in the phenotypic expression of familial prion diseases. It delays the onset of the disease associated with a 144 base pairs insertion⁷ and modulates the phenotypic expression of fatal familial insomnia and the form of Creutzfeldt-Jakob disease associated with a mutation at codon 178.¹ If our last observation shows that heterozygosity at codon 129 does not protect against the disease associated with a mutation at codon 200 it then suggests a possible delaying effect on its onset, as Collinge and colleagues propose.

As in the patient of British descent reported on in detail by Collinge and colleagues, the anticipation phenomenon—that is, earlier onset of the disease with progress through generations—appears clearly in our first two patients' families. Whether only the codon 129 genotype contributes to the molecular basis of this anticipation phenomenon is still unknown.

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EDITOR,—It is good to read a clear and concise exposition of the current position on the enigmatic and horrible spongiform encephalopathies and their mysterious transmissible agent(s).¹ These universally fatal chronic brain infections of mammals (including humans) are untreatable and will remain so until more is known about this unique agent. To label them prion diseases, which implies that the causal organism is a self replicating protein containing no nucleic acid,² is to obstruct research. This hypothesis not only flouts accepted biological principles but is unnecessary.

There is good evidence that this transmissible agent is a virus containing DNA but that it is embedded in a tough proteinaceous capsule.^{3,4} The presence of the capsule explains the agent's extraordinary resistance to all the manoeuvres that inactivate viruses, such as gamma radiation, ultraviolet light, high temperatures, and even enzymes that digest nucleic acid.^{5,7} Instead of devoting more time and money to the inherently unlikely possibility that this organism alone among replicating particles contains no nucleic acids, researchers should concentrate on cracking its tough proteinaceous capsule.

About 100 years ago Robert Koch was confronted by a similar situation, albeit at the microscopic rather than the ultramicroscopic level. His efforts to make progress with the tubercle bacillus came to a standstill until he tackled its tough (lipid) capsule. Hopes of treating these awesome "slow virus" infections of the brain may rise when the scrapie agent's capsule is breached.

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Interpreting fluorescein angiograms

EDITOR,—Barbara Harney¹ has misunderstood the point of the case that we reported,² and we disagree with one of her assertions. The fact that there is leakage of dye on fluorescein angiography in patients with raised intracranial pressure is axiomatic. It was for this reason that the procedure was undertaken at this regional neurology centre, to investigate the young woman, who had headache and bilateral papillo-oedema and in whom cranial imaging showed no abnormality and the opening pressure on lumbar puncture was normal on two occasions. In this case the fluorescein angiogram showed definite blurring of the disc margins at 6.5 and seven minutes. This was not thought to be hyperfluorescence of the discs by our ophthalmological colleagues. Our contribution to Minerva included a photograph of the angiogram, but this was not published.

We were, like Harney, puzzled by this finding. After the discovery of buried disc drusen, however, we reviewed the literature, and it emerged that late leakage of dye is recognised in this condition. Punctate fluorescence of the drusen can corroborate the diagnosis but was absent here. Contrary to what Harney says, the disc margins in this condition need not remain well defined. The phrase "a recognised diagnostic pointer" was not our own and was perhaps an unfortunate choice by the technical editor. A reference for these observations³ was included in our original but, again, was omitted from the published report. We agree that care should be taken over terminology in the interpretation of fluorescein angiograms but contend that the use here was accurate.

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The language of health

EDITOR,—R Buckland states that the Read codes will be "applied automatically by computer software."¹ In fact, the software requires the coder to input a term before it can produce a list of possible codes from the database. The coder then selects the codes to apply. Analysis of other code systems has shown that the process of coding is time consuming² and probably at least 20% inaccurate.^{3,4} The Read codes were designed to be used with a computer and are therefore organised on a hierarchical structure. They can be used as a single axis system, but for a detailed description a multiaxial code is recommended. This means that even individual procedures can require several codes. As coding with the Read codes can be more detailed than with other codes it will be more prone to error and may take longer.

The clinical terms project is a fundamental part of the NHS information management and technology strategy and is financed as one of the national

facilitating projects. The Read codes, being the common origin of the proposed electronic data interchange, provide the potential to improve the distribution of information to clinicians for patient management. Additional benefits include information for research, audit, epidemiological studies, and management. While the NHS Management Executive recognises the clinical terms project as fundamental, considerably less thought and budgeting have been given to the inputting of the codes.

The increased detail of these codes means that hospital coders are likely to have more difficulty in coding clinical work accurately. The probable consequence is that doctors will be given the task. This will be practical only if they are provided with the necessary training and time. Good quality clinical information systems are expensive, will often need adjustments for individual units, and, to make them usable, require computer terminals at every site where information might be recorded. The investments required are obviously large, but the strategy makes clear that the choice of whether to invest, as well as the amount and source of the investment, is a local one.⁵

The management executive must give more thought to the development of improved methods of applying Read codes and the budgetary implications of this.

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EDITOR,—As R Buckland points out, the clinical terms project is set as the foundation of the NHS's information technology strategy and is supported by professional bodies.¹ The project is working to identify all the terms required for recording medical records and for other uses, such as medical audit. Coding schemes and medical record models are, however, only a means to an end and have no value if they fail to support effective clinical information systems. Clinicians can make use of clinical information only if they are provided with systems that are useful in their job of delivering patient care. It is their use in supporting clinical systems that must form the test of the Read codes. The implementation of the information technology strategy must avoid this relationship's being reversed: the coding scheme must not form the test of clinical systems.

Buckland is wrong to dismiss technical details. The Read codes adopt a particular approach to the representation of medical concepts. This is based on enumerative classification, which is deeply rooted in the traditions of epidemiology and vital statistics. It is a huge step from these uses to the recording of all embracing clinical descriptions for multiple purposes. To take but one of many examples, there is a single code to represent all the variations on the Charnley hip replacement procedure—quite adequate for most statistical purposes but falling short of the detail required for audit and for many of the uses to which medical records are put.

To date the representation of detailed clinical descriptions for more than a narrow area of medicine has never been achieved by use of an enumerative approach. There are strong theoretical and empirical arguments, from both doctors and librarians, why it is not possible. It is not surprising that, since Buckland's editorial was written, the neatly expressive classificatory structure illustrated