Appendix 1: **List of interview questions**

Before commencing the interview participants were reassured about confidentiality and advised that tapes would be destroyed so that voices could not be recognised. Further questions about the process were invited. After Question 1 they were again asked if they were comfortable to proceed.

Q 1*:* to gain insights into participants' conceptualisations of a diagnostic error.
What do you regard as a diagnostic error?

Q 2: to describe themes of errors in relation to the cognitive model we used.
If you are comfortable, can you tell me about some errors that you have made?

GPs would then describe an error they made or were closely involved with. This spontaneous response generally covered a clear sequence of the salient features of the case, the context in which it occurred, their analysis of why and where they went wrong and the outcome. They often added remarks about what they learned from it and how they thought they changed their practice as a consequence, with more experience or working in a different environment.

Q 3: Clarifying questions
These were used only if more details were needed and were open-ended. Occasional questions used to clarify terminology.

Q 3.1. : Examples of clarifying questions about framing

How do you deal with this sort of undifferentiated, I know there's something but I don't know what it is?

So what did you sort of think was the problem? Why do you think it happened?

Q 3.2. : Examples of clarifying questions about effect of biases

People often talk about getting stuck on the first thing which is what you just said, can you tell me how you manage that because it must be a common issue?

So why do you think that happened?

You often use the term 'red flag' which you just used, what do you mean by that?

Q 3.3. : Examples of clarifying questions about closure thresholds

So this issue of confidence, how do you deal with that .. so how do you have a threshold of confidence that you say "stop now",

But what makes you feel, do you think, that "I'm not worried you"? What is it?

Can I just ask you a question about finishing the consultation? What do you hope to achieve before you're willing to do it.

Could you sort of speculate on the idea of a level of confidence that you have in your diagnoses?

One of the problems people describe is when to stop looking for things like and where do you stop?

COREQ guidelines table

Domain 1: Research team and reflexivity			**Comment**
Personal Characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview?	JB
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD*	JB:FRCPE, FRACP, MA; CG:BM,BS; MB*: MEduc
3.	Occupation	What was their occupation at the time of the study?	Research Fellows
4.	Gender	Was the researcher male or female?	1 male/2 female for analysis
5.	Experience and training	What experience or training did the researcher have?	>30 years qualitative research JB and MB*, trainee CG
Relationship with participants			Nil
6.	Relationship established	Was a relationship established prior to study commencement?	With some of them
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.*g. personal goals, reasons for doing the research*	Broad outlines given .
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Bias, assumptions, reasons and interests in the research topic*	Reasons for research and interest in training
Domain 2: study design			
Theoretical framework			Dual theory of cognition

COREQ guidelines table

9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	Content analysis
Participant selection			
10.	Sampling	How were participants selected? *e.g. purposive, convenience, consecutive, snowball*	Convenience
11.	Method of approach	How were participants approached? e.*g. face-to-face, telephone, mail, email*	Email and face-to-face
12.	Sample size	How many participants were in the study?	15
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	60% of those approached not interviewed for lack of time or interest
Setting			
14.	Setting of data collection	Where was the data collected? e.*g. home, clinic, workplace*	Clinic for most, 32at home
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	No
16.	Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date*	All experienced GPs in active clinical practice
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Pilot tested. Semi-structured interview
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	No

COREQ guidelines table

19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	Audiotaped
20.	Field notes	Were field notes made during and/or after the interview or focus group?	Yes
21.	Duration	What was the duration of the interviews or focus group?	30 minutes
22.	Data saturation	Was data saturation discussed?	Yes and reached at about 2/3 of way
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	3: JB, JG, MB
25.	Description of the coding tree	Did authors provide a description of the coding tree?	yes
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Both, as we responded to the data
27.	Software	What software, if applicable, was used to manage the data?	NVivo
28.	Participant checking	Did participants provide feedback on the findings?	yes
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.*g. participant number*	yes

COREQ guidelines table

30.	Data and findings consistent	Was there consistency between the data presented and the findings?	yes
31.	Clarity of major themes	Were major themes clearly presented in the findings?	yes
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	yes

* MB refers to Margaret Balla identified in Acknowledgements

Box 1. Case 27: Illustration of initiation of the process and setting the initial diagnostic frame.

Reconstruction	Analysis
Presentation *Patient in 70's came with breathlessness .. the first thing was he kept saying to me "this is exactly like it was about 6 months previously".. looked back in his notes and 6 months previously he'd been diagnosed with heart failure and so I thought "well, you know" and he was so insistent that it was the same thing... he was a bit breathless but there wasn't anything really obvious going on .. so I thought maybe he was anaemic as well and that had got worse. And it was a Saturday morning so I couldn't easily get any tests straight away so I booked for him to come back first thing on Monday morning for blood tests and ECG and I sent him up to the hospital for a chest x-ray. He was so insistent that it was the same thing and in retrospect that was really misleading for me*	Salient feature was patient's insistence that the diagnosis was the same as previously, seemingly confirmed by looking at case notes of his previous presentation. System 2 in action as tests ordered, largely to rule in cardiac failure and rule out possible complicating factor of anaemia.
Context issues *It was a Saturday morning so I couldn't easily get any tests straight away.*	Management affected by practice environment - routine blood tests not immediately available
Outcome *Next day contacted by one of his friends .. to say "actually, he's had a pulmonary embolism .. he'd got quite a lot worse that afternoon and been admitted to hospital and ..CT showed multiple pulmonary emboli.*	Delay in diagnosis likely to System 1 overpowering System 2, raising closure threshold enough to be affected by context issues (no blood tests available at weekend).
Summary System 1 single diagnosis based on existing label, immediately jumps to the diagnosis. Weak System 2 affected by context issues, delaying diagnosis.	

Table 1. Biases arising from salient features of presentation which initiate the diagnostic process and frame the direction of subsequent information gathering.

Previous diagnosis label	*Because somebody had wrote down that he had bell's palsy and he'd been seen in hospital .. I immediately thought that's what he had (1);* *Story of the insect bite and that was what we were sort of using as our diagnostic tool really (6)*
Pre existing psychosocial problems	*all thought some of the bleeding might be from sexual abuse (31);* *sick notes, and prescriptions and whatever and I thought that that was probably the main reason behind the um sort of um consultations (37)*
Reassurance from initial appearance	*when I called the patient back I got hold of the granny who said oh yes mum's in the shower that as a clue to me meant that maybe the child wasn't that ill (11);* *She wasn't terribly unwell (33)*
Similarity to a recent case or similarity to representative case built from experience	*My diagnosis was fed by a patient the previous week who'd presented with an ischemic foot (40);* *And I thought he had cancer because of the mass and the weight loss and the paleness (44).*
Incorrect localisation of salient features	*vomiting and sweating and diarrhoea .. epigastric pain (10);* *epigastric discomfort . .. must be indigestion (20).*
Common things occurring commonly (Probabilistic reasoning)	*viral infections are common (16);* *my preconception at the time was that a young <30 year old is very, very unlikely to have bowel cancer (32)*
Ignoring as well as over or under estimating red flags or critical cues	*he came in hopping, which is quite unusual. Not weight bearing at all is quite unusual (30)**;*** *normal chest on examination (24)*
Vague presenting symptoms, no salient features recognised	*fatigue from whatever cause (3); it was all very vague (28);* *atypical leg pain couldn't work out what was going on (21)*

Box 2. Case 14: Illustration of dominant System 1 impeding System 2 review at closure, leading to error.

Reconstruction	Analysis
Presentation *Elderly patient seen 6 years ago for what appeared to be resolving haemorrhoidal bleed .. 6 months prior [to the most recent visit] described narrow stools like a snake ..[At the present visit] bowel frequency and some bleeding with examination of clear external piles no rectal masses on PR. Did some bloods but wasn't anaemic.* *[I ignored] the older the patient the lower the threshold for colorectal cancer that we would have for referring .. red flag that's there for a reason therefore it would be foolish to sort of dismiss..*	System 1 dominance may explain the high threshold for vigilance in this age group. No significant attempt to rule out and normal Hb wrongly used for rule in. Another example of the power of a perceived label in biasing process.
Salience *External piles with a normal PR .. [6 years ago] with haemorrhoides seen by a colleague.*	Salient feature was a normal examination 6 years earlier.
Outcome *2 months after last visit ..change in bowel habit with rectal bleeding and as part of investigation had a sigmoidoscopy and biopsy which found a malignant colonic tumour*	Delay in diagnosis likely to System1 overpowering System 2, raising closure threshold.
Summary System 1 single diagnosis based on label immediately jumps to the diagnosis. Ignored expected natural history, and the presence of a red flag. Diagnosis was delayed until new critical cue emerged.	

Table 2. Effect of framing biases on closure thresholds for ruling disease in or out.

Presents with diagnosis label	*I'd keyed in too quickly and then just ignored any of the sort of differential information (1);* *When your brain immediately jumps to the obvious diagnosis its worth just having in the back of your mind what else it could be (6)*
Psychosocial label/behavioural	*I closed it before she came in .. I think hadn't really thought out the differential diagnosis (4);* *Not appreciating the seriousness of the, of the problem, coupled with not really wanting to think about it because the patient was so difficult. (31)*
Ignores red flag	[did not] *take a step back and consider what we call the sort of red flagged ones, are there any flags in front of you that are presenting information of other serious diseases that might kill or harm? (2);* *Think I ought to have thought this severe pain which isn't improving I ought to go back to cancer but so I was put off by the negative investigations and that kind of prior assessment and err .. level of pain which was not otherwise explained (15)*
Ignores possibility of serious disease with low probability	*[ignored] older the patient the lower the threshold for particularly for colorectal cancer that we would have for referring .. red flag that's there for a reason therefore it would be foolish to sort of dismiss (14);* *My preconception at the time was that a young 28 year old is very, very unlikely to have bowel cancer .... slightly raised C-reactive protein…it wasn't dramatically raised ... I certainly didn't act on it because I think I was confused by the fact he'd got better the second consultation (32)*
Used wrong clinical features to rule-out a condition	*[ignored] new onset quite severe headache in a (40) something year old is a red flag in itself (22);* *We think of ectopic pregnancy as being bleeding and pain and this was painless bleeding (17)*

Ignored gut feelings	*it's a sixth sense .. that I think as you gain more experience you really hone and fine tune .. it's invaluable particularly with children 19; was not terribly unwell ... obviously needed more investigations.. wasn't happy with my decision even though it wasn't a conscious process. (33)*