



**Current Issues in Genetics and Insurance Practice Workshop:  
"What can we deduce from a family history?"**

**An invitation workshop convened by the Genetic Interest Group on  
17 January 2003**



## PROGRAMME

Introduction and welcome  
Interpreting a Family History – the perspective of a clinician and an insurance medical advisor  
Family History – a societal and a public context  
Discussion  
Summary and conclusions

## ATTENDING

Graham Spittles	Royal and Sun Alliance
Debbie Akers	Friends Provident
Jerry Brown	Swiss Re
Alan Tyler	Swiss Re
Patrick Mahon	ABI
Dr Nadeem Quereshi	Queen's Medical Centre, Nottingham
Dr Jane Betha	Queen's Medical Centre, Nottingham
Professor Martin Richards	Centre for Family Research, Cambridge
Dr Simon Sanderson	Cambridge
Dr Alison Stewart	PHGU, Cambridge
Professor Michael Modell	Royal Free and University College Medical School
Dr Tessa Homfray	St. George's
Professor Robert Rubens	Guy's Hospital
Dr Sophie Taysom	HGC
Dr Pritti Mehta	GIG
John Gillot	GIG
Melissa Winter	GIG
Alastair Kent	GIG
Claire Foster	GIG
Maggie Ponder	GIG
Anna Lane	GIG
Jayne Spink	DoH
Kit Farrow	Haemochromatosis Association
Dr Sam Samaratunga	Arnold and Porter

## DISCLAIMER

This workshop was held under the Chatham House rules. This means that the discussion in the attached report is not attributable and it inevitably reflects the author's interpretation. Whilst every effort has been made to report this in an even-handed manner, responsibility rests with the author alone.

Alastair Kent  
Director  
Genetic Interest Group



## **Interpreting a family history – the perspective of a clinician and an insurance medical advisor**

**Professor Robert Rubens**

**Professor of Oncology, Guy's Hospital**

Private insurance is a commercial undertaking driven by the need to make profit and to be competitive. As such, those offering insurance products need to be able to assess and evaluate risks, and to do this accurately there needs to be symmetry of information between the applicant and the insurer – the principle of “utmost good faith”. Any substantive non-disclosure creates asymmetry, leading to the possibility of adverse selection.

In the context of life, critical illness, permanent health and long-term care insurance, family history potentially constitutes a significant element in risk assessment, but its disclosure and use are not straightforward, and the weight attached to information will be influenced by circumstances such as the nature of the policy, the amount of cover sought etc.

Consider the colo-rectal cancers. In the case of the rare familial polyposis syndromes controlled by a dominant gene, the disease is often extant prior to the applicant seeking insurance, and the family history is irrelevant. It is the diagnosis that determines the risk.

For other hereditary cancers such as HNPCC, standardised diagnostic criteria (the Amsterdam criteria) apply. The lifetime risk of developing colorectal cancer can be calculated depending on the family history revealed by the applicant.

Thus, for colorectal cancer the lifetime risks are:

Population risk	1 in 50
1 affected first degree relative 45 or younger	1 in 17
1 first and one second degree relative affected	1 in 12
2 first degree relative affected	1 in 6
Dominant gene pattern (HNPCC)	1 in 2

The increase in incidence is greater by 2-3 times than the increase in mortality. This is significant for those providing critical illness insurance, and might lead to a cancer exclusion on a policy for those with a family history. From a clinician's perspective, an adverse family history may lead to heightened awareness, closer surveillance and a better prognosis. As new treatments are developed, so the prognosis for those at risk who go on to develop the disease will improve, and evidence resulting from these new interventions will need to be factored into insurers' calculations of risk.

Turning to breast cancer, it is again necessary to distinguish between those resulting from mutations in BRCA 1 or BRCA 2, which show Mendelian patterns of inheritance, from those where the family history is not so strongly indicative of risk.

With BRCA 1 and 2, increasing age correlates strongly with an increased risk of breast cancer and/or breast and ovarian cancer, with BRCA 1 showing its effect at a younger age than BRCA 2. Compared to the normal population, those with BRCA 1 / 2 mutation show a tenfold increase in risk on an age-for-age basis.

When considering other forms of breast cancer it is important to recognise that retrospective studies may increase the apparent risk due to recall bias and selection effects. For this reason data from properly conducted prospective studies provide a more reliable data basis on which to base clinical and insurance decisions.

Such studies have shown that, in the absence of a family history, as age increases, so the cumulative risk of developing breast cancer diminishes towards the population level. However, if a sister or a mother has breast cancer then the risk to the individual is doubled, and if both have a diagnosis then this increases to 2.5 times.

Where there is a strong family history (BRCA 1 / 2), prophylactic mastectomy reduces the risk by 90 % or more – but given the incomplete penetrance of the gene, this protection will come at the price of a number of mastectomies being carried out in women who would not have gone on to develop the cancer.

For underwriters, a family history indicator of the presence of BRCA 1 / 2 is indicative of a possible need to increase premiums for life cover, and exclude cover in critical illness policies. Other “family histories” of breast cancer are not relevant for life, and at best marginal for critical illness cover.

The proper use of accurate data regarding family history contributes significantly to the ability of insurer to calculate risks and so determine the “fair” premium required if non-standard rates are to be applied. They should also reduce the incidence of declination to a minimum, for example in cases where the level of risk is such as to make the offer of cover commercially unviable (especially when high levels of cover are being sought).



## **Family history - a societal and a public context**

**Professor Martin Richards**  
**Centre for Family Research, University of Cambridge**

The development of the “family history” began towards the end of the 19th century, with proponents of the Eugenics movement contributing the first protocols for collecting the information. These ‘pedigrees’ as they were usually (and still are) called were used both as evidence for the inheritance of a wide range of characteristics and disease and to investigate the pattern of their inheritance.

Today the collection of a family history for medical reasons is a salient event for many families. The need for it often arises as a consequence of a concern about an inherited disease. The request from a clinical geneticist to gather information usually comes prior to a clinic appointment where it is to be discussed, and it may start family processes running which can continue after the appointment at which it is discussed, both in respect of the information resulting from the consultation which spreads through the family, and that which remains with the consultee/patient.

An example of the salience of the collection of family comes from a recent genetic epidemiology study. In the Anglia Breast Cancer study all the women enrolled in the study received comprehensive information about the study, but few actually remembered anything other than the fact that a family history was collected, and from this they inferred that the study was about genetics.

It is also important not to forget that, whilst geneticists (and insurers?) are interested in blood ties, families are interested in kinship, so family histories collected for clinical purposes may not always represent biological relatedness. It has been estimated that about 25-30 % of family histories used in clinics may be inaccurate so that there is a significant error in the risks assigned to individuals but this error factor is not widely discussed.

Despite advances in genetic testing, the family history will remain an important clinical tool. Whilst DNA testing may confirm the presence or absence of a mutation, it is the family history that throws light on the actual expression of the disease in the family concerned. A family history may be used to screen for those who are at sufficient risk to warrant the use of direct genetic testing of individuals.

Gathering family history is not always straightforward. For example, a significant proportion of people do not have a significant family history of disease because they belong to small families with insufficient relatives to reveal the pattern. People may have lost contact with family members for some reason, and so may be ignorant of possible risks to which they are exposed.

Consent is an important issue. When getting a clinical family history, most of the people who appear in the history will not have consented. Indeed, they may be unaware that the family history has been assembled and the information it contains is being passed between clinicians. This is not typical of other types of medical information, which normally relate only to the patient.

Confidentiality may be difficult to preserve for those with rare Mendelian diseases. Pedigrees are highly identifiable due to the individuality of family patterns. If not modified to preserve anonymity, published papers in academic journals may result in a family history being identifiable to a significant number of clinicians and others. Again, this is not commonly found with other types of medical information.

As has been stated above, family history-taking is not an exact science. Families are complex, and their dynamics very often obscure the picture for many reasons. The significance of this is not uniform. If mis-information leads to diagnostic inaccuracy, this can often be rectified through DNA or other clinical tests. Relationship inaccuracy is more difficult to put right, and can result in individuals being treated as blood relatives when they are not or vice versa.

Current levels and trends in divorce and remarriage complicate the picture considerably when drawing up extended pedigrees. The potential for inaccuracy is significantly reduced if family history is restricted to information about parents and siblings (with females often knowing more, more accurately, than males).

It would seem that, given sufficient data, it ought to be possible to calculate the links between a family history of certain types of disease and the risk of a given individual developing that condition by some stated point in the future. However, uncertainty about the quality of the data (which may be reduced given large enough sample sizes) can make it difficult to make accurate predictions for individuals with a high degree of confidence. The question is, therefore, how good must the association be between the elements in the equation before they can be relied upon when making decisions that relate to either the medical or the insurance management of the risk of adverse consequences for the individual and his or her future wellbeing?



## DISCUSSION

In focusing on the question of the relationship between reported family history and its link to clinical and insurance applications, the issue which needs to be addressed is that of “confidence” – or in other words, how much reliance can be placed on data which is known possibly to contain an element of inaccuracy. Clearly there is a need to make decisions – whether in a clinical or an insurance context – and in most circumstances this has to be done despite the fact that the data is incomplete but is the best available.

Factors which affect this include the extent to which studies indicating statistical correlation between observed family history configuration and future health events are undertaken by respected researchers and published by “reputable” organisations and journals. In the insurance context, the reliance on smaller pedigrees than those relevant in clinical situations may also permit more trust to be placed in the data because it is more likely that the information will be known to the applicant.

Given the “gatekeeper” role that family history may play in both medical and insurance contexts, the possibility of deliberate falsification in order to render oneself eligible must not be overlooked. This can operate in both directions – by claiming a false family history so one’s anxieties about a risk of breast cancer (for example) can be allayed by genetic testing, as well as by under-reporting of events so as to bring oneself into the “normal” range.

Recognising that errors occur that are for reasons of omission as well as of commission, research would be helpful that looked for patterns or to establish that such errors are random would help clarify whether there was a particular threat to medical or insurance practice.

For insurers it is the impact of false reporting in respect of critical illness policies that is likely to become a “crunch point” as incentives to adverse selection are greater, and the market (at the moment) is smaller, so pressures resulting from a lack of symmetry of information in disclosure may threaten the commercial viability of the product.

Applicants often feel that knowledge of a risk allows them to take action and so bring their vulnerability to adverse future events closer to that of the population at large. Prophylactic mastectomy, or compliance with medication and dietary regimes in heart disease should, they feel, be given credit. Providing supporting evidence exists, this should not be impossible for insurers to give credit for, and indeed many insurers seem happy to take treatment regimes into account when these are brought to their attention.

In collecting family history data, whether by self-report or from other sources (e.g. the family doctor), the central point at issue is “what does the patient/applicant know”? If the GP happens to know more than the patient, then this information as out of bounds to the insurer, as it transgresses the boundary of a balanced (symmetrical) contract.

Individuals may withhold medical information from other family members because of a fear that this knowledge will affect the latter’s insurability adversely. This is accompanied by a fear that those from whom the information has been withheld will not be believed if they claim not to have known. Non-disclosure is sometimes difficult to prove, and the effort put into trying to establish this may vary from product to product, and with reference to the size of the claim – with a lower threshold for suspicion with critical illness policies than life insurance. However, this distinction may be becoming blurred as approximately 60% of life insurance policies now include a critical illness accelerator. The rate of non-disclosure does not vary greatly between products.

GP records of family history vary substantially with respect to the information they contain and the ease with which it can be accessed. Retrospective “trawls” through patient records may overlook specific points of interest. These may also be lost as records increasingly become computerised, and “old” data is not incorporated into the new electronic health record. GPs responding to insurer’s requests for medical information have been at a loss to know what legitimately needs to be disclosed. Good practice (and the requirements of the Information Commissioner) are driving insurers and clinicians into greater precision with regards to what is asked for and how the questions posed are to be responded to.

It is important to strip out those cases where disease is extant at the time of application. This is a cause of some confusion, as the genetic nature of the condition is not relevant to insurers once symptoms are evident, but applicants may not appreciate this point and some insurers have been poor in communicating the distinction between predictive and symptomatic information. Both insurers and applicants need to consider the wordings that appear on applications and within application declarations.



The apparent opacity of the insurance decision-making process, and the consequent difficulties with public understanding that result point to a need for increased transparency and a publicly accessible protocol to be developed to illuminate the underwriters' decision-making process.

Internal (e.g. risk assessment) and external (e.g. the Disability Discrimination Act) pressures drive underwriting practice in the direction of increasing the evidence base for decision-making. However, insurers are largely dependent of published data, with clinical and epidemiological literature a spur to practice – historically mediated by the re-insurance companies who publish manuals based on evaluation of current research and practice. Whilst the rare, highly penetrant disorders may be relatively well understood, common disorders are much less so. Initiatives such as Biobank UK (the prospective study of 500 000 middle-aged volunteers) may help clarify the links between DNA changes and common diseases in the future. At present it is unclear whether the data will be sufficiently predictively powerful to allow significant conclusions to be drawn.

The public policy importance of genetic factors in insurance rests not so much with the facts as with the way in which they are perceived. Perception of what might happen influences what is recorded – even when a failure to record certain key facts for fear of an adverse impact on insurability may result in medical disadvantage to the patient. Increasingly, geneticists find themselves being asked not to communicate diagnoses of risk to GPs for fear of adverse insurance consequences – even when these results are outwith the potential insurer's interest. If the sole source of information for the insurer was the applicant (with possibly increased penalties for non-disclosure) for all policies up to an agreed limit then this may benefit the clinical care of patients. It is the possible interjection of the GP into the insurance arena that changes the nature of the doctor/patient relationship and prejudices medical communication, particularly where honesty requires the GP to disclose something the applicant might wish to have kept secret. Clearly any expectation that GPs should collude with patients in withholding relevant information would be unethical and unacceptable.

Reliance on patient disclosure of relevant information is not without its disadvantages. People may happily disclose one aspect of their medical condition but keep other factors back (innocently, through misunderstanding, or for more malign purposes).

Non-disclosure is also known to increase with age. Estimates range from a low of 2-3 % for applicants in their 20s to a peak of 20 % by age 60. This is normally because, as one ages, there is more to remember and a greater chance of forgetting something potentially significant that happened many years previously. This is relevant because the insurance deal is struck at the start of the contract, not on claiming, so insurers have only one opportunity to get it right.

Given the relatively small number of applicants who are adversely rated or declined for life insurance on family history grounds (within the limits of the current moratorium on DNA test results), some people have claimed that insurers could ignore family history data completely. This arguments seems to be based on the assumption that insurance buying behaviour will be unchanged in the absence of the gate-keeping role that family history exerts. Once this is gone the pressure of adverse selection may increase, especially if intermediaries are able to target at risk populations and make them able to obtain cover by exploiting "loopholes" in the selection process. The direct result of this will be upward pressure on premiums, creating a "financially-excluded underclass" (many of whom may well have adverse family histories because of the downward pressure on income resulting from chronic disease in the family) rather than a "genetic underclass". This does not seem either rational or equitable.

Life insurance, despite the best efforts of the Industry to sell policies, is nowhere near universal across the population who might be assumed to need it. In 2001 there were approximately 8 million policies in force. During the year, 1.5 million new policies were sold, with an average value of £ 82 000 (up from £ 72 000 in 1998). Some of these sales will be caused by "churning" – the lapsing of one policy and its replacement by another by an individual, but even if this is discounted, it can be seen that only a proportion of the population who might be thought of as "needing" life insurance (to cover a mortgage, for example) actually have it. The 2001 census gives the figure for occupied UK housing stock at 24.5 million people. This includes those who rent and those who own their houses outright, but a proportion of these people may also feel the need for life cover too.



Approximately 570 000 critical illness policies (many of which will be linked to life cover) with an average value of £ 68 000 (up from £ 51 000 in 1998) were sold in 2001. 205 000 income protection policies and 5 000 long-term care policies were sold in the same year. Similar arguments about the extent of population coverage for these products can be applied, leading to the conclusion that the majority of the UK population (by a substantial margin) will be dependent on non-insurance means for their financial wellbeing if they are faced with chronic ill-health or death. Even for those with insurance cover, the average sum insured is relatively small, with a majority of those covered necessarily having policies for less than the average. Doctors' appreciation of the workings of the insurance market is, understandably, not great. For this reason, they can sometimes give poor advice so patients tend to be vulnerable to misperceptions, and base their decisions on fear of what might be, rather than knowledge of what will. The soon-to-be-published ABI information leaflet on genetics and insurance may help to redress the balance, but its impact should be monitored in order to establish its role in raising awareness of actual policy and practice.

Family history information would seem to be an underused resource in medicine and (perhaps) in insurance too. Crucial to the issue for insurers is the notion of "bandwidth" (i.e. what constitutes the normal spectrum). If the evidence exists that an applicant is within the normal band then he or she will get the normal rate – although the threshold and the "gauge" (the size of the event that has to occur to distinguish something significant from the background noise) will be different for different types of product, with critical illness cover being more sensitive than life. Family history information is often neglected when more systematic attention to data collection and analysis might shed light on (for example) the impact of treatment regimes on risk and on prognosis. Better clinical evaluation of family history, and improved communication of treatment outcomes may result in more of those currently related as "substandard" or excluded altogether by insurers coming into the range of those able to be covered at standard rates or only needing a small increase in premium. However, achieving this is likely to be made more difficult by a growing public awareness of the level of disclosure of medical information to third parties that happens in the health care systems, and the possible pressures that this will generate to reduce this.

Excessive regulation arising from a fear of possible adverse consequences is bad news for the practice of medicine. It will also be bad news for patients, who want/need to make arrangements for their future financial wellbeing if this forces prices to rise to a point where those who need the cover are unable to afford it – or alternatively if insurers feel unable to offer the product because they feel unable adequately to quantify the degree of exposure that they feel they face.