

NATIONAL DOSE ASSESSMENT WORKING GROUP

PAPER 6-07: REPORT FROM THE SECOND MEETING OF THE HABITS SUBGROUP

The second meeting of the NDAWG Habits Subgroup took place on 30th September 2004. It was attended by M Thorne (Mike Thorne and Associates Ltd, Chair), J Ipe (FSA, Secretary), J Hunt (CEFAS), R Smith (NRPB), J Titley (FSA), D Webbe-Wood (FSA) and P Roche (Independent). Apologies were received from D Cutts (FSA) and M Gaunt (Rolls Royce and Associates).

Following the first meeting of the Subgroup and subsequent discussion of the work of the subgroup at the 5th NDAWG Meeting, M Thorne developed a first full draft of position paper of the habits subgroup. Discussion of this draft paper formed the main topic of discussion at the second meeting of the Subgroup. The paper comprises the following sections:

- Introduction
- Current approach to the acquisition of habits data
- Enhancements to habits surveys
- Key foodstuffs and consumption rates
- Other exposure pathways
- Use of critical groups in estimating individual exposure
- Characterisation of representative individuals for assessing effective dose
- Conclusions and recommendations

In addition, provision was included for an appendix giving more detailed information on integrated habits surveys.

The structure of the paper conforms closely to the envisioned structure reported in the report from the first meeting of the Subgroup, which was presented at the 5th NDAWG meeting. However, the titles of the sections have been somewhat simplified and generalised.

It was noted that there is not a one-to-one correspondence between the sections of the position paper and the revised Terms of Reference of the Subgroup. However, it was agreed that this could be addressed by inclusion of suitable text in the conclusions and recommendations section of the position paper.

There was overall agreement amongst Subgroup members that the draft position paper formed a good basis for discussion and for the development of a revised position paper that could be ready to present to the NDAWG by the time of its April 2005 meeting. It was noted that this was in line with the proposed schedule of work of the Subgroup that had been endorsed by the NDAWG at its 5th meeting.

The Subgroup gave further consideration to its Terms of Reference. There was no proposal to modify those terms. However, the Subgroup felt that it was important to notify the NDAWG of its interpretation of the final item. This reads:

- Use of habits survey and dosimetric data for infants, children and adults (including pregnant women).

It is understood by the Subgroup that habits data may be collected for pregnant women for the purpose of assessing radiation doses both to such women and to the embryo or foetus. In practice, surveys do not currently distinguish pregnant and non-pregnant women, and it is not clear that any such distinction should be attempted in future. Thus, the issue of exposure of the embryo or foetus is considered to be more an issue in internal dosimetry than in the design and undertaking of habits surveys.

The draft position paper was discussed on a paragraph-by-paragraph basis and detailed suggestions for modification and expansion were made by Subgroup members. This resulted in 63 actions being placed on Subgroup members to acquire information or draft sections of text. Topics to be given further consideration include (but are not limited to):

- The significance of unusual foodstuffs, both in terms of habits and in terms of radionuclide concentrations;
- The implications of cost recovery for the extent of habits surveys around licensed nuclear sites and other facilities authorised to discharge radioactive wastes;
- The plausibility of growing various food types locally;
- The degree to which habits survey data can be placed in the public domain;
- The availability of general information on food consumption rates by pregnant women relative to other adults;
- The possibility that contaminated foodstuffs may be exported from the local area by specialised routes that do not involve dilution with uncontaminated foodstuffs of a similar type;
- The distinction between 'occupationally exposed individuals' and 'members of the public';
- The role and scope of 'diary' studies;
- The methodology for identifying a habits survey group and acquiring data from members of such a group;
- The nature and significance of non-food pathways;
- The interplay between habits surveys and environmental monitoring;
- The potential roles of random and stratified sampling in survey design, with particular consideration being given to the potential for acquiring data on more than one population group;
- The potential for combining national and local habits survey data;
- Potential approaches to defining habits and calculating doses to children and infants, given the preponderance of adults in the survey populations;
- The possibility of making spatial distinctions in assessed doses from external exposure without causing problems of breaches of anonymity.

Currently, the draft position paper comprises about 11 pages (about 5000 words). Although the additional considerations outlined above will cause it to increase in length somewhat, the draft final position paper to be put before the NDAWG in April 2005 is envisaged as no more than 20 pages (10000 words) of main text, but with one or more annexes that could bring its total length to between 30 and 40 pages.

The next meeting of the Subgroup is scheduled for 10:30 a.m. on Thursday 10th March 2005. It will be held at the London Office of the FSA.

M C Thorne, Chairman
2 November 2004

**Minute of the NDAWG Habits Subgroup
30th September 2004, FSA London**

(Meeting Duration 10:30 – 15:30)

The main discussion of the meeting centred on the National Dose Working Assessment Group Position Paper of the Habits Subgroup

Present:

Mike Thorne	– MT	(Mike Thorne & Associates Ltd, Chair)
John Hunt	– JH	(CEFAS)
Rachel Smith	– RS	(NRPB)
John Titley	– JT	(EA)

David Webbe-Wood	– DWW	(FSA)
Peter Roche	– PR	(Independent)
John Ipe	– JI	(FSA)

Apologies:

Darren Cutts	– DC	(FSA, Secretary)
Mike Gaunt	– MG	(Rolls Royce)

2. Agreement of the Agenda

After MT had welcomed everyone to the group, the Agenda was agreed upon and no changes were made.

3. Minutes of the Meeting of 19th March 2004

The Group looked at the actions from the previous meeting

Action 1/01 *All to agree a record of each Habits Subgroup meeting to be freely disseminated to other*

NDAWG subgroups

Information from the final minute appeared in Paper 5.01 and was presented to NDAWG. Therefore, it is more than likely that DC circulated the minutes to other groups. However, this needs to be checked.

2/01 Action: JI will check that the minutes from the previous subgroup meeting have been distributed to the appropriate groups.

Action1/02 *MT: produce a brief list of bullet points of issues raised related to methods of obtaining habit data.*

This has not been done but will be discussed under agenda item 5 – Discussion of the Draft Position Paper.

Action 1/03 *JH: to review action1/02 and liaise with JT regarding the information*

This follows from Action 1/02 and will be discussed under agenda item 5 – Discussion of the Draft Position Paper.

Action 1/04 *MT: to obtain a list of the 'MAFF' Parish surveys and present the information to the group.*

MT, who presented a list to the group, has completed this.

Action 1/05 *MT: to draft a few lines about occupancy, direct, inhalation and plume etc*

This has been done by MT. The lines have been put into the draft position paper.

Action 1/06 & 1/07 *DC: write a short statement describing how the critical groups given in RIFE are determined from the habits surveys results.*
JH: to review DC's statement on critical groups.

Copies of DC's short statement were distributed to the group. This will be discussed further under agenda item 5.

Action 1/08 *MT: to write paper for the 5th NDAWG meeting from the minutes of this habits subgroup meeting.*

Paper 5.01 was presented at NDAWG. An action was placed on NDAWG to respond to the paper, but so far there has been no feedback.

For information – A specific reference was made to pregnant women. MT made an adjustment in the position paper. The reference to pregnant women needs to make it clear that this includes consideration of exposure of the embryo and foetus.

4. Actions Arising

2/02 Action: MT will inform NDAWG secretariat for the record.

5. Discussion of the Draft Position Paper

Preamble

The group agreed to go through the position paper paragraph by paragraph. MT introduced the paper with an initial preamble detailed below.

The structure of the paper was put forward by MT at the last NDAWG meeting. Slight changes were made to the titles of the sections, but MT has not deviated from the overall structure of the initial draft. Section 2 lacked some information due to MT not having access to the RIFE 9 report at the time of drafting. Also, JH clarified the degree to which current surveys aim to be comprehensive.

2/03 Action: MT will provide NDAWG with a finalised position paper by April 2005.

2/04 Action: MT will tidy section 2 and include cross-referencing.

Section 3 illustrates the problems of pre-selection and sampling that potentially undermine the statistical interpretability of the dose assessment results obtained using habits survey data. However, this requires some redrafting because the current approach is to aim for complete survey of the pre-selected population of interest. The group discussed ways of achieving a legitimate statistical basis for analysis by appropriately defining the sub-group. Section 4 was considered to have been 'done to death'. The group decided to discuss whether the right balance existed between resourcing for categorisation from habits surveys and monitoring.

It was decided that the position paper needs to show explicitly how it matches the terms of reference. This can be done in the conclusions and recommendations section. The group discussed this issue in more detail later on the meeting. Several issues were raised for discussion later, including the grey area between licensed nuclear site orientated habits surveys and generic surveys, non-nuclear site issues, the consideration of unusual foodstuffs, and multiple discharges from small sites. Extensive work has been done on multiple discharges and this work could be cited and briefly discussed in the position paper.

2/05 Action: Group will consider need for annexes for the issues identified above.

- 2/06 Action: MT** will separate unusual foodstuff issues from the habits survey data issues – the unusual foodstuffs issues are more about radionuclide concentrations than habits.

The group discussed the need for follow up on previous surveys, the current level of such follow-up activities and the need for new observations to be acted upon. To achieve a clear audit trail, these activities should be part of the work specification. At the moment this process is rather *ad hoc*. New observations on habits arising from follow-up activities need to feed through to compilers of the RIFE report.

The group discussed the need to inform the public on how new observations are acted upon. The following decisions were made.

- Section 7 will contain a clear description of the methods used in acting upon observations.
- The position paper will be placed in the public domain via the NDAWG website, subject to its review by the full NDAWG.
- The group will discuss whether more information needs to be put into the public domain.
- It might be useful to place the relevant data on habits surveys and radionuclide concentrations in the public domain, so that interested parties could then carry out their own calculations.

Section 1 (Introduction)

First Two Paragraphs

- 2/07 Action: RS** will include text on the different types of facilities we wish to include, not just licensed nuclear sites.

- 2/08 Action: MT** will include a first sentence that makes clear that the work includes sites other than licensed nuclear sites.

The following points were also raised:

- It needs to be mentioned that a lot of habits survey work has been done around nuclear installations, but work around non-nuclear sites is much less extensive.
- It was asked whether an historical statement was required.
- The document needs to be cross-referenced with recommendations from other NDAWG working groups.

- 2/09 Action: JT** will write an introductory paragraph concerning the implications for habits surveys of cost recovery for licensed nuclear sites versus the absence of cost recovery for non-nuclear sites.

- 2/10 Action: MT** will point out that it is important for our group to be able to reference the forthcoming Principles Document on retrospective assessments.

The following decisions were made.

- The first paragraph should contain an introductory sentence stating that the paper covers a full range of authorised premises i.e. licensed nuclear sites and other.
- The conclusions should refer back to the Terms of Reference.

- 2/11 Action: MT** will describe in the conclusions how the Terms of Reference have been addressed in the foregoing discussion.

The group discussed deficiencies in the surveys. It was noticed that the paper does not yet include discussion of how plausible it is to grow certain foods in a particular area. Also, it needs to be pointed out that people who were surveyed were not always aware if food was locally produced. The group discussed issues relating to fruit and milk. It was suggested that, locally, more discernment was needed on unusual cases. It was suggested that it might be beneficial for habit survey reports to have

a preamble that described local population around each site and a brief discussion of how the group of persons included in the survey was identified.

- 2/12 Action: RS** will write a paragraph describing the issues concerning the plausibility of growing food locally. She will include information on the studies that have been undertaken and are currently at hand.

The group discussed the combination of pathways. It was agreed that this issue was dealt with satisfactorily in RIFE. It was decided that it would be necessary to explain to people how the combination of pathways is done and to explain whether all pathways are taken into account. It was suggested that it would be beneficial to include this explanation as a preamble in RIFE.

- 2/13 Action: JT** will write a paragraph for Appendix A detailing context and protocol. The paragraph is to describe the context in which habits surveys are undertaken (i.e. the role, frequency and why they are undertaken around a limited number of establishments) and the arrangements between the parties involved.
- 2/14 Action: JH** will describe what then happens in the field.
- 2/15 Action: DWW & DC** will liaise with JT on the preamble for Appendix A and with JH on the actual text.
- 2/16 Action: DWW** will remind DC of the need to produce some text on how habits surveys are currently carried out.

Occupancy

The group expressed their satisfaction with the occupancy data (both indoor and outdoor) that is presently being collated. However, there was a concern over the data collected for special cases.

- 2/17 Action: RS** will write a short paragraph on occupancy for special cases.

The group discussed whether the habit survey reports should be placed in the public domain? JT informed the group that he had been actioned at the last habit survey project meeting to ask EA solicitors if they could see any reason why the habit survey reports could not be put in the public domain:- in particular if there might be problems with individuals being potentially identified from survey results.

- 2/18 Action: JT** will inform the group if there are any further developments on this issue.
- 2/19 Action: The group** will make it clear to NDAWG that the occupancy factors can be important in specific contexts.

The group discussed accident scenarios and solid waste disposal in the context of defining scenarios and alternative potentially exposed groups. The group believed that the role of National Survey data is underplayed in the first draft of the position paper. The group wanted more detailed discussion of the need for homogeneity of the critical group with respect to either dose, or habits and behaviour.

- 2/20 Action: MT** will write on the need for habits surveys for those sites that are intermediate between licensed nuclear sites and smaller authorised sites.
- 2/21 Action: MT** will look at the issue of combining habits for individuals.
- 2/22 Action: MT** will compare and contrast various alternate treatments of combination of habits, environmental monitoring data and dosimetric data to derive individual doses in retrospective assessments. The advantages and disadvantage of each of the alternatives will be shown.

The group discussed the important issue of pregnancy. Many issues were raised. These included how to ask questions on pregnancy in surveys, the more general question of whether participants should be distinguished by ethnic group and whether age-weighted dose coefficients were necessary or even

desirable. It was confirmed that at present the NRPB is not pursuing the proposal for age-weighted dose coefficients.

- 2/23 Action: DWW** will investigate what data is available on consumption by pregnant women, as compared to women in general.
- 2/24 Action: MT:** The footnote at the end of section 1 will be removed, as effective dose is not the only quantity of interest.

The group discussed the issue of Dounreay particles. It was decided that these were related to a special pathway of exposure and would not be considered further in the context of habits surveys.

Section 2 (Current Approach to the Acquisition of Habits Data)

- 2/25 Action: JT** will provide an introductory paragraph for section 2
- 2/26 Action: MT** will provide an explicit statement stating what is not done. This will come after JT's introduction.

The group was informed that no data on ingestion of sediment are available. To obtain valid ingestion data it would be necessary to carry out trace element analyses of faeces. It was agreed that it would be hard to find the actual quantities of sediment incidentally ingested by children.

The group was informed that there are anecdotal, but not habits survey, data for occupancy by sewage workers.

Section 5 of the position paper mentions that soil ingestion data are limited and do not strongly constrain intakes. The group was informed that no key papers exist on soil ingestion after Simon 1998.

The group discussed paragraph 1, which refers to site-specific and not location-specific surveys.

- 2/27 Action: DWW** will find out what can legitimately be collected as data in a habit survey? He will also determine what the National Diet Survey collects.
- 2/28 Action: MT** will Include illustrations in section 2 where surveys are either distant from the site of interest, or involve significant exposures from more than one installation and include a mix of exposure from licensed nuclear sites and other authorised premises.
- 2/29 Action: JH** to give perspective on Northern Ireland and Channel Islands Habits Surveys.
- 2/30 Action: MT** will structure Section 2 with the following points in mind:
- The statement of what is currently done will come first and issues arising will come last;
 - Anything in Section 3 on issues arising will be moved to Section 2;
 - Section 3 will be limited to potential approaches for addressing the issues arising.
- 2/31 Action: MT** is aware that the position paper needs to be in a form that can be placed in the public domain and will ensure that its, structure, content and presentation is appropriate to this context.
- 2/32 Action: JT,** will list the issues that he considers are weaknesses in the current approach and describe how we can improve on them.
- 2/33 Action: MT** will include the following issues in Section 2.

- The survey data collected may not have a robust basis for statistical interpretation.
- The food consumed is not necessarily local. It may have come from elsewhere. Similarly, food may be grown locally and exported elsewhere. This can be of concern if it is not dispersed in the market but goes to a specific outlet.
- The usual pathways considered in assessments.
- On the problem of defining the degree of ingestion of soil.

Section 2 Paragraph 2

This paragraph will be changed.

Section 2 Paragraph 3

2/34 Action: MT will clarify, with a footnote, what is meant by 'workers'.

2/35 Action: MT will discuss with Rob Allot what is meant by the terms 'worker' and 'member of the public' so as to ensure consistency with the paper on retrospective dose assessment.

Section 2 Paragraph 4

The group discussed the sector of the population that is currently surveyed. It was agreed that whole sections of the population could be missed. It was suggested that black market practitioners were likely to be refusals. It is possible that likely refusals could be the part of the population most at risk. The surveyors often identified their sample groups through word of mouth.

Decision: There should be an assurance in the habit survey report that a well-defined sub-population has been considered.

Decision: There should be an explicit statement describing how survey populations are identified.

2/36 Action: MT will change a sentence in Section 2 paragraph 4.

2/37 Action: JH will provide a statement on the methodology for selecting a survey group.

Section 2 Paragraph 6

2/38 Action: JH will expand on diary studies.

The group discussed how people's habits changed after the surveys. There were no reported major changes in habits or consumption after the surveys.

Section 2 Paragraph 7

It was suggested that the degree of radioactive contamination of foodstuffs should be sufficiently low as not to preclude any reasonable pattern of consumption. However, it was agreed that this was an NDAWG matter rather than something to be discussed by the habits subgroup.

Section 2 Paragraph 8

A table should be included in the position paper comparing local consumption rates with generic data. DWW has already written a paper containing such a table.

2/39 Action: DWW will circulate his paper to the group.

2/40 Action: MT will transpose DWW's table to the position paper.

Section 2 Paragraph 9

2/41 Action: MT will add an introductory phrase. **MT** will mention major non-food pathways and other pathways that might be significant. The other pathways should NOT be described as minor.

Section 3 (Enhancements to Habits Surveys)

Section 3 Paragraph 1

Decision: The paper should be comprehensive on subgroups.

2/42 Action: MT will contribute an introductory phrase for section 3.

2/43 Action: MT will add a phrase on 'low concentrations'. MT will also comment on monitoring being commensurate with assessed doses.

Section 3 Paragraph 2

2/44 Action: MT will edit: 'between the relevant agency and those carrying out survey

2/45 Action: MT will ensure that the recommendation is included that the survey design methodology is properly defined and reported.

Section 3 Paragraph 3,4,5,6

2/46 Action: MT will redraft all of these paragraphs.

The group discussed random sampling. It was suggested that a survey could be enhanced using random sampling if the intent was to survey the radiological status of a wider population group.

The group discussed if there were any changes that would enhance the degree of follow up for the most exposed group. The group discussed if there was anything getting in the way of follow-up that any of the parties represented on NDAWG could do something about (resource issues *etc.*)?

2/47 Action: MT will develop this section along the lines of 'Enhancements to and variants of habits surveys'. He will explore the issues associated with using either random sampling or stratified sampling.

2/48 Action: JT will consider what the implications would be of using either random sampling or stratified sampling.

2/49 Action: MT will draft (by end of Oct 2004), as an appendix, an alternative statistical sampling approach. This will be distributed for comment. An appropriate summary will be written, once comments have been received.

2/50 Action: MT will provide a draft response to the following issues raised by JT:

- How many results are too few?
- When does national habits data need to take over?
- Can local data be augmented with national data? If so when and how?

The group discussed data for infants and children and whether or not scaling of adult data could be an appropriate approach.

Section 4 Paragraph 1

2/51 Action: MT will include a bullet point stating what is meant by 'locally produced food'.

2/52 Action: MT will insert the paragraph describing food processing.

Concerns raised by the group about this paragraph were addressed satisfactorily by the chair.

Section 4 Paragraph 4

2/53 Action: JT will provide text on how feedback is being dealt with.

Section 5 Paragraph 1

2/54 Action: MT, in the first sentence of this paragraph, will make specific mention of exposure to plumes of gases and aerosols, but the main emphasis will be on noble gas exposure.

The group was informed that at present there is no spatial component due to the requirement for anonymity. However, it was suggested that NII could use the habits data and assign external exposures to each anonymous individual in the survey without releasing the underlying data into the public domain.

2/55 Action: MT will contact Patrick Stevens and ask for a paragraph describing what is being done now.

Section 6 (Use of Critical Group in Estimating Individual Exposure)

Section 6 Paragraph 1

JH's paper was discussed in the context of two ICRP quotes appearing in the position paper.

2/56 Action: MT will expand the ICRP quotes. The Group will come back with any comments on MT's expanded text.

It was explained to the group that retrospective assessments report on existing people whereas prospective assessments are describing what dose someone could receive in the future, if there were no constraints.

2/57 Action: MT will redistribute material between sections 6 and 7. MT might restrict section 6 and leave the discussion of alternatives to section 7

2/58 Action: MT will ask Rob Allott for a draft of the retrospective dose assessment paper, which will be used to develop the position paper.

Section 6 Paragraph 9

2/59 Action: MT will add to this paragraph with a discussion on pregnant women. More specifically, the discussion will refer to *intake* by pregnant women and *dose received* by the foetus.

Section 6 Paragraph 10

2/60 Action: RS to develop this paragraph.

The group discussed specific dose assessments for children.

Decision: the question needs to be asked - 'do children constitute a critical group in their own right?'

6. Future Work of the Subgroup

2/61 Action: MT will circulate a final draft of the position paper by the end of the calendar year.

2/62 Action: JI will circulate a draft minute of this meeting by the end of October 2004.

7. Preparation of a Report to the forthcoming NDAWG Meeting

2/63 Action: MT will state at the next NDAWG meeting that the habits subgroup has a draft position paper with numerous actions. He will add that an interim report will be circulated in April 2004.

8. Other Relevant Business

The group did not discuss any other business.

9. Date and Venue of the Next Meeting

This meeting started at 10:30 and ended at 15:30. The next meeting is planned for Thursday 10th March 2005, to be held at the FSA's London Office.