

# RESEARCH & HEALTH SERVICE DEVELOPMENT: RESEARCH LEADS TO SERVICE DELIVERY IMPROVEMENTS

HEALTH SERVICES REFERS TO ALL STRUCTURED AND INTERRELATED ORGANIZATIONS, ACTIONS AND RESOURCE PERSONNEL WHOSE PRIMARY INTERESTS ARE TO HELP INDIVIDUALS AND COMMUNITIES MAINTAIN GOOD HEALTH BY PROVIDING PREVENTIVE AND PROMOTIVE HEALTH INTERVENTION, AND TO RESTORE HEALTH BY DIAGNOSIS AND TREATMENT OF ILLNESS. THEY GENERALLY DENOTE GOVERNMENT-OWNED AND -PROMOTED FACILITIES THAT PROVIDE, AMONG OTHER THINGS, FUNDS, STAFF, EQUIPMENT AND CONSUMABLES, SUCH AS DRUGS. EFFICIENCY OF HEALTH SERVICES IN A COUNTRY IS MEASURED BY THE EXTENT OF ACCESS, AVAILABILITY, COVERAGE AND QUALITY OF SERVICE DELIVERY, AS WELL AS HOW THEY ARE ORGANIZED AND MANAGED. IT IS IMPORTANT THAT THEY BE ORGANIZED AROUND PEOPLE'S NEEDS AND EXPECTATIONS AND LEAD TO THE PROGRESSIVE REDUCTION IN EXCLUSION AND SOCIO-DEMOGRAPHIC DISPARITIES IN HEALTH. THEY SHOULD ALSO HAVE A SOUND FINANCING SYSTEM AND INFRASTRUCTURE TO ENSURE THAT RESOURCES ARE USED EQUITABLY AND EFFICIENTLY.

The way health (basic, clinical and epidemiological) research can directly improve public health services through introducing new concepts and practice patterns and by augmenting infrastructure and human resources, has increasingly come to the attention of governments, health care policy-makers and administrators in recent years. From this perspective, it is worthwhile to evaluate the impact and contribution of IARC's prevention and early detection research activities in improving service delivery in national health services in low- and medium-resource countries.

The Gambia Hepatitis Intervention Study (GHIS) was jointly established in 1986 by the Government of The Gambia, the Medical Research Council, United Kingdom and IARC, to evaluate the protective effectiveness of infant hepatitis

B immunization in the prevention of chronic liver disease, particularly hepatocellular carcinoma. This long-term IARC study has markedly strengthened the capability of The Gambia to deliver the Expanded Programme on Immunization (EPI) and improve the coverage of hepatitis B vaccination leading to reduced prevalence of hepatitis B surface antigen (Plymoth *et al.*, 2009; Viviani *et al.*, 2008).

Over the last two decades, IARC has organized several trials in developing countries to evaluate various screening options to facilitate development of cost-effective strategies and suitable public health policies for early detection and control of cervical, breast, colorectal and oral cancers in low- and medium-resource countries, such as Angola, Burkina Faso, Guinea, India, Lao People's Democratic

Republic, Mali, Mauritania, Nepal, Niger, Republic of Congo, United Republic of Tanzania and Thailand (Deerasamee *et al.*, 2007; Muwonge *et al.*, 2009; Muwonge *et al.*, 2010; Nene *et al.*, 2008; Nessa *et al.*, 2010; Ngoma *et al.*, 2010; Rema *et al.*, 2008; Sankaranarayanan *et al.*, 2004; Sankaranarayanan *et al.*, 2005; Sankaranarayanan *et al.*, 2007a,b; Sankaranarayanan *et al.*, 2009a,b; Sankaranarayanan *et al.*, 2011a; Screening Group, 2011; Teguate *et al.*, 2011). From the start, these studies aimed not only to answer research questions, but also to contribute to improving the infrastructure and skilled human resources of the local health services. Funding agencies, such as the Bill & Melinda Gates Foundation, Association for International Cancer Research (AICR), and Cancer Research, United Kingdom, and organizations, such

as the Union for International Cancer Control (UICC), African Regional Office of the World Health Organization (WHO-AFRO) and Program for Appropriate Technology in Health (PATH), played a major catalytic role by supporting these studies.

Our cervical cancer screening studies have instigated the wider availability of: visual screening and colposcopy; improved histopathology services; treatment of precursor lesions with cryotherapy, cold coagulation, and loop electrosurgical excision procedure (LEEP); cold knife conization; and improved the capacity for delivering radical cancer surgery services for stage I cervix cancer. Augmented human resources and infrastructure deliver the above services in several sub-Saharan African countries such as Angola, Burkina Faso, Guinea, Mali, Republic of Congo, and United Republic of Tanzania, and Asian countries such as Bangladesh, Bhutan, Cambodia, India, Nepal and Lao People's Democratic Republic (Sankaranarayanan *et al.*, 2011b; Teguete *et al.*, 2011). Medical and nursing personnel, who were trained and worked as part of the IARC studies, have evolved as master trainers in screening, diagnosis and treatment and impart their skills to other providers in their countries/regions. The governments of Angola, Guinea and the United Republic of Tanzania have sustained the evolution of these cervical cancer screening training centres by supporting construction of the training facilities, equipping them and providing support for on-going training activities.

Between 1999 and 2011, IARC organized 49 courses on cervical cancer screening in 16 countries, which resulted in the training of 860 doctors in visual screening techniques, colposcopy and treatment with cryotherapy, cold coagulation and LEEP. Some received training in radical surgical procedures and providing colposcopy and LEEP, while 229 nurses, midwives and health workers received education in visual screening and cryotherapy (Tables 1 and 2). Most have evolved as master trainers in their countries thanks to experience acquired through training, retraining and the considerable hands-on opportunities. Nine regional training

centres have been set-up and supported by local institutions and governments. IARC continues to provide assistance to facilitate the exchange of master trainers from different countries in the regions. The training facilities have contributed to the instruction of master trainers from Nepal, Bangladesh, China, Thailand, Cambodia, Lao People's Democratic Republic, Vanuatu, Guatemala, El Salvador, Paraguay, Equator, Guinea Bissau, Cape Verde, Comoros islands, among others. The training courses organized by the Cancer Institute of the Chinese Academy of Medical Sciences, in collaboration with IARC during 2003–2007, have resulted in instructing more than 120 master trainers in colposcopy and LEEP in China. They, in turn, have trained a large number of providers over the past five years, resulting in the establishment of several new colposcopy, LEEP and opportunistic VIA screening services within China and in the region.

It is anticipated that the large evidence base and resources generated by IARC and other researchers will, in due course, lead to scaling up of screening and treatment availability and options through organized programmes in health services of low- and medium-resource countries. It is also hoped that the wide variation in survival from treatable forms of cancers between different low- and medium-resource countries/regions will catalyse urgent investments in improving awareness, population-based cancer registration, early detection programmes, health services infrastructure and human resources, so that the disparities in availability, access to diagnostic/treatment services and survival outcomes will be rapidly reduced (Sankaranarayanan *et al.*, 2010; Sankaranarayanan & Swaminathan, 2011c).

**Table 1. Training courses on early detection and treatment of cervical cancer (1999–2011)**

Country and year of training (# of courses)	Early detection (VIA, VILI, HPV-DNA testing, colposcopy) Number of participants	Treatment (LEEP, cryotherapy, +/- radical surgery) Number of participants
<b>Africa</b>		
Angola (2002)	13	13
Congo (2001; 2003)	27	-
Egypt (2011)	-	20
Gabon (2009)	24	17
Guinea (2000; 2001(2); 2002; 2003; 2007)	67	64
Mali (2001; 2004)	60	-
Mauritania (2002)	18	18
Morocco (2009)	22	-
United Republic of Tanzania (2002; 2009)	48	36
<b>Asia</b>		
China (2004; 2006; 2008)	68	31
India (1999; 2000 (3); 2001 (5); 2002 (2); 2003 (2); 2006; 2007 (2); 2008 (2); 2010; 2011 (2))	630	294
Lao People's Democratic Republic (2002)	15	15
Nepal (2003)	8	8
Thailand (2006; 2007)	54	30
<b>Europe</b>		
France (2000; 2003)	5	5
<b>Oceania</b>		
Vanuatu (2007)	10	10
<b>Total</b>	<b>1069</b>	<b>561</b>

**Table 2. Training resources on early detection and treatment of cervical, breast and oral cancers**

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**Cervical cancer**

- A practical manual on visual screening for cervical neoplasia
- A training course in colposcopy
- A training course in Loop Electrosurgical Excision Procedure (LEEP) – practical
- A training course in Loop Electrosurgical Excision Procedure (LEEP) – theory
- A training course in Visual Inspection using 4% Acetic Acid (VIA) – theory and practice (movie)
- A training course in Visual Inspection using Lugol's Iodine solution (VILI) – theory and practice
- Colposcopy and treatment of cervical intraepithelial neoplasia: a beginner's manual.
- Course in visual methods for cervical cancer screening: visual inspection with acetic acid and Lugol's iodine
- Cytopathology of the uterine cervix – digital atlas
- Digital learning series – A training course in cryotherapy
- Digital learning series – A training course in Loop Electrosurgical Excision Procedure (LEEP)
- Digital learning series – A training course in Visual Inspection with 5% Acetic Acid (VIA)
- Digital learning series – A training course in Visual Inspection with Lugol's Iodine solution (VILI)
- Histopathology of the uterine cervix – digital atlas
- Quick clinical reference chart for Visual Inspection with Acetic Acid (VIA)
- Quick clinical reference chart for Visual Inspection with Lugol's Iodine (VILI)

**Breast cancer**

- Digital training resource for clinical breast examination and breast awareness
- Quick reference chart for clinical breast examination

**Oral cancer**

- A digital manual for the early diagnosis of oral neoplasia
  - Detecting Oral Cancer – A guide for health care professionals
  - Quick clinical reference chart for visual inspection of the oral cavity to detect precancerous lesions and invasive cancers
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