Quality Indicators for Cervical Cancer Screening Programs: The Role of Computerized Systems

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ABSTRACT

Cervical cancer is the malignancy most successfully monitored by screening programs. Although most countries offer screening services, outcomes differ. It is clear that incidence reduction is achieved when quality assurance is implemented. Quality indicators are essential audit tools when implementing screening policies. Uniform indicators are used to monitor general performance and to identify potential problems that may occur and jeopardise efforts. That way quality management is enabled and the assessment of deviation from goals is facilitated. In this paper the authors present the workflow of cervical cancer screening programs in respect to the quality and performance indicators required by the European Guidelines for Quality Assurance in Cervical Cancer Screening. The authors also propose the appropriate data structures and entities that are required for a computerised system to support their calculation. Additionally the authors highlight important interconnections of the computerised system with other systems; these interconnections are vital for the calculation of the proposed quality indicators.

Keywords: Cervical Cancer, Computers, Cytopathology, Information and Communication Technologies, Quality Assurance, Quality Control, Screening, Software

INTRODUCTION

When approaching the overall estimated burden of neoplasia of the uterine cervix in the 27 EU member states, more than 54000 new cases and 25000 deaths annually reveal that (Kalogirou et al., 1997) cervical cancer remains a serious public health problem. The American Cancer Society reported that 12200 new cervical cancer cases were expected in USA in 2010 and that there will be 4210 deaths (American Cancer Society, 2010). Approximately 7-8% of the
total population screened in the UK will have an abnormal smear (Paraskevaidis et al., 2007); of those approximately 1.5-2% will present with a high-grade and 5% with a low-grade lesion, the former requires medical treatment and the latter frequent monitoring.

Population-based screening programs worldwide seem to be the most efficient way of monitoring cervical cancer amongst relevant programs in other malignancies (Miller et al., 1992). Screening for cytological abnormalities and treatment of high-grade precancerous cervical intraepithelial lesions when found, appears to reduce cancer incidence significantly. Mainly this is due to the nature of the disease, than can be prevented if identified in early stages (Syrjanen et al., 2010). Moreover, re-examining of women at a 3-5 year follow-up interval is found to reduce incidence up to 80% (International Agency for Research on Cancer, Cervix Cancer Screening, 2005; Syrjanen et al., 2010).

Incidence and mortality rates vary geographically, as prevention policies implemented differ in terms of attendance and efficiency, or even lack in certain countries of Eastern Europe. Most cases reported are found in Eastern European countries (31,013 new cases and 15,187 deaths). Moreover, mortality rates compared with incidence, reflect lower survival resulting from delayed diagnosis and lower treatment effectiveness in certain eastern European regions (Arbyn et al., 2007a; Sant et al., 2003).

It is nowadays clear that incidence reduction is only achieved when quality assurance is implemented throughout every step of the program, from information provided to the women to treatment strategies and clinical management of screen detected abnormalities (Giordano et al., 2008). As a result, opportunistic screening is discouraged because it can jeopardize the aimed benefits, lead to adverse side effects due to poor monitoring (Adab et al., 2004) and unnecessarily increase costs.

Under that scope, quality indicators closely monitored by experts are essential evaluation tools of all efforts when applying prevention programs. Indicators are measurable results, periodically assessed and evaluated so as to monitor results of health interventions and a crucial element of policy making.

Prevention and treatment of chronic diseases, with particular attention to cancers, has been a strategic priority in policies formed in EU countries. The European Commission of experts in research, health care and cancer screening initially argued on the necessity of organized cervical cancer screening programs in all EU members and introduced European recommendations on cervical cancer screening (Micksche et al., 2001).

The first edition of the European Guidelines for Quality Assurance in Cervical Cancer Screening, released in 1993, established the principles of organized population-based screening strategies (Coleman et al., 1993). The second edition, released in 2008, focuses on policies for adverse effects minimization, maximization of screening benefits and additionally examines future prospects of HPV testing and vaccination. Moreover, key performance indicators were presented in the summary document as measures of quality assurance and program success (Arbyn et al., 2010).

Efforts are focused on delivering healthcare to all in an accessible, equal and highly scientific method, employing quality control in all steps. Screening programs are already enrolling in most EU countries, but recently have to overcome more obstacles than usual due to the economic crisis and the financial cuts enforced in all sectors. It remains, therefore, crucial that in order for the programs to remain financially viable that all policies are carefully monitored and evaluated in terms of cost-effectiveness.

Framed by scientific advisory boards of experts, policy frameworks concerning national screening programs are formed mostly based on the European Guidelines (Arbyn et al., 2010), properly adjusted to the characteristics of the population and the National Health System. Indicators as introduced by the European Guidelines are monitored so as to form measurable assessment tools for the scientific advisory board. In this paper we present the fundamental points of cervical cancer screening programs, we analyse the screening process and propose
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