'AT-A-GLANCE' BROADSHEETS, AN APPROACH TO PUBLIC INFORMATION

M J Gaines

National Radiological Protection Board,
Chilton, Oxfordshire, UK

ABSTRACT

The At-a-Glance series of broadsheets uses illustrations as the main information carrier but is underpinned by the results of scientific work. The clarity of the presentation, together with attractive design and printing and the association with science, has produced publications with great appeal to laymen. Some 500,000 broadsheets have been produced, many to meet the demand for bulk supplies for other organisations.

INTRODUCTION

NRPB has a well-established system of publications but most of them are far too technical for laymen. Even the booklet, 'Living with Radiation', is too advanced for the non-scientist, although it does provide a useful introduction for other technical, non-radiation protection, professionals. To avoid the jargon of radiation protection, NRPB therefore created the 'At-a-Glance' series of broadsheets in which illustrations are used to communicate most of the information - they are not just used to support text.

A major means of communicating the scientific output of NRPB is often a conference paper or a journal article, and therefore the organisation is very experienced in the use of visual aids. When we were considering how best to improve our communications with laymen, particularly people such as elected representatives on local authorities, we determined how best to use the skills we already had in presenting quantitative information visually. The idea of a series of broadsheets, in which visual materials dominate, was developed in 1989 and the first in the series was published towards the end of that year. Since then, over 500,000 have been produced.

THE MAIN SERIES

The series has developed over this time but the illustrations remain the principal means of telling the story, with the captions supporting them; and - equally important - each one is underpinned by the science.

Initially, four broadsheets were produced. Two of these are about broad aspects of radiation protection and two are about NRPB.

With the title 'Radiation Protection', one leaflet summarises the basic ideas of radiation protection as a starting point for other leaflets in the series. The ideas are grouped under sequential headings: atoms, radiation and radioactivity, radiation and tissue, radiation effects, harm and sensitivity, radiation protection principles, radiation protection in the UK, and how effective?

'Radiation Doses - Maps and Magnitudes' shows visually the main sources of radiation exposure, natural and man-made, and the average and the range of doses. The enormous variation in doses across the country is lucidly set out - indeed, one of the aims of the leaflet is to help lay readers to appreciate just how great the variation is. The graphics are based mostly on data contained in an NRPB report[1].

In 'NRPB at a Glance', pictures of NRPB staff at work are arranged under a linked series of scientific ideas: source of radiation exposure, environmental transfer, doses to people, dose distribution, and estimation of health effects; NRPB's role in standards is summarised.

'Partners in Protection' illustrates the way NRPB works with the

European Communities, industry, local authorities, central government, other professionals, etc. It is a striking characteristic of NRPB that it acts as a focal point for a large and varied number of organisations.

In 1990 a fifth broadsheet, 'Radon', was published. It describes the characteristics of radon, the means by which it builds up in homes, the nature and level of the risks, the remedies and preventative measures, and the problems posed by and solutions to radon in the workplace.

In 1991, four more broadsheets, were published.

'Transport of Radioactive Materials' summarises the use of radioactive materials to explain why transport is essential. It then describes the types of packages and containers used, outlines the modes of transport, and illustrates with pie diagrams and bar charts the radiation doses received during routine transport operations and those arising from accidents; these illustrations are again based on data in NRPB and other publications[1,2,3].

'Non-ionising Radiations' illustrates the types of sources of these radiations across the electromagnetic spectrum, the biological effects and the protection measures available, and the magnitude of the emissions and exposures produced.

'Nuclear Emergencies' summarises the types of accidents that can occur, the countermeasures that can be introduced, the standards that apply and the monitoring and detection techniques available. Emergency plans are outlined and the responsibilities of the various Government bodies listed. The National Arrangements for Incidents involving Radioactivity are described.

'Medical Radiations' starts with a cover illustration that illustrates the caring face of radiation in medicine. It summarises the way in which x-rays are used, how staff are protected, how x-rays help in diagnosis, how patients are protected, how radioactive materials are used in diagnosis, and how radiotherapy is used; it also describes magnetic resonance imaging and summarises the role of NRPB. The bar charts are based on various NRPB studies[1,4,5].

Although not in exactly the same mould, the 'Radiation Atlas of Western Europe' (published 1992) is an atlas of natural radiation levels - cosmic, indoor gamma, outdoor gamma and radon. It contains maps derived from a report[6] prepared by NRPB for the CEC from data produced by various researchers in western Europe. Others in the series are in production.

'RADIATION AT WORK' SERIES

A broadsheet, 'Low Specific Activity Scale in the Oil Industry', has been produce. It is intended for workers in the industry and deals with the problem of 'LSA scale' which collects in parts of oil installations. The new publication is the first in a new series dealing with the problems of radiation at work, and was suggested by staff of an oil company who had seen some of the NRPB's 'At-a-Glance' series.

The publication describes the hazards of LSA scale, shows how it can be detected and measured, and indicates the sort of precautions and procedures necessary. It also shows that radiation doses to workers close to LSA scale are much lower than doses to other workers such as industrial radiographers, nuclear industry workers and air crew. Indeed, the average off-shore worker receives a lower radiation dose than the average person in the UK because he does not inhale so much of the naturally occurring radioactive gas radon while he is on the oil rig.

One more in this series is in production and others are planned.

SLIDE SETS

The popularity of the 'At-a-Glance' series, and the requests we have had for slides based on them, has encouraged the Board to mass-produce standard sets of slides based on the series. Generally, they are supplied in batches of twenty, with a copy of the broadsheet and captions for the slides. In this way, slide sets are being produced for 'Maps and Magnitudes', 'Radon' and 'Non-Ionising Radiations' broadsheets.

GRAPHICAL TECHNIQUES AND BELIEVABILITY

A recent publication has pulled together the expertise of social scientists, scientists and public relations professionals to provide a practical guide to communicating with the public[7]. With this publication in mind, and assuming that the science is correct, it is instructive to examine how graphics should be used to encourage people to believe scientists in this cynical age.

Firstly, the illustrations should communicate; if possible they should have impact, like the three-dimensional radon map, but that is not always possible. However, we have the data to relate a topic like radon to everyday life and this is shown in the three graphs showing how radon levels vary from season to season, from day to day, and from hour to hour as windows and doors are opened and some escapes from the house. These graphs are average values of several hundred houses and there are no false zeros - radon concentration really does vary to this degree, day to day.

The illustrations should clearly inform. Hopefully they all do - the broadsheets have been described as 'information-packed'.

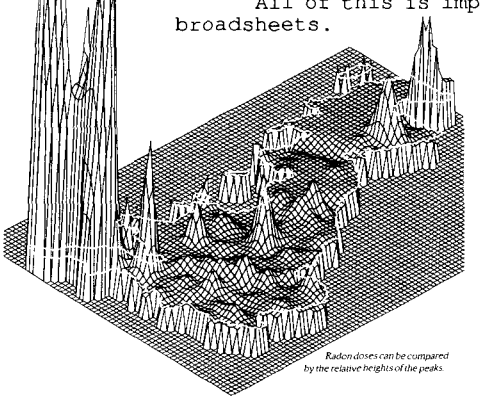
The illustrations should also explain, and this they seem to do in relation to a variety of topics. They are also used to separate assumption (the linear relationship) from fact (which it is not) and they are used to show a practical item such as the ease of introducing remedial measures for radon.

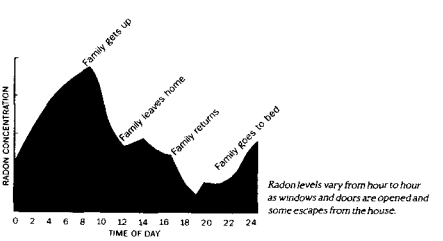
The illustrations should also clarify, and an example is the 'Nuclear Emergencies' broadsheet which clarifies important, complex situations.

The illustrations should also tell the truth, as far as that can be determined, and a particularly good example is the 'Transport of Radioactive Materials' broadsheet; the charts on accidents hide nothing.

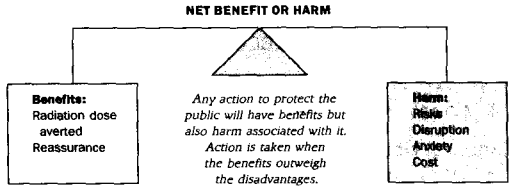
The illustrations should also compare like with like, for instance the pie diagrams in 'Maps and Magnitudes', or the bar charts of doses to workers in that publication and in 'Medical Radiation'.

All of this is important for the 'believability' of the broadsheets.

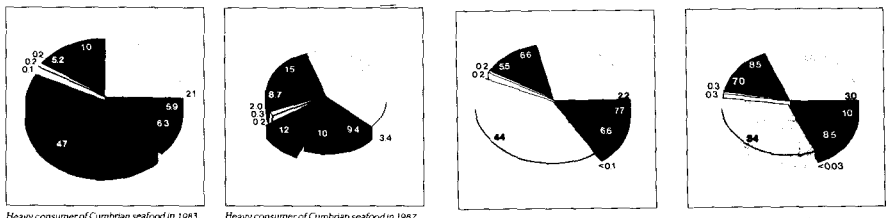




From 'Radon'



From 'Nuclear Emergencies'



Heavy consumer of Cumbrian seafood in 1983. 4.8 millisieverts overall.

Heavy consumer of Cumbrian seafood in 1987. 2.9 millisieverts overall.

Because of their exposure to cosmic rays commercial aircrews receive the same average dose as workers in the nuclear industry. 2 millisieverts, bringing their total to 4.5 millisieverts each year.

Radon in coal mines gives the miners an average dose of 1.2 millisieverts, so that their total dose is, on average, 3.5 millisieverts.

From 'Radiation doses-Maps and Magnitudes'.

Have they been successful? The public takes into account many factors in relation to risks. For instance it is less concerned about those that are familiar and understood; and it is also less concerned when the institution is responsible for controlling the risk is seen as trustworthy. Scientists as a group are held in high regard and clear explanations are appreciated. In using the At-a-Glance series to explain radiation protection NRPB hopes it has helped the public to become at least interested and informed, and possibly enabled it to form its own opinion. The demand for the broadsheets - 50% of them have been sold to local authorities, nuclear industries, research institutes, etc, and the feedback that we have had from them and other organisations, schools, health authorities, regulatory bodies and the general public - indicates some success; but we continue to learn and we will continue to improve the series.

REFERENCES

1 J S Hughes, K B Shaw and M C O'Riordan, 1989, Radiation Exposure of the UK Population - 1988 Review, NRPB-R227, National Radiological Protection Board, HMSO, London.

2 R Gelder, et al, 1984, Radiation Exposure from the Normal Transport of Radioactive Materials within the UK, NRPB-R155, National Radiological Protection Board, HMSO, London.

3 K B Shaw, J S Hughes, and C K Wilson, 1990, The Radiological Impact of Transport Accidents, Nuclear Energy, 29, pp 409-412.

4 P C Shrimpton, et al, 1986, A National Survey of Doses to Patients Undergoing a Selection of Routine X-ray Examinations in English Hospitals, NRPB-R200, NRPB, HMSO, London.

5 P C Shrimpton and B F Wall, 1986, Doses to Patients from Medical Radiological Examinations in Great Britain, Radiological Protection Bulletin, No 77, pp 10-14.

6 B M R Green, J S Hughes and P R Lomas, 1991, Radiation Atlas - Natural Sources of Ionising Radiation in Europe, Commission of the European Communities, Luxembourg.

7 NEA/OECD, 1991, Communicating with the Public, OECD, Paris (in French and English).