The processes of risk assessments undertaken by the Human Animal Infections Risks and Surveillance Group

Since the Human Animal Infections and Risk Surveillance (HAIRS) group was established in early 2004, there has been a steady evolution and development of the risk assessment processes used by the group. The initial methods and sources used for detecting, assessing and reporting potential threats were developed to fulfil the functions of the Chief Medical Officer's National Expert panel on New and Emerging Infections (NEPNEI). Thus all activities were agreed and approved by the Panel. This paper summarises the current activities and risk assessment processes used the group.

1) Hazard identification

Potential hazards (either potentially zoonotic agents or emerging infections) are identified by members of the HAIRS group through horizon scanning activities or from laboratory or case reports. Members of the HAIRS group also act as a focus through which concerns of their respective agencies/administrations/groups can be considered by the group. Horizon scanning undertaken by individual agencies, administrations and groups will vary depending on individual remit however; they will incorporate monitoring of a wide range of official reports (e.g. WHO/OIE disease outbreak news), scientific literature (e.g. Emerging Infectious Diseases) and grey literature (e.g. ProMED mail, Health Map, Media reports). Depending on the perceived urgency of the situation, significant results of horizon scanning activities are either disseminated immediately within the Group or are discussed as a standing agenda item at the monthly meeting. All potential hazards discussed by the HAIRS group are logged.

A discussion to determine the requirement for a comprehensive risk assessment is carried out at a time proportionate to the perceived risk of the agent/incident by the HAIRS group. For an initial assessment to be undertaken, an overview of information currently available on the agent/incident is assembled and provided to all members for consideration. Limited information on novel/emerging agents specifies the necessity to draw parallels with related agents and incorporate expert opinion at this early stage to ensure that the most appropriate information is considered.

If on consideration of currently available information a formal risk assessment is not deemed necessary by the group, the agent is considered a negligible risk and recorded as such in the hazard identification log. The group may decide to take no further action and "sign off" the incident or continue to monitor the emerging situation/literature on the agent to ensure the accuracy of the currently assigned risk. However for all incidents/agents discussed, if changes in the agent's epidemiological properties occur that may affect the public health significance of the agent, the risk assessment of this agent will be re-examined.

2) Risk assessment

If a risk assessment is deemed necessary, a formal assessment is carried out by the most appropriate member(s) of the group in consultation with the rest of the HAIRS group and, if appropriate, recognised experts.

The appropriate risk assessment procedure is chosen depending on the issue under consideration; (a) Zoonotic potential assessment (Palmer *et al*., 2005) or

(b) Emerging Infection assessment (Morgan *et al.,* 2009).

i. Gathering evidence

A more recent development of the risk assessment process is to include all sources of information employed in determining the risk as well as an assessment of the quality of evidence used. To ensure an accurate assessment of the risk, a thorough and systematic examination of the scientific literature is undertaken, guided by questions used within the respective algorithm of the appropriate risk assessment. A bibliography outlining the sources of all information used in the risk assessment is imperative. For many incidents where limited information has been published, the literature search should be widened to include non-peer reviewed studies, case reports and other grey literature. For circumstances where sufficient information is scant, expert opinion should be sought.

To reduce the inherent subjective nature of qualitative risk assessments, particularly in cases where limited information is available, an assessment of the quality of evidence is carried out (see appendix A). Categorising the evidence in this manner allows for confidence in the estimation of risk to be recorded.

ii. Estimating the risk

Using the relevant completed information tables and the risk assessment algorithms the probability and impact of the infectious agent under examination or the zoonotic risk level are estimated. For new and emerging infections, the probability and impact are reported separately for a greater understanding of the risk.

If a question cannot be conclusively answered (i.e. yes/no answer), evidence for both answers should be provided in the information tables and following precautionary principles, the algorithm should be continued until an decisive answer is attained. Tentative answers are differentiated from conclusive answers by the use of hatching in the algorithm.

Once the algorithms have been completed, the level of confidence in the output is assessed by examining the quality of evidence in the information tables which underpin the risk assessment (appendix A). The output(s) of the risk assessment and the level of confidence are presented on the front cover of the risk assessment.

3) Risk management

The actions taken following the completion of a risk assessment will be proportionate to the interpretation of the results attained (Appendix B). In terms of risk management, the HAIRS group may act as risk managers or refer issues to other groups. For issues assessed as low risk or where direct action is not warranted, the group may “sign off” or “risk manage” the incident, or continue to monitor the situation and reassess the risk at appropriate intervals. For incidents assessed as being of potential threat to public health the Group will alert appropriate groups to the situation and the need for risk management action. In circumstances where the evidence used to assess the risk of an incident is deemed unsatisfactory, the risk is reviewed by the group and management decisions are made on a case-by-case basis. Members of the Group will act as points of contact for the agencies

and departments responsible for risk management. The HAIRS group then will not directly act as risk managers but may contribute advice and expertise to the risk management process.

4) Risk communication

Communication of risk assessments may take various forms dependent upon the determined risk, the requesting body or the context surrounding the situation/incident. A PDF version of risk assessments carried out within the HAIRS group are made available to members for further dissemination as they deem necessary, unless otherwise specified. A record of distribution is maintained by the secretariat. Under certain circumstances risk assessments may be placed in the public domain. Risk assessments are also communicated to members of NEPNEI and UK Zoonoses, Animal Diseases and Infections Group (UKZADI). For specific situations, a narrative risk statement or summary may be appropriate. In addition, abridged versions of risk assessments are also published in the public domain in the HAIRS Annual Reports. The group also contributes to the monthly "Infectious Disease Surveillance and Monitoring System for Animal and Human Health: Summary of notable events/incidents of public health significance" which is published monthly on the HPA website and distributed widely.

Review and revision

To ensure the accuracy of risk assessments produced by the HAIRS group, all assessments are informally reviewed at least annually. If a revision to the current risk estimate is required, the assessment is reviewed and updated using new information that has become available since the previous version. Risk assessments will also be reviewed on an ad hoc basis as determined necessary by HAIRS members.

Reference

Palmer S, Brown D, Morgan D (2005). Early qualitative risk assessment of the emerging zoonotic potential of animal diseases. Br Med J (331), 1256-60.

Morgan D, Kirkbride H, Hewitt K, Said B, Walsh AL (2009). Assessing the risk from emerging infections. *Epidemiol Infect* 137 (11), 1521-1530

Appendix A: Assessing the quality of evidence used to assess the risk

Table 1 Determining the quality of evidence used to the estimate the risk of an emerging pathogen

Quality of evidence	Examples of types of information/ evidence
Good (i.e. further research unlikely to change confidence in information)	▪ Peer reviewed published studies where design and analysis reduce bias e.g. systematic reviews, randomised control trials, outbreak reports using analytical epidemiology ▪ Text books regarded as definitive sources ▪ Expert group risk assessments, or specialised expert knowledge, or consensus opinion of experts ▪ Established surveillance systems by recognised authoritative institutions
Satisfactory (i.e. further research likely to have impact on confidence of information and may change assessment)	▪ Non peer reviewed published studies/ reports ▪ Observational studies/ surveillance reports/ outbreak reports ▪ Individual (expert) opinion
Unsatisfactory (i.e. further research very likely to have impact on confidence of information and likely to change assessment)	▪ Individual case reports ▪ Grey literature ▪ Individual (non-expert) opinion

Table 2 Determining the confidence of the risk assessment output using the quality of assessment score

Quality of evidence	Confidence
Mostly 'unsatisfactory'	**Unsatisfactory** (little poor quality evidence, uncertainty/ conflicting views amongst experts, no experience with previous similar incidents)
Mostly 'satisfactory'	**Satisfactory** (adequate quality evidence - including consistent results published only in grey literature, reliable source(s), assumptions made on analogy and agreement between experts or opinion of two trusted experts)
Mostly 'good'	**Good** (good quality evidence, multiple reliable sources, verified, expert opinion concurs, experience of previous similar incidents)

Appendix B: Expected risk management actions

Table 3 Expected actions following assessment of the risk to the UK population from a new or emerging pathogen

Probability/Impact	Expected actions
Very low	The risk of such an event is often deemed acceptable without the implementation of mitigation strategies.
Low	Implementation of mitigation strategies should be considered in terms of the efficacy, impact and practicability of potential measures. Continue to monitor.
Moderate	Mitigation strategies should be reviewed immediately and escalation should be considered.
High	Control measures and escalation should be implemented without delay and action groups formed.
Very High	Public health emergency. Considerable and immediate effort to reduce the impact and/or prevent the event is required. Urgent escalation is essential.

Table 4 Expected action following assessment of the zoonotic risk of a pathogen. Table extracted from Palmer *et al.*, 2005

Zoonotic risk level	Expected actions
Level 0: Not zoonotic	Evidence of lack of zoonotic potential. Good grounds for not taking further action
Level 1: Potential zoonosis	Possibility of human pathogenicity not excluded. Work needed on biomarkers of infection and pathways of exposure
Level 2: Potential zoonosis	Serological evidence of infection or human exposure has occurred but surveillance not sufficiently reliable. Enhanced surveillance needed
Level 3: Confirmed zoonosis	Human cases have been reported, but evidence against person to person spread. Enhanced surveillance needed. Control exposure of humans to animals and environmental sources
Level 4: Confirmed zoonosis	Human cases have occurred, with subsequent person to person spread not excluded. Control of direct or indirect person to person spread needed