attitudes and skills.[48] Further, in the absence of a policy decision to replace the Pap smear, this remains the standard of care in the South African public sector. Health system strengthening, including monitoring and evaluation, is an urgent priority and will still be imperative should an alternative screening method be adopted.

With immediate effect, skills required to implement cervical screening should be integrated into the nursing curriculum and continuing professional development training on cervical screening rolled out nationally. Manuals for the South African context are available to guide the content and implementation of such training.[49] In addition, further task-shifting to enrolled nurses and enrolled nursing auxiliaries should be considered as a policy option, but this should be coupled with appropriate training, support and supervision to create a conducive work environment, as well as appropriate incentives to optimise motivation and productivity of these cadres in their new roles. Political commitment, leadership

and good stewardship of the South African health system is essential and lacking.[50] This should drive the human resources for health agenda, create a public sector that staff want to work for and feel appreciated in, and draw in the various actors (such as the nursing council, medical schools and the private sector) to work towards implementation of the cervical screening policy.

For the future, the HPV vaccine holds the greatest promise for cervical cancer control in South Africa. However, this is a longer-term solution because women who have already been exposed to HPV will still need screening.[51] Further, the prohibitive cost of the vaccine due to intellectual property patents and World Trade Organization agreements limit its use in Africa. The GAVI Alliance's recent decision to consider future support for expanding availability of the vaccine in eligible, low-resource countries over the next five years offers hope.[52] Global advocacy and lobbying are needed to mobilise further resources to extend similar benefits to non-GAVI-eligible countries, including South Africa, and to challenge current practices that limit developing countries' access to drugs and other medical interventions. But the bottom line is that human resources and well-functioning health systems will be essential for the successful delivery of HPV vaccines once these are available in developing countries.

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Résumé

La politique sud-africaine de dépistage du cancer du col de l'utérus recommande trois frottis gratuits à dix ans d'intervalle pour toutes les femmes âgées de plus de 30 ans, afin d'atteindre une couverture de 70% d'ici 2010 en ciblant le groupe d'âge le plus à risque de développer des lésions précancéreuses. Parvenir à une large couverture nécessite des soignants du secteur public motivés et soutenus, dotés de compétences adaptées, travaillant dans un système de santé fonctionnel. Compte tenu du manque de médecins en Afrique du Sud, les infirmières ont été chargées de réaliser l'essentiel des frottis au niveau primaire. La couverture demeure sous-optimale et une proportion notable de femmes avec des lésions précurseurs ne sont pas soignées. De plus, le renforcement du système de santé, essentiel pour le dépistage cytologique, ne s'est pas produit. Les évaluations d'autres technologies de dépistage se sont multipliées ces dernières années, mais malheureusement, le renforcement du système sanitaire requis pour utiliser la nouvelle technologie n'a pas reçu une attention similaire. Se fondant sur l'expérience sud-africaine, cet article avance que les interventions et les innovations technologiques ne suffisent pas à améliorer les programmes de dépistage. La délégation des tâches est limitée, à moins que d'autres problèmes des ressources humaines (par exemple la formation, la charge accrue de travail, l'usure et le dosage des compétences) ne soient abordés en même temps dans une stratégie globale de développement de la main-d'œuvre, parallèlement à des activités pour rendre fonctionnel le système de soins de santé.

Resumen

En Sudáfrica, la política de tamizaje cervical recomienda tres pruebas gratis de Papanicolaou a intervalos de diez años para todas las mujeres mayores de 30 años de edad, con el objetivo de lograr el 70% de cobertura para el 2010 al dirigirse al grupo etario con mayor riesgo de presentar lesiones cervicales pre-cancerosas. Para lograr una amplia cobertura se necesita un suministro adecuado de trabajadores de salud motivados y apoyados en el sector público, con capacitación y aptitudes necesarias, que trabajen en un sistema de salud funcional. Debido a la escasez de médicos en Sudáfrica, las enfermeras profesionales efectúan la mayoría de las pruebas de Papanicolaou en el primer nivel de atención. La cobertura sigue siendo sub-óptima y una considerable proporción de mujeres con lesiones precursoras no reciben tratamiento. Además, aún no se ha fortalecido el sistema de salud, lo cual es esencial para el tamizaje basado en citología. En los últimos años han proliferado las investigaciones para evaluar otras tecnologías de tamizaje; lamentablemente, no se ha dado la misma atención al fortalecimiento del sistema de salud fundamental para lograr que funcione la nueva tecnología. Usando la experiencia de Sudáfrica, este artículo argumenta que las intervenciones e innovaciones tecnológicas por sí solas no son suficientes para mejorar los programas de tamizaje cervical. La reasignación de tareas es limitada, a menos que otros problemas de recursos humanos (p.ej. capacitación, aumento de exigencias del personal, rotación del personal y una mezcla de aptitudes) sean tratados simultáneamente en una estrategia integral de desarrollo del personal, junto con trabajo para lograr un sistema de salud funcional.