Introduction

The potential for systematic early detection and treatment of breast cancer to reduce the burden of disease is widely recognized in the European Union (EU). Population-based screening programmes using mammography, the evidence-based test recommended by the Council of the EU, are implemented in most EU countries. Italy is a prime example of the European-wide efforts to make effective and appropriate breast cancer screening accessible to all women who may benefit, where over 1.4 million women attended screening in 2009 out of 2.5 million invitation letters, covering 90% of all women aged 50–69. Building on the achievements in the European countries, continued, concerted efforts are necessary to enable all eligible women to attend breast cancer screening, as pointed out in the paper by Giordano et al. that presents EU data on coverage and participation.

Performance of the screening programmes is continuously monitored, and compared with short-term indicators and standards largely derived from the European guidelines for quality assurance in breast cancer screening and diagnosis. Professionals in individual programmes examine issues such as communication and training. The short-term indicators are designed to show opportunities for improvement in the screening process. The cancer detection rate indicates programme sensitivity, while the recall rate deals with specificity, and other indicators are associated with logistic aspects, such as the length of time between testing and assessment of detected abnormalities. However, these indicators cannot be used to fully evaluate the impact of screening on a population which, as a whole, also includes women who did not accept their invitation. Such an evaluation is important from a public health viewpoint. Recently, several European countries, like Italy, have evaluated which outcomes have changed following the activation of screening programmes, both in terms of positive effects (reduction in presentation of advanced stage cancers, reduction of radical mastectomy rates and reduction in cause-specific mortality) and adverse effects (overdiagnosis and intervention including surgery in women who do not have breast cancer). An accurate assessment of service screening would improve the current public discussion, enabling speculation to be replaced by fact.

A long-term perspective is required to produce a comprehensive assessment of the benefits and harms of breast cancer screening. This is illustrated by the evaluation of overdiagnosis, i.e. detection of a breast cancer, through screening, that would not have otherwise been detected in a woman's lifetime. Puliti et al. show in this issue that reliable estimation of the rate of overdiagnosis must take into account trends in breast cancer incidence and the compensatory drop in incidence after the end of the screening period. Given the 20-year age range of the female population targeted by many screening programmes in the EU, direct assessment of the magnitude of overdiagnosis has only recently been possible in a few European programmes. The same applies to other key factors, such as the impact of screening on breast cancer mortality, and the cumulative rate of false-positive tests, when considering the balance between benefits and harms. The experience in European countries differs markedly from the estimates of benefit and harm put forward by authors associated with the Nordic Cochrane review of breast cancer screening, which are largely based on a selected subset of the randomized controlled trials.

Effective and accurate communication is important in breast cancer screening. The scientific evidence of the benefits and harms of population-based screening programmes in Europe was reviewed by the European Cancer Network in Warsaw in May 2010, to clarify the methodological standards that should be met for women attending screening. The efforts of scientists and professionals experienced in implementation and evaluation of most of the population-based breast cancer screening programmes currently running in the EU were also coordinated in two workshops of the EUROSCREEN group held in Florence by the Italian National Centre for Screening monitoring in November 2010 and March 2011. Using the evidence-based standards developed in the workshops, pooled estimates of the key benefits and harms of breast cancer screening have been generated that are applicable to screening in the EU. Overall the current European evidence shows that about two lives are saved for every case of overdiagnosis; this is more favourable than the estimate by authors of the Nordic Cochrane review.

Perhaps of greater importance than the numerical results is the evidence-based consensus on methodological standards of evaluation that is documented in these papers. Moss et al. show that analysis of breast cancer mortality trends, a method used by some groups to assess the impact of screening on breast cancer mortality is usually inappropriate. This is because it is prone to error due to inclusion in the screening period of breast cancer deaths occurring in women diagnosed before the screening programme started. Puliti et al. also show that estimates of overdiagnosis should allow for lead time, and the changes in breast cancer incidence occurring independently of screening. The latter would mean, for example, explicitly reporting the annual increase in breast cancer incidence prior to screening and including sensitivity analyses indicating different estimates of overdiagnosis under different
assumptions in the modelling of the expected incidence trend. Application of the methods and recommendations presented in the papers in this supplement for assessing the benefits and harms of screening should enable health professionals to develop balance sheets tailored to the specific conditions in a regional or national screening programme.14 These will provide more accurate information for women seeking to make an informed choice about attendance in breast cancer screening programmes in Europe.

Marco Zappa and Antonio Federici
National Centre for Screening Monitoring (Osservatorio Nazionale Screening – ONS); Department of Prevention, Italian Ministry of Health
m.zappa@ispo.toscana.it

REFERENCES
4 National Centre for Screening Monitoring; Eighth Report. Marco Zappa (ed) Epidemiologia e Prevenzione, 2010(Suppl 34)
7 Impact Working Group. Epidemiological changes in breast tumours in Italy: the IMPACT study on mammographic screening programmes. Pathologica 2011;103:290–3