International Agency for Research on Cancer

World Health Organization

Lyon, 26–28 January 2011
Princess Takamatsu Hall

BIOSTATISTICS GROUP (BST) ACTIVITIES AT IARC

1.   Biostatistics is an essential contributor to cancer research, both laboratory-based and epidemiological. It was recognized as one of the three core disciplines when the Agency was founded and continues to develop to meet new challenges such as the advent of large datasets from laboratory methodologies e.g. transcriptomics and metabolomics.

2.   There are three principal aspects to biostatistics envisaged in the context of cancer research at the Agency:

- Development of methodology to enable adequate analysis of new types of data, or to optimize the analysis of traditional forms;

- Provision of statistical expertise to ensure the correct application of existing techniques of analysis and appropriate interpretation of the results;

- Education to maintain and improve the level of statistical understanding among all research staff at IARC.

3.   Given existing expertise and senior appointments to the Agency over the last 18 months, there are now a significant number of IARC professional staff members with high levels of statistical training:

- Freddie Bray, Section of Cancer Information (CIN);

- Graham Byrnes, Biostatistics Group (BST) / Section of Genetics (GEN);

- Pietro Ferrari, Dietary Exposure Assessment Group (DEX) / Section of Nutrition and Metabolism (NME);

- Richard Muwonge, Screening Group (SCR) / Section of Early Detection and Prevention (EDP);

- Martyn Plummer, Infections and Cancer Epidemiology Group (ICE) / Section of Infections (INF);

- Joachim Schüz, Section of Environment and Radiation (ENV);

- Salvatore Vaccarella, Infections and Cancer Epidemiology Group (ICE) / Section of Infections (INF).

4.   A consequence and strength is that all six of the IARC research Sections comprising one or more epidemiology Groups now have at least one professional staff member with expertise in statistics; the exceptions are the two predominantly laboratory-led Sections, Mechanisms of Carcinogenesis (MCA) and Molecular Pathology (MPA), together with the Monographs (IMO). It should be noted that a number of the above senior staff would consider themselves as

epidemiologists with statistical skills and are employed as such, rather than primarily as statisticians.

5.   In addition to the above professional staff members, there are 15 general service staff members employed in statistical clerk or similar posts. These colleagues are also spread across the Sections.

6.   Following consultation with the IARC Senior Leadership Team, a decision was made in 2009 not to create a separate Biostatistics Section at IARC; the restructuring and associated recruitment has followed from that decision. This was partly based on the relatively small size of the Agency and the insufficient resources to create a new Section with the requisite critical mass. Moreover, there are significant advantages to having statisticians immersed in the work of a particular applied research group, where they can become familiar with the particularities of their specialist subject. Furthermore, the non-intuitive nature of statistical inference may be better integrated into the scientific process when a statistician is part of the core team.

7.   However, there was recognition of the need to develop a strong profile for biostatistics as a discipline at the Agency, including providing an opportunity for biostatisticians to consider methodology at a more abstract level. Apparently different problems may have similar solutions and hence benefit from the sharing of expertise between research groups. Also, the freedom to pursue more profound solutions to practical problems helps maintain a sense of rigour, creates a more attractive environment for statisticians and will benefit the quality of general IARC research in the longer term.

8.   As a consequence it has been decided to create a structure to capture the benefits of both dispersed and centrally grouped biostatistics. In March 2010 the Biostatistics Group (BST) was created and Dr Graham Byrnes (P4) was assigned to head the Group. At the same time, in order to permit his own research contribution to develop a clear focus, Dr Byrnes and hence the BST Group was assigned to the Section of Genetics (GEN). The BST Group is therefore not a line management structure but aims to operate horizontally across the Agency.

9.   As a consequence of the above structure, part of the responsibility of Dr Byrnes (25%) was defined as developing a professional environment for statistics at IARC. The goal is to create a forum by which statisticians in different groups can exchange ideas, coordinate the hosting of visitors and external collaborations, and manage provision of statistical services, education and training. This activity should incorporate an element of career development for the more junior statistical clerks and other related posts.

10.   In November 2010 the Agency invited an *ad hoc* Advisory Group on Biostatistics (AGB) to consider the current activities and to advise the Director on the future development of the discipline at IARC. The AGB comprised:

- Professor Maria Blettner (Scientific Council member), University of Mainz, Germany
- Professor Stephen Duffy, Cancer Research UK, London, UK
- Professor Niels Keiding, Department of Biostatistics, University of Copenhagen, Denmark
- Professor Gilles Thomas, Plateforme INCa Synergie Lyon Cancer, Centre Léon Bérard, Lyon, France

11. The AGB met with members from IARC: Dr Freddie Bray, Dr Graham Byrnes, Dr Pietro Ferrari, Ms Mary Heanue, Dr Richard Muwonge, Dr Martyn Plummer, Dr Joachim Schüz, Dr Eduardo Seleiro, Dr Salvatore Vaccarella and Dr Christopher Wild.

12. The advice of the AGB and further in-house consideration led to the decision to explore a number of initiatives that are summarized briefly below.

13. In order to encourage and support the conduct of appropriate methodological research by statisticians, their partial role in BST should be formally recognized as being 20% of their time. This time would be available to devote to methodological developments stimulated by problems encountered in their subject-specific work, but also through discussion with other IARC statisticians. It would also allow the senior statisticians to provide mentoring of more junior statistical staff across the Agency within the BST proportion of their time.

14. The BST Group identity will be reinforced by regular meetings to which attendance is strongly encouraged. These would cover a variety of topics, for example:

- Current problems and conflicts over appropriate statistical practice;
- Short presentations of current projects in progress;
- Discussion of recent important papers in methodology, or which raise methodological questions.

15. Statistical methodological research output will continue to be evaluated within the existing quinquennial review process within Sections. However, peer-review committees should include a member with specific expertise in applied statistics and a familiarity with the constraints imposed by an applied research setting. Independent quinquennial peer-reviews for BST were not considered appropriate as this could imply that some staff would be subject to double review and the methodological research would risk being considered out of context.

16. Consideration should also be given to inclusion of statistical expertise on the IARC post-doctoral Fellowships Selection Committee to ensure that applicants in this discipline are professionally reviewed. In addition, it is important that biostatistics should be represented on selection committees for fellowships at all levels.

17. The Head of BST should continue to be consulted on the development of post descriptions for all statistician posts across the Agency and be included on interview panels where statisticians are recruited.

18. A more structured approach to ensure all research Groups at IARC have access to statistical advice will be developed.

19. In the shorter term, statistical needs of Groups currently without expertise should be provided by a combination of:

- Training and mentoring of junior staff. There is potential for conflict between the advice of the statistical mentor and the Group or Section Head, but this is best managed by creating a climate of goodwill through the experience of successful collaborations;

- A centrally funded statistical reference service. This would need to be funded by a mechanism which does not penalize those Groups who have already invested in statistical expertise. In addition, the career development of anyone occupying such a "service" post would necessitate an element of research focus for the individual concerned.

20.   In the longer term, all research Sections and/or Groups at IARC will be encouraged to hire a professional statistician (full or half-time), or to share one with another Group/Section, to increase statistical resources and expertise.

21.   An important aspect of education, mentoring and professional development at all levels is through interaction with external experts in statistics, biometry and bioinformatics. This can happen through collaboration on joint projects, but would also benefit from bringing visitors to work on specific themes. It is envisaged that these visits could range from senior statisticians to doctoral students, for periods ranging from a few days to several months. A budget to fund such visits will be required.

22.   In order to provide more visibility to BST, one possibility is to assign the Group to the Director's Office, in analogous fashion to the Laboratory Services and Biobank Group, recognizing that its remit is Agency-wide rather than specific to the hosting Section (currently GEN). The Head of BST would continue to report to the Head of GEN as first level supervisor for his specific GEN-related activities but to the Director, as second level supervisor, for the BST Group activities. This structure should better allow for statistical co-supervision of junior scientists.

23.   The Scientific Council is asked to note the current developments and initiatives in statistics at the Agency and to comment on the proposed future priorities.