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REPORT ON THE
TASK FORCE MEETING
OF THE
“BOVINE TUBERCULOSIS”
SUB-GROUP

KILKENNY, Ireland
9-10 June 2004

REPORT OF THE SUB-GROUP OF TUBERCULOSIS TASK FORCE

MEETING IN KILKENNY, IRELAND

JUNE 9-10 2004

Participants: J. Ferris (Chairman)

Members of the tuberculosis sub-group

F. Reviriego, J. Pierre Vermeersch, Wolf-Arno Valder and

Jan-Peter Paul for the Commission

Representatives of the Irish Department of Agriculture, Food and
Forrestry.

Agenda: see Annex 1

Day 1

Chairman J Ferris opened the meeting, which, as he explained was the first in a second 'round' of meetings in the Member States where TB Eradication programmes were operational and co-funded by the EU. He explained that the focus of the second 'round' would be on assessing whether the previous recommendations had been adopted and had made any impact in improving progress towards the eradication of bovine TB.

Martin Blake, on behalf of the Irish Veterinary Services, updated the group on the Irish TB eradication programme, the provision of financial resources, staffing distribution and sourcing, management structures in place and training commitment; the animal health forum and the local animal health committees. He outlined the PPF (Programme for Prosperity and Fairness) and the Sustaining Progress national agreements with the social partners. The commitment of the Department to the establishment and running of CVERA and the other Departmental associations with Universities/Research organisations and to the development of the knowledge base in regard to bovine TB and to the tools necessary for eradication.

He outlined the principles of Eradication programmes and how the Irish TB eradication programme conforms to those principles and to Directive 64/432/EEC as amended. He explained that the term herd restriction in an Irish context covered both status suspended and status withdrawn under the Directive. He took the group through the recommendations of the TB sub-group of the task force and the 2003 FVO Mission on TB and how those recommendations had been integrated into the Irish programme, which would be outlined further in the course of presentation scheduled over the two days.

Ann McManus and Tom McTague outlined the ACHS Animal Health Computer System, which is a fully integrated computer system, which links the Veterinary Practitioners working for the Eradication Programme to the Department's District Veterinary Offices (DVOs) over the world wide web; all clients and persons carrying out work for the Department are uniquely identified on the system; all tests inspections etc. on herds/animals can be recorded and analysed. They outlined the operation of the system and the routine payment and reporting process. They detailed how the system integrates the animal health and the bovine identification databases into one system.

Brid Cannon made a presentation on the development and operation of the Cattle Movement Monitoring System recording the origin, movement and final destination of all bovine animals. Used for assurance purposes and for tracing of bovine animals in the context of the eradication programmes. She outlined the various validations to ensure that the information on the database is accurate. She further outlined the operation of Farm-to-Farm movement recording and also the recording via markets, on-farm deaths/disposals, bovine slaughtering, and live exports. The information available is then used to produce various reports on herds and /or animals. She outlined the proposed re-engineering of the current CMMS to web-based system, which will further enhance the usability of the database.

James O’Keeffe provided details of the development of the Reactor Herd Management System. He demonstrated, by means of a display of screen shots, the working of the system. He outlined the ‘what-if ’questions that may be answered, particularly in relation to pre- movement testing possibilities, by analysing the data available from the system. He provided outlines of various projects on - the demographics of movement 2000-2003 in a number of counties which will comprise a cohort and county study; also a study designed to answer the questions on pre movement testing – what type of animals/movement interval would provide added benefit towards eradication. James then went on to outline the Trace Onward Tracking system (TOTS), which is the local management tool to enable the District Office Managers keep track of the distribution of tasks and their stage of completion. The system also keeps track of animals that have moved out of herds later experiencing a TB ‘breakdown’; it also records the results of epidemiological investigations and field survey where such is required.

Peter Maher, next presented the working of the herd finder system which integrates data from area aid mapping, ordinance survey, orthophotography and animal data to provide a visual outline of farms and the neighbouring holding and also a matching list of herds at the set distance required by the operator. This system is available to everyone within the Departments Intranet system. He outlined how the development of this programme had greatly enhanced the focussing of resources to the immediate vicinity of the problem.

The Chairman then invited questions focused on the 5 Information Technology presentations. It was explained that it was intended to either fully incorporate the functionality of or to integrate seamlessly by electronic hyper-link each of the various systems as development was finalised directly into the AHCS as it in turn is further developed.

The second session of the morning dealt with the diagnostics used in the Irish Bovine TB eradication programme.

Ian O’Boyle outlined the diagnostic test used at herd level. The primary test is the SICCT and over 5 years some 50M tuberculin tests have been conducted. The application of the SICCT programme is in accordance with Directive 64/432. He went on to outline the audit process on the operation of the tuberculin test-operators, equipment and tuberculin. He gave details of the circumstances when blood testing such as the Gamma Interferon Assay (INF- γ) and ELISA/anamnestic ELISA (this last to detect infected cattle that are anergic to the SICTT) are used in the Irish programme. His conclusion was that the management of the Irish programme was tight, it exceeded the requirements of the Directive in many respects it made use of the available ancillary blood tests and yet progress was disappointing indicating that

there is a factor beyond the control of the cattle-testing programme that is preventing eradication.

Eamonn Gormley presented information on the role of INF test. The sensitivity of the interpretation is set at maximum to maximise the extraction of potentially infected animals. The specificity of the test in Irish conditions is ~95% which conforms to specificity levels found elsewhere; the Sensitivity of the IFN- γ is 88% whereas 74% is the sensitivity for severe interpretation of the tuberculin test; the use of both tests in combination increases the sensitivity to >98% in heavily infected herds. He outlined the use of the IFN- γ assay in chronically infected herds and also in herds which produce skin reactors which do not confirm as infected with *M. bovis*. He briefly outlined the current project in extending the use of IFN- γ assay to contiguous herds that have already had a tuberculin test in compliance with the Directive; the project to regionalise the test in order to extend its use to the whole country; and to assess the effect of the skin test on the results of the IFN- γ assay and the effect of time delay in conducting the IFN- γ assay.

Eamonn Costello outlined the functions of the mycobacteriology division of the Central Veterinary Research Laboratory (CVRL); the diagnostic function in the determination of status of suspect lesions found in animals of clear status on slaughter and also in specific tuberculosis test reactors. The CVRL also is involved in the laboratory examination of inconclusive reactor animals, badgers, deer and other miscellaneous samples. He outlined the methodology used to confirm TB infections and the replacement of technical methods by molecular technology. All tuberculosis complex isolates from cattle and badgers in Ireland have been identified as *M. bovis* isolates. To improve detection CVRL is looking at decontamination methods, accuprobe, automation of culture and isolate identification by PCR based methods both those commercially available and developed in-house.

Following lunch Michael Sheridan provided a resume of the history of TB eradication in Ireland with special emphasis on the lessons learned. He gave the start-up profile of disease, the establishment of the TB eradication programme in 1954, the establishment of the task force in the late 60s to address the perceived problem, at that time, of a lack of uniformity in testing standards, the “stand-off” in 1975 which interrupted the programme, the restricted funding of the late 70’s, the reports of the farmer representative organisations, the veterinary organisations into the eradication programme, the change in tuberculin and the various consultative reports. He outlined how the recommendations of the various consultative groups finally led to the establishment of ERAD as an executive office with a board of Directors. He detailed the various programme measures implemented under ERAD whereby despite very many more reactors having been removed from the Irish cattle population that the underlying disease levels did not appear to change but that there had been a huge increase in expenditure. He presented the conclusions of Professors Morris and Pfeifer in 1990 who, concluded that badgers were a major impediment to the eradication of *M. bovis* infection in cattle and that badgers had likely been infected in excess of 30 years. He outlined the commencement of the research programme and the establishment of the TB investigation unit, which has since developed into the Centre for Veterinary Epidemiology and Risk Analysis (CVERA) located within the Veterinary Faculty of University College, Dublin. He went on to summarise the Realistic Expectations publication, which was an end of term review following the demise of ERAD. He briefly alluded to the badger vaccine development programme as a 15-year programme. He referred to the history of pre-movement testing in

Ireland where it had been a feature from the inception of the TB eradication programme until it ceased to be a requirement for internal movement because farmers demanded its abolition on economic grounds in 1995 and the results of this change in policy.

Damien Barrett addressed the question of the role of cattle movement in the spread of bovine TB. He referred to experimental transmission studies which showed that cattle to cattle transmission from infected to clear cattle occurred but at a relatively low level requiring a complex series of interactions. In analysis of field data the number of breakdowns where only one animal is involved would indicate a low level of cattle to cattle spread. New Zealand work would say that within-herd transmission is unlikely to maintain disease without an external source. Irish data would indicate that between 7% and 11% of herd restrictions are attributed to introduced animals. Where introduced animals have been the cause of a breakdown only 30% of the animals were potential breeding animals. In conclusion he stated that ongoing routine surveillance minimises the opportunity for cattle to cattle transmission, which minimises the consequences of introducing infected animals into the herd.

John Murray gave a presentation on herds described in the Irish programme as 'Atypical herds' in that they produced repeatedly numbers of tuberculin test reactors but with very low *M. bovis* confirmation rates. If not as a result of TB infection these herds distort the picture of the problem and can be a distraction and also occupy a significant resource in testing and staff time. Various reasons exist for 'Atypical herds' from genuine infection with *M. bovis* to infection with cross-reacting mycobacteria to deliberate attempts to defraud the system. A sample procedure was established to divert the potential fraud cases out of the equation so that resources can be concentrated on genuine problem herds. This procedure is now seen as a quality control measure.

Damien Barrett next spoke about the reasons for herd TB-breakdowns when the impact of TB infected badgers was negated. Thus the areas where the badger population had been significantly reduced during the Four Area Project and the East Offaly Project were monitored and all TB-breakdowns were investigated, to determine the proportion confirmed as TB, to identify the probable source of infection and to establish the level of within herd bovine to bovine spread. Infection sources such as purchase, contiguous spread, residual infection and 'unknown' were all investigated. Overall the number of breakdowns was reduced as compared to the non-project areas; of the breakdowns that did occur 44% were confirmed as TB. Purchase was the most prominent source of infection accounting for 33% of breakdowns; in 54% of confirmed breakdowns only one animal was involved; very little evidence of contiguous spread was determined; the purchase of animals was associated primarily with beef herds i.e. herds that finish animals for slaughter. Purchased animals came dominantly from areas where badgers were still a potential source of infection. Badgers remained a potential source of infection and hence a cause of breakdowns in Monaghan where there was no buffer zone adjoining Northern Ireland wherefrom badger ingress continued and also, to a more limited extent, in Offaly where the interval between successive badger removals was protracted. The occurrence of residual infection was dominantly found in the cow population.

James O Keeffe next examined the nature of restriction episodes at herd level the predictive value of the nature of the episode on the future profile of the herd. He outlined the result of epidemiological investigations on herds with more than one

standard interpretation test reactor. The dominant features of these type of episodes were area/contiguity problems, badgers and residual infection.

Daniel Collins spoke on the topic GIS and mapping as an aid to epidemiology outlining the different layers of GIS and the information base available to explore and analyse data. He provided samples of the use to which GIS has been put in CVERA over the years and where it has been and is being used by the Department of Agriculture.

Paddy Sleeman next gave a presentation on the possible routes of transmission of TB between badgers and cattle. Given that badgers are nocturnal the probability is that it occurs at night and not that frequently. There are four prime sites identified – at setts in pastures hedges, cattle troughs, within cattle sheds and moribund badgers. He showed a video of badgers accessing feed and water troughs.

Simon More answered questions on the evidence to support his contention that cattle to cattle transmission is not responsible for many of the herd-breakdowns in Ireland and that badger to cattle transmission is at least in Ireland a very significant cause of TB breakdowns albeit not the only cause.

The Chairman asked the about the difference in the real occurrence of TB in the areas where badgers had been removed and where badgers had not been removed. S. More indicated that a PhD project was underway in conjunction with The Netherlands, which would address this question.

Day 2.

The sub-group visited the local area, which formed part of the four-area project reference area. They were taken to visit 2 district areas to view badger setts in the field.

On return Jan-Peter Paul asked for clarification on the numbers of badgers in the country. It was explained that in the early 90s 2 surveys were done covering Ireland and Northern Ireland and the initial estimates were 250,000 badgers in the whole island. Following collation of the 'four-area project' data the social group size was adjusted downwards. The question was also asked about the reason why the problem in badgers had suddenly appeared in the 80's. It was explained that TB was first discovered in badgers in Ireland in the mid 70's and that they were shortly thereafter made a protected species, cattle numbers rose and badgers were not suspected of causing problems prior to mid 80's when actions had been taken to address the other perceived problems in the TB Eradication programme and the Department was satisfied that the programme was operating at optimum performance levels and by which point TB infection in badgers was found to be widespread. The question was also asked about other zoonotic diseases in badgers and whether any surveys had been conducted; however the practice of surveying wildlife is a relatively new phenomenon and while there is now information on ectoparasites and trypanosomes in badgers that is the current extent of knowledge.

It was then pointed out that perhaps the Department of Agriculture could look at farming practices to reduce the possible impact of interaction between species.

The question was asked about incentives for farmers to have or to prevent disease. Michael Sheridan, in reply, made reference to a socio-economic study, which looked at many factors and where the results of the study indicated that the single significant factor was location of the farm. The location is determined to be influenced by the

badger, neighbours and residual infection – 3 TB possible sources which are inextricably linked.

A question was put concerning identification of geographic areas where there were problems and what if anything had been done for or to those areas. It was explained that various focus had been directed towards those ‘blackspot’ areas such as more frequent testing; testing twice/year; severe interpretation of the tuberculin test; blood testing; contiguous herd testing etc.. It was further explained that other presentations would demonstrate that these areas continued to be a focus.

John Griffin next presented details of the Four Area Study looking at the role of the badger in bovine tuberculosis. He gave the historical background of the East Offaly project. The EOP demonstrated that removal of badgers from an area resulted in clearance, to a very significant extent, of TB from the cattle population. The ‘four-area-project’ was designed to address the perceived inadequacies of the EOP such as badger ingress in to the study area thus as far as possible areas with good natural boundaries were selected and if not a buffer removal area was operated. The Four Area Project would also test if the result from the EOP was repeatable, would be used to try to develop a policy based on the results and also to further knowledge on badger ecology. He outlined the work involved in establishing and operating the project, detailed the number of badgers caught, TB status of badgers caught and also the TB breakdown levels in the removal and reference areas both pre and post removal. Essentially the result of the Four Area Project repeated what was found in the EOP. The conclusion of this study is that the badger is an important reservoir of *M bovis* for cattle in Ireland and that this source must be addressed if eradication is to be achieved.

Owen Denny asked the question as to whether it had been possible to determine what the effect might have been if badgers had been totally removed and no badger population left. It was explained that in so far as was possible the badgers had virtually been totally removed from the ‘project’ areas but that cattle did move into and out of the ‘project’ area such as when purchased or moved to parts of holdings located outside the ‘project’ area where badgers might have continued to be a source of infection so it had not been possible to determine the effect of total exclusion of badger influence.

Alice Amado asked if the strain typed had been looked at in badgers and cattle and she was informed that the data on this had been published-strains are shared.

Fulgencio Garrido asked the question whether the removal and reference areas had been matched in regard to farming practice and badger populations. He was informed that in selecting the areas all factors that might influence TB levels were taken into consideration and, matched as far as possible.

Leigh Conner next gave a presentation to put the difficulties being experienced with TB in wildlife into an international perspective (Australia). He outlined the indicators of whether a species was an end stage host or indeed capable of being a source of spread and therefore had to be addressed. This process involved looking at each wild species detected with infection to assess lesion location, routes and levels of infection and routes of infection in domestic livestock and whether there are interactions between the groups that could lead to transmission.

Simon More gave a presentation on the critical evaluation of recent work by CVERA on TB which when originally established was to look at the factors that mitigated against the eradication of TB and to provide advice for policy formation. He

discussed the nature of disease origin and spread and the influence of the tuberculin testing programme on this process. His opinion was that the influence of cattle to cattle transmission is in the Irish situation impossible to determine because of the confounding problem of infection in the badger. The EOP and the Four Area Study are extremely important to provide an answer to this question with a significant difference between the removal and reference areas as a response to badger removal; confirmed breakdowns reduced very significantly but didn't over the study period drop to zero. He addressed criticisms of the Irish Four Area Study from G.B. and explained why it was not considered to be of relevance. He next looked more closely at the breakdowns that were left after badgers had been removed so as to determine source possibilities. He concluded that badger to cattle transmission is the most significant source of TB breakdowns in Ireland. He went on to look at the direction of future work on TB following a workshop to look at key un-resolved questions namely: badger-to-badger, badger-to-cattle and cattle-to-cattle transmission routes.

James O'Keefe outlined the development and proposed focus of the new wildlife unit established as results of the Four Area Study were becoming apparent. He specifically requested the opinion of the sub-group in ensuring that the focus of the unit was correct to reduce the risk of infected badgers coming in contact with susceptible cattle. He explained that the primary work-area for the unit would be directed to those areas of the country that produce the bulk of reactors and where following a breakdown associated with badgers the badger numbers would be reduced and that this reduction would continue for five years. He outlined how the problem areas had been identified so that approx 30% of the landmass under grass accounts for the production of 60% of standard tuberculin test bovine reactors.

At this point the Chairman took questions from the floor that were replied by the Irish representatives. The questions on whether badger populations in the 'reduction areas' might increase by migration or by changing reproductive ratio and how this might be addressed was responded to by the hope that this increase would be prevented by twice yearly capture for 5 years. The level of TB in cattle would be continuously monitored in the areas to assess the impact on disease levels. It was the opinion of some of the Irish speaker that hopefully by the end of 5 years TB-vaccine development will have progressed sufficiently to influence the next stage of the eradication programme. There was a suggestion from the floor that the question of residual infection in badger setts should also be considered during the work of the Wildlife Unit.

Paddy Sleeman presented data on the information that has been gleaned by work with badger populations located on islands. These isolated populations have proved to be uninfected by bovine TB and have provided invaluable data necessary to develop vaccine delivery and monitoring programmes.

Ian O Boyle went on to discuss various bait marking studies looking at the use of setts by badgers and whether 'main' setts were used by more than one social group of badgers which has relevance for population estimates and vaccine delivery strategy. Part of the work presented covered the setts visited by the sub-group in the field trip.

Eamonn Gormley spoke on the topic of TB vaccine development and the relationship between diagnosis and vaccination. The purpose of vaccination is to reduce the numbers of susceptible animals. It is also hoped that it will reduce the severity of disease in the badger. Tests are necessary to detect infected animals and also to determine which animals are vaccinated and which not vaccinated. A key goal is then

the development of immuno-diagnostics; the aim being to detect infection in as early a stage as possible.

Leigh Conner then went into some more detail of the work being done in badgers. Historically levels of infection have been based on grass pathology at 11-12%; the sensitivity of post mortem was increased in the Four Area Study to show levels of infection at 20%. Very detailed p.m., gland and tissue collection and very sensitive culture methods revealed a level of infection at 48%. It was determined that a collection of a minimum of 12 tissues were necessary to detect infection in the maximum number of badgers. Most badgers had minimal disease progression evident. Further work is required to determine if levels of infection as high as 48% is widespread. Aims of vaccination are to protect the population; a vaccination trial will precede general vaccination. Before any work could start experimental infection models were initially required and then challenge trials, which are now underway. Studies have shown that badgers are very susceptible to infection with *M. bovis* and an experimental infection model has been developed which mimics field infection in a uniform manner. Studies into methods of vaccine delivery – oral in a lipid matrix and duration of protection experiment up to 12 months post vaccination are required. A field trial is in design stage.

Fulgencio Garrido cautioned in respect of the quality, safety and efficiency of the vaccine and the selection of the strain of BCG and to consider strains used in experimental studies in common with many other animal vaccine experiments for comparative purposes. In reply he was informed that the BCG strain currently being used is the same as that used in the possum in New Zealand and which was very successful on a field trial providing 70% protection against challenge with *M. bovis*. Reversion to virulence has not been detected. In possum excretion of the vaccine strain is not detectable after 4 weeks.

At this point the members of the task force members withdrew to discuss issues that had arisen and to draw up recommendations.

Chairman suggested as a model for the second round of visits that the outcome of the first visit could be revisited to assess whether recommendations had or had not been implemented. Accordingly on return to the general assembly the Commission noted that on a number of occasions the task force had asked Member States for an update on adoption of the recommendations and congratulated Ireland on implementing all the previous recommendations except one.

New Recommendations for Irish Programme.

1. The Principle of the previous recommendation on pre-movement test stands.
This perhaps could be focussed on targeted specific herds after the clearance test.
2. It is a pre-requisite to enable the veterinary services to take measures directed towards infected badger populations including density reduction.
Badger removal has to be based on veterinary epidemiological investigations and where other sources of infection have been ruled out as a cause of the herd problem.
3. Parallel testing (tuberculin and IFN- γ) should be conducted in all infected herds for the removal of reactors. Depending on the feasibility this should be at either the first or second test.

In addition where the % of positive animals exceeds a certain pre-determined threshold consideration should be given to stamping out the herd.

4. All the existing computer systems should be integrated and made operative nationwide.
5. The roles related to risk assessment and the risk management as well as the administrative interfaces should be clearly defined.
6. Review the epidemiological and managerial approach from an animal to a herd basis.
7. The Irish Veterinary Service should define, taking into account the epidemiological situation, the adequate epidemiological unit in order to undertake all appropriate disease control measures including re-testing, restrictions, parallel testing, pre-movement testing, badger operations and synchronised testing. These control measures, based on the results of thorough epidemiological investigations, should be applied to the epidemiological unit
8. Separately analyse the contribution of on-going and new initiatives for eradication which should have different contributions to make towards achieving targets.
9. Ensure uniform and adequate surveillance at meat plants and correlate meat plants findings with the outcome at herd level. Invest in and improve surveillance at meat plants for Animal Health reasons.

Enhance co-ordination between Animal and Public Health divisions to achieve that aim.

10. Involve the producers and communicate the risk aspects, their role and the reasons for the enhanced measures.

At the end of the meeting, as conclusion, the Commission presented its view on the Irish TB programme:

- The Commission acknowledges the Irish effort on research projects but clarifies that it is not the task of the TB subgroup to give its opinion on on-going or future research programmes.
- The analysis, efforts and initiatives should be at herd level.
- The Commission's policy is not to support a control programme but an eradication programme aimed at an increase of the percentage of TB officially free herds.
- Targets have to be clearly set and have to be aimed at the eradication during a reasonable period of time. The goal is eradication in a set period with annual reduction of disease levels previously targeted.
- It is necessary to tackle the badger problem fundamentally.
- The proposed recommendations constitute a totality and must be taken into account as a whole.

Wednesday 9th June*Programme***Chairman: John Ferris DVRL**

9.00	The National TB Eradication Programme since the sub-group's previous visit and response to Task Force recommendations.	Martin Blake DCVO
	Computerisation as an adjunct to TB eradication	
9.30	AHCS - (Animal Health Computer System)	Ann McManus AP/ Tom McTague
9.50	CMMS - Cattle Movement Monitoring System	Brid Cannon PO
10.10	RHMS (Reactor Herd Management System)	James O'Keefe SVI
10.30	Coffee	
10.50	TOTS (Trace Onward Tracing System)	James O'Keefe SVI
11.15	Herd Finder	Peter Maher SVI
11.35	<i>Questions & Discussion</i>	
	Diagnostics used – coping with a changing farming environment post-cap reform	
11.45	Field diagnostics	Ian O'Boyle
12.15	Laboratory diagnostics – Serology and advances in the use of specific antigens	Eamonn Gormley
12.35	Laboratory diagnostics – <i>post-mortem</i> advances	Eamonn Costelloe
	<i>Questions & Discussion</i>	
13.00	LUNCH	
14.00	ERAD (Eradication of Animal Disease): Resume of TB eradication in Ireland	Michael Sheridan
14.30	Cattle movement patterns and Pre-movement TB-test experience in Irish conditions	Damien Barrett VI
15.00	Atypical (TB Breakdown) Herd Programme	John Murray
15.20	Reasons for TB breakdowns in cattle in areas following badger removal	Damien Barrett VI
15.40	Coffee	
	Epidemiology	
16.00	Aspects of the epidemiology of Tuberculosis.	James O'Keefe
16.30	GIS and Mapping as an aid to epidemiology	Guy McGrath
17.00	Presentation on Cattle/wildlife Interaction	James O'Keefe SVI and Dr Paddy Sleeman
17.30	<i>Questions & Discussion</i>	

Thursday 10th June

	Field visit	
9.00 – 11.30	View local four-area-project reference area - demonstrate cattle/badger interaction opportunities.	James O’Keeffe SVI/ Murt Duggan and Dr Paddy Sleeman
	Coffee	
	Current Programme –Epidemiological basis Address recurrent problems in Irish herds.	
12.00	The role of non-bovine species Internationally	Leigh Corner
12.20	Review of the recent TB programme of the Centre for Veterinary Epidemiology and Risk Analysis (CVERA)	Simon More
12.40	Future direction for CVERA in the field of TB epidemiology/risk analysis.	Simon More
13.00	<i>Questions & Discussion</i>	
13.15	LUNCH	
	Epidemiological Applications	
14.30	Four Area Study	John Griffin SSVI
14.50	New Wildlife Unit	James O’Keeffe SVI
15.10	Island Studies as a support to Vaccine Delivery	Paddy Sleeman and Ian O’Boyle
15.30	Recent advances in TB Vaccine Development in Ireland	Dr Eamon Gormley
15.50	Initial Results from Vaccine Trials 2004	Dr Leigh Corner
16.10	<i>Questions & Discussion</i>	
	Coffee	
16.30	Discussion on Irish programme – agree recommendations	Sub-group only
17.30	Presentation of Sub-group Recommendations	Re-assembly of full group
18.30	CLOSE	