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## DOCTOR OF PHILOSOPHY

### Visualise: an exploration of an artist's approach to 3-D computer visualisation in clinical radiology

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*Award date:*  
2009

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# Visualise

*an exploration of an artist's approach to 3-D computer visualisation in clinical  
radiology*

John McGhee

2009

University of Dundee

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## **Patient stories**

'Yes because I was saying to myself that I remember them speaking about it, going to hospital doing this and do that and I mean I've always been interested to know what happened you know.

*Well that is interesting to know*

When I took that heart attack I never in my wildest dreams did I think I had a heart attack as it was just in there, just a pain in there and it came, it started on the Thursday night and my sons stayed in Tayport and I was across there and I had had my tea and we were later in having the tea as my son worked in the pub didn't finish till seven so the time he came along the road we had our tea and then we came back to Dundee and we got home and was as sick as anything and that was the start of it, that was on the Thursday, Friday wasn't too good and I went up to the community centre as my friend was there she was at the playgroup with her wee grand-daughter and went up there but when I went into the community centre the girl in the office said to me 'are you all right, you are looking hellish' and I said 'I'm just going into see XX' so I went in and XX said 'what is wrong' and I said 'I've got a pain' and she said 'come on chemist' so we went up to the chemist well I got my medicine there and the girl got my medication up on the computer and she said the only thing I could give you is 'Gaviscon Rapid take that but if you are not any better get to your doctor' so that was on the Friday, so on the Saturday I was going to Cyprus for three weeks so we went for a bar lunch and she said 'are you wanting a drink' and I said 'no I don't think I should bother taking one' and she said 'a whiskey will no, that will help you' well I never drink whiskey bit I took the whiskey anyway and well I always go on Saturday to play bingo at the Tay Club, so I went there played my bingo and then I went away to the toilet and I was as sick as anything.

*Oh dear no*

And it was fish I had at dinner time and I thought it must be the fish.

*Well you think sometimes with fish, you do*

Because I had fish on the Thursday night but anyway one of my other friends says 'I'll take you to the hospital' and I said 'I'm no going to the hospital' but I didn't mean I wasn't going to the hospital but I didn't want her to come with me because I thought what use of me going down to the hospital with her she doesn't know anything about my family the problems, the health problems or anything so I came home and went to bed and then I got frightened so I phoned my sister-in-law to see if my brother was in and she says 'oh he is sleeping he has been working all day and he is just home' and I said 'it is okay' and she said 'what is wrong' and I said 'I've got pains in my chest' 'we will be right over' well I phoned her at five past six and they had me in here at twenty past six and at that time I just lived across the road but he he had come from Byrons Avenue, he just never even washed himself he just come right over, but I mean because that same year I had been on a course with

## **Patient stories cont**

the University and the College and it was all about, hill fossils and things like that and I was away hill climbing and everything and that finished in June and this was in the December that I took that heart attack.'

Participant 1A

'But I worked in a shop years ago because my husband was on a kidney Machine at that time and it suited me better as I used to go to Dundee to the Kidney dialysis place at that time, so.'

*So Fire Brigade.*

'But my trouble started, well I had deferitus years and years ago and I was in the hospital in Aberdeen then it was about 6 or 7 years later I got water pills from our doctor and I went back to him after a week and I said to him 'I don't feel well with these tablets and I was going away down to Blackpool as my daughter lived in St Anne's and I was only going for a long weekend because they were going away to Ireland and I went down to look after the kid and when I got down there I didn't feel very well that day and she said 'if you are not right, phone this friend' anyway I felt not too bad but Ryan was about 15 and Holly would maybe be about 12 at that time and I went away to the toilet and my nose started to bleed and a think I never had was a bleeding nose so I shouted to Ryan and he came through and he said 'what is it gran' and I said 'I've got a bleeding nose, I've never had a bleeding nose' so anyway I went to the room and sat on the bed and I just felt terrible and he says 'I'll phone' I forget his name but he had a first aid thing and do anyway he came up and he took my pulse and says 'I'll take you to the hospital' so he took me to the hospital and I was kept in two/three days in there and it was the potassium that was in my body and causing all this bother, so from then on it has just been, and then I was in here, but I was all right at that time, I was in here with pneumonia and they didn't tell me, it was after I got home and that I got this letter to go back and get this thing, you have to see the specialist about my kidneys and that was what caused it this, but the doctor here, the hospital at Blackpool sent word to the doctor here and when I asked him he said 'no' but it was his fault and these tablets.'

*Oh right, I see, so now they are trying to have a scan to see a bit more*

'And I've got tablets and I feel they are not doing me any good and I think that it is it get on to the doctor but defriatus years and years ago when my kids were young but after that it was fine, so that was what really started.'

Participant 17

## **Patient Stories Cont**

*One in Dundee and was that a similar scan to like what you are having today?*

Well I think so, you go in that tunnel, the only thing is I don't want dye, that blue dye put in'

*Well I don't know anything about the scans unfortunately.*

'My husband went into the kidney machine when he took ill he was originally it was in ?? but you wouldn't mind of that place but anyway it was a hospital outside Perth he went for this x-ray test and they discovered that he had kidney, TB of the kidney and they reckoned he must have picked it up abroad somewhere because he was in the navy but anyway he went, he got that blue dye put in him and he went to Glasgow in November and they took that dye out of his kidneys and they reckoned that was what caused his kidneys to collapse, so there is no way, I've seen it on the television and read about it so there is no way I'm going to have that.'

Participant 17

'Well you see I don't know what treatment they are going to give me if the kidney deteriorates in any way, last time I saw the consultant, it wasn't the same one I saw in July he says 'if it does get any worse he had something up my sleeve' but I don't know what he had up his sleeve, but this one what he is trying to get me to do is to stop smoking, he says 'this vein you have got to watch that and if you continue smoking it is not going to help.'

*So you think that looking at something on a screen might make you understand more about why they are trying to explain it, so it might help why*

Participant 14

'Well to me like I say I have never been that much interested in things like that so it is just one of those things, I see where the kidneys are, I see where the veins that go out, not the veins but go into them and at the moment that is my only prblem, as I say I came in here with illness in 1998 and they couldn't make out what it was but end up I was anaemic so I mean I was in the hospital for a fortnight and got home and I still wasn't well and I went back four month later and the technician discovered it was an iron deficiency, but I had that when I was younger as well I was on iron pills for a long time when I was younger, then I went on iron pills for a long time when I was younger, then I went on iron pills again and then they took me off them because the blood was all right, so I'm on about seven different lots of pills and I don't know if they know where to go.'

*Hard to keep track I'm sure it must be*

'That is when the thought it was something wrong with the aorta or something wrong with that it was just a bad x-ray film so I got all the tests and I think I had an MRI then, I shut my eyes but then they discovered that one kidney had not grown, so that is all I know about my body.'

Participant 14

*And you mentioned that you have already had one MRI before so it is not your first today?*

'No and when I was in for x-rays and that I had to take the jewellery off and I remember just shutting my eyes and waiting until everything was over then I opened my eyes again, so I think it was that and I was in for that other, there is one x-ray I got done and I had to lie flat and I was just over a thing like that you know and I had to keep very still but there was no cover over or anything and when I got up out of that thing I never felt well, I had to get a blood test while I was there and then they took an x-ray of the back of the kidneys or something they were doing but I had to lie there for a while and when I got up I just didn't feel right at all.'

*Okay, I don't know what that was.*

'I had to drink stuff before I went in.'

*All right there is all these different types of procedures.*

'I mean that was about 8 years ago.'

### **Value of information**

*So do you think looking at something like that which explains it a bit does that help or do you think it makes you think oh maybe not?*

'No it is helping because I'm saying to myself now it is explaining the blood getting through and the narrow and the doctor I saw at the renal clinic he said, when I told him about that he said 'is there anything different' and I was telling him that when I'm walking and that and this breathlessness which I wasn't bothered with it till I had my heart attack but I feel that when he said 'it could be hardening of the arteries' and I thought well no, like anything I'm going to come and see if I could help it as I say I know that my uncles blocked arteries and brothers had hardening of the arteries.'

*So you have heard about other people?*

'And it is in the family, you see my father died with a heart attack, my mother died with heart attack, my father had high blood pressure and my mother was never bothered with her heart and she had been at the hospital in things like

that but she had got it into her head that it was cancer because if she ate anything cold, like if she had cold chicken or anything she was fine but if she took hot chicken she was sick.'

*Something not quite right?*

'So she thought, she had got it into her head.'

*It is difficult when you don't know I suppose you start to think.*

'I was watching, she was staying with my sister and she was watching the telly one night and she was actually watching the snooker because she loved the snooker and watching the snooker and she took a heart attack and that was it and that was it she came in here and then we got a phone call and we came up, and you know, and I mean she had just turned 80, but my brothers have all, well my older brothers they died young, one was 51 and one was 53 the oldest one took a stroke the other one he came in for a hernia operation and he never came out he was in for about 4 weeks and there you go.'

Participant 1A

*Okay, and do you think seeing that information on a screen like that and explained like that would help you then make a decision or understand more of what your treatment might be?*

'Yes, aha.'

*So that would be a helpful purpose there.*

'Aha.'

### **Value of information cont**

*Okay I've got a couple of words as well, so is there any words on this list that you think are the best ways of describing the 3D images that you saw, I mean do you think they were wonderful or did you think they were okay?*

'No I think it is great that they have done that.'

*Okay that is good to know. Is there any other words that you would describe in your own words having seen that?*

'Em, I think for me just looking at it gives you a better information than somebody sitting telling you that they are going to this and going to do that, well you are seeing what could be happening.'

Participant 1A

'Well the point being I've got two sons and a daughter down in the South of

England and it is difficult to try and explain to them, when I have been trying to explain things to them I try not to go over the top and worry them but I would like them to be able to understand what is going on'.

*So you would like to have a form of communicating that would show that, do you think that would help?*

'If they could actually see,'

*If they could see something, something short maybe, or would you think that maybe having something written?*

'Not written, well I could let them read.'

*Well maybe letting somebody read something and maybe looking at pictures as well, pictures might help?*

'Yes.'

Participant 6F

'Well [the 3D video] it didn't enlighten me as to what my problem is'.

Participant 9 I

### **Where do people get information**

'Yeh, and they are explaining it to you.'

*Explaining.*

'Explaining it and you are seeing what they are doing so.'

*So that along with your doctor explaining it to you would be something that would help?*

'Because sometimes somebody will explain it to you and like'

*Without the images?*

'Without that and you are trying to take it in but you are not taking it in but if you are watching it you are taking it in better than the'

*And would you also like something to take away with you to read, maybe when you got home?*

'Oh yes aha, if there was anything, yes.'

*That would be something that would be helpful too. And generally speaking do you find health information to be something that you find quite interesting or is it?*



'No because I need a know a lot of medical books, I mean no I don't go home and say I'm going to get a medical book and read up what the doctors said, I don't mean that, I read a lot of these when I'm lying in bed these wee Mills & Boons but I like the medical ones.'

*Oh right aha.*

'So you know that you get a lot of information in that.'

Participant 1A

### **Preferences**

'I would say it is more specific in three dimensional.'

*More specific so, and that helps you to understand?*

'Yes I understand it, I.'

*So there is more information?*

'Yes there is more information.'

Participant 2B

'Well I would say that the two dimensional is not as effective in showing the effect as the 3D the 3D give you a better idea where and how it functions'.

*Where and how, and have you ever found it to be difficult to deciphering three dimensional types of images, you have been quite positive about looking at the three dimensional just now?*

'No problems, that give you the more accurate location of where they are as compared to the 2D I mean the 2D if could be here at the front, it could be at the back whereas the 3D you get a better idea of the exact location where they are'.

*So did you find that the fact that the body pans round?*

'That is right it give you an idea they are not just flat at the back or flat at the front that they were located somewhere within that area'.

Participant 9I

*The three dimensional and what would you say your reasons are for that?*

'well as I said it is more realistic'.

*More real?*

'It is great what computers can do'. Participant 10J

*Okay, you wouldn't mind, what do you think that looking at the 3D that I showed you in the pictures and on the screen adds compared to maybe looking at a model, does it clarify anything more for you or?*

'Well a model is a model isn't it and that is interesting as well but I prefer what I've seen there.'

*And you prefer looking at, I showed you the still images on the screen as well and were those preferable to looking at the printed out pictures?*

'Well they come first to see the still images and then afterwards. Yeh I quite liked the way it was done, the still images and then the.'

Participant 15

### **Preferences Contd**

*So written and somebody to talk to you about it but nothing from a computer really, you don't need to be shown anything really?*

'No'

*And not shown the printed images or are you happy not to look?*

'No, no'

*Just to talk and some written?*

Yeh

Participant 17

*So would it be helpful do you think if the doctors showed you information like this?*

'It could be yes.'

*It could be but only back at the very beginning?*

'Yes'

Participant 17

'On the computer, 3D visual like you have shown me on the screen...no I think better the 3D providing it is my own...Speaking to somebody as well, somebody working the computer for me because I can't do that'

Participant 16

'Well it is nice to have something in writing isn't it.'

*Nice to have everything in writing?*

'Yeh.'

*So you would like to have something in writing?*

'Yeh plus seeing it in the 3D'

*Okay and would you also want to be speaking to a health professional?*

'Yeh, rather than discussing it with family, discuss it with the health not actually the surgeon but somebody.'

Participant 16

*Which would you say you preferred, did you prefer looking at the information I showed you in the two dimensional or the three dimensional?*

'I don't think I have a preference.'

Participant 12

*And what do you think looking at 3D adds to maybe looking at the model?*

'Well that was too gory but seeing it like that you are not actually seeing the body you are just seeing the (picture)

*So you prefer not to see the body?*

'Yes.'

*Okay, so the model you think is a bit sort of gory?*

'Yes.'

Participant 14

## **Preferences Cont**

*So the second one that I showed you that had the movement that wasn't so so helpful?*

'No I don't think so, I'm not sure about that.'

*That is fine, it is not a problem we can move on it might become clear. And did you find the three dimensional video that I showed you to be clear or did you find it not really, I can show you it*

'It was clear.'

*Okay it was clear and did you find the two dimensional one clear as well, you said you preferred that?*

'Yes.'

*More clear than the 2D, which parts did you find to be quite clear, is there anything?*

'Well the blood that was going into the kidneys and that.'

Participant 17

*Which parts (of 3D) did you think were most clear?*

'The close ups.'

*Okay so would that be the close ups of the branches, you did mention that at the time*

'Yes, into the kidneys, yes.'

Participant 15

'I would like to read it after I have heard it, because what doesn't go in to begin with you can read and study it for yourself.'

*Right so, and that would be after speaking to a health professional?*

'Yes.'

*So your preference would be for the written and the health professional?*

'Yes I would like to see it as well.'

*Okay, so all three, any particular order that you think, would the the written information be*

'I think the word, doctors word first of all and then the written and then seeing it.'

*And then maybe the written to take away with you to have a look at later on?*

'Yes that is right.'

Participant 15

'Well you know that is something is wrong here but you don't know, you know it is the kidneys.'

*So the two dimensional one is not so clear maybe?*

'No, these are better, if somebody was saying to you, now that is what is wrong with you and your kidneys and that is it, that would be better.'

*Any other reason that you can of they are better?*

'Better in showing the patient, you know, what is wrong.'

*But you think they are better.*

'Yes because I don't know.'

*So the two dimensional ones aren't very clear?*

'No.'

Participant 11

13 That is far superior you are seeing more and you have more idea.

C The three dimensional?

13 Oh yeh, and it is like, it is the difference between chalk and cheese actually there is a bit difference.

C So what would you say the main differences are?

13 Well you have got that in colour for one, it stands out more and then it is actually showing you, giving you more details of it because in the black and white it is just black and white, I noticed when they shone the colour the two kidneys, one had more white cells and black cells than what the other one did and then the two bits and pieces and it stood out a mile in colour

Participant 13

Right looking at it and looking at that, it is like you are looking at a human being, a real person because you have got the shape, you have got the colour you have got everything, this is darker and it is showing you where it is sitting and what it is doing and how it functions, so it looks so real, when you are looking at that and it stands out a mile and you look at that you know

Participant 13

### **Preferences (cont)**

The three, and is there any particular reason why you preferred it?

18 Eh more user friendly, patient friendly, or whatever.

Participant 18

C But you thought the 3D was the superior.

18 Definitely with a wee bit more on what treatments

Participant 18

8 Well being a layman in medical terms I found these a bit difficult to understand at first

C So that is the two dimensional?

8 The two dimensional ones, while obviously these are much clearer and give a better kind of perspective.

C Better perspective, okay

8 When I'm looking at it, I mean if you had handed me that for example I would never have known what that was.

C So that is the first and that is the second two dimensional one?

8 And these two look like jelly fish, (laughs)

Participant 8

### **Problems with giving information**

*Yes, you see that is true that seems to be missing there, but I think it will be a comparison of what you think between these pictures and the three dimensional pictures, so that*

'Well this one is, well I have found out today that I have two arteries into my kidney instead of one and this is what I've got and I've a problem with them and that is why I'm asking you that.'

Participant 3C

'I would rather have the doctor telling me.'

*Doctor, okay, doctor and still looking at it on the screen?*

'Looking at it on the screen, yeh.'

*So that would be the same one as before.*

Participant 11

### **Complexity information**

'It is useful if you don't know, of course there is no body there but you don't see where it is but then this one tell you where it is.'

Participant 3C

### **Prefers printed images**

'Yes, I don't really see that as much good but I think I prefer the, seeing it there I think I would prefer the pictures.'

*The pictures that were printed out?*

'Yes.'

Participant 3C

### **Contextuality (kidneys)**

'I think if they put one or two things just round about it where the parts of the body were.'

Participant 3C

'And it wasn't too bad but again because there is no body there it just looks to me like a piece of wood, it is going no where.'

*That is really useful actually because it doesn't actually tell you, it would be important if you were seeing that in that way that somebody was explaining it.*

'You can't see where it is, you can't see where your kidneys are in your body so you can't say where this is coming from or going to.'

*No, which is quite important to know when you are trying to understand.*

'It is all right for a medical person but'

*But the likes of you and me and everybody else it is important to have a bit of a context of where you are.*

'If you see something else to see exactly where it is going or where it is coming from, so that doesn't show you anything.'

*Okay. So do you think that those pictures, the ones that did help you do you think they would help you understand a bit more about how arteries worked or arterial health or not really?*

'No I've seen some for my heart on the pictures, well if you get something they have the TV up and they have more of the body not just your heart.'

*So that would be useful to have more of the body?*

'Yes to see where things are and where it is coming and where it is going to and how it works.'

*Okay that is good to know and with these pictures that you saw, particularly the three dimensional ones which are the ones that have a bit of colour to them. Oh are you all right, do you want a glass of water?*

Participant 3C

'It is something they have to tell me, I mean whether they decide to do it or not I don't know but I had a sister who had to get one kidney out and my other sister who had an aneurism from her kidneys, they both all right.'

### **Contextuality (kidneys) cont.**

*So I think from what you are saying is that you would need to have a bit more information than it just shown in that form would be helpful to have pictures which show other bits.*

'Where the things work, where they come, you know, where your kidney goes to, well I can understand maybe where it goes to but how does it go, does it'

*And that is not actually helping you?*

'Because I can't see bits of the body to see where other bits are was is near it or'

*And what else it is kind of linked up to?*

'Yes.'

Participant 3C

*Okay, and do you think, was there anything else that you thought was more specifically explained that helped there?*

'Well particularly the view of the kidneys in the body, the rotating body, that was very, that really put them exactly where you, where they are and it really yes, explained it totally, that was a really good image'

*So that would have come through from, not so much maybe from the pictures but from looking on the screen?*

'On the screen definitely'.

Participant 7G

*Does it help with putting the information into context maybe or does it, do you think they show you more information than showing in on a model?*

'Well showing it in the 3D there you are showing me the kidneys and the blood vessels that go to the kidneys and then you just showed me the guts.'

*So the model doesn't show, isn't able to give the same information?*

'Shows other things that are there aswell but if it is the blood vessels that my kidneys are bothered with I'm not interested in'



*So you would rather just see the kidney parts and the parts that are relevant to the kidneys and not other bits of the body as well?*

'Yes.'

Participant 16

18 Just with it being 3D I think and actually showing people where the kidneys are (laughs)

Participant 18

### **Preference for how information given**

*Okay and overall when you are receiving information about your own health how do you like to have it, do you like to have it in written information or would you like to see it on the computer or would you prefer just to see some pictures like this or what would be your preference?*

'It I had to have treatment?'

*Or if they are just giving information about your own health, say you have*

'No just by word of mouth.'

*Word of mouth and not necessarily, would you like them to give you a sheet of paper to go home with?*

'No.'

*No, just word of mouth, and overall do you find the topic of health information and talking about it to be interesting or is it boring or do you find it, do you find you like to watch programmes on TV about health information or is it not really particularly your interest?*

'Well it is interesting, sometimes I do but I don't go out of my way to watch it, if it comes on or if it is something that interests me maybe I would.'

Participant 3C

*Well I don't know, one of the first questions we have got is, what you think the differences are between showing information in this two dimensional form and in the three dimensional, what are your thoughts on?*

'That show you more doesn't it.'

*The three dimensional, shows you more?*

'That is much clearer than.'

*You think is it clearer?*

'Yes, well for me it is.'

Participant 4D

'finds the 2D more clear and as mentioned before sharper, one point to note is there is no movement with the 2D video and as she has a bit of difficulty with her sight therefore the movement is a bit more problematic.'

Participant 4D

### **Preference for how information given cont.**

*So overall would you say you preferred the two dimensional which were these ones or the three dimensional?*

'Oh the three dimensional'.

*And is there any overall reason you would say that you could, that that was, you said more specific earlier on.*

'Just more interesting I suppose (laughs)'.

*So maybe more information?*

'Well yes, it impinges better'

Participant 7G

Right would you like them to show you on the screen if you were in the appointment?

'Yes, but the written one because you can read it, you can't take it in, you have a cup of coffee and you go back'. Participant 10J

'Well I think a health professional can sometimes be a wee bit too technical you need something in plain English if there is any problems you need somebody to explain it to you know.'

*Right so would that still be a health professional but making it easier or*

'Yeh.'

*Or would you like something written down?*

'Well sometimes written information could be rather frightening if you don't know the words, I worked in a doctors surgery and sometimes the patients say 'but it has got this written and should it be me that is reading that because it is not something that you can understand and the context that is given so written information can sometimes be dangerous.'

*Okay so you prefer not necessarily written so what would you prefer to have?*

'Somebody telling me.'

*Face-to-face*

'But not.'

*Not too professionally, when I came in about today somebody was explaining something and I said 'look explain it to me as though I'm four years old' so that is the kind of thing, they can get too technical and it goes over your head.*

*Participant 14*

8 Well a couple of these but not necessarily in this order, first of all I would like to go and see a professional, like my GP.

C Your GP

8 And if the GP said to me, I can show you a sequence of the treatment that we are proposing to give you then I would say 'fine' I like that, that is where I stand.

Participant 8

### **Need for information**

'it is interesting if it is of some use to you, some people watch all sorts of things. I say if I'm going for an operation I'll just go in, put me to sleep and just hope for the best.'

Participant 3C

'Put it this way, like the narrowing of the blood supply and that like you know what I mean, I didn't realise that, all that I was told more or less was that I was to be put down to Dundee to see the specialist because they didn't know if the medication I was on had damaged the kidneys'.

Participant 5E

'No, I not really worried about it I think because the way I look at it is what happens, happens, you know what I mean you cannot do anything about it, but as I say I didn't know anything about the narrowing'.

Participant 5E

*So you would be comfortable, you would be happy to look at it in the three dimensional form?*

'Aha.'

*Okay, and do you think that looking at images such as those on the screen that were the three dimensional ones might help you in making decisions*

*about how they are going to treat you, do you think it would make you understand more about treatment?*

'Yes.'

*And that would help you understand and would help you with decisions?*

'Yes.'

*Why do you think that is?*

'Well if you saw it for yourself and saw the damage then you could [make a decision], but just somebody saying to you 'oh your kidneys are damaged'.

*Does it help you create a picture maybe?*

'Yes, aha'.

Participant 6F

'Well it is useful to see the inside of the kidney, God knows people think it is actually something you have for breakfast'. Participant 9I

### **Need for information cont**

*And did you feel that looking at the presentations on the screen made any difference regarding your understanding of arterial disease?*

'That is a difficult questions actually, I'm not sure if it does or it doesn't, certainly gives me an idea of the location and the possible problems that could occur, like the narrowing of that artery, it doesn't answer questions that I would ask say the doctor which of course you have just said you have not medical knowledge to answer the questions I would like to ask'.

*So it doesn't help as much as you would hope as you would need the input of a doctor?*

'Yes, that is fair, that is right, you say to me, you have a protein leakage and the kidneys are all right you have 20% or 30% efficiency that doesn't give me an idea just precisely what that means, I understand there that the percentage goes down then the kidneys are not working as they should and how does a percentage measure, does it measure per litre, per millilitre what ever it is, these are the sort of questions I would like answers, what does it mean exactly when they say your kidneys are working at 30%'.

*Right and would you find that information that you are asking or that you query useful to see in a visual form?*

'If it were possible, it may not be possible'.

*But it is something that you would help for understanding?*

'I have a relative recently who has had complete renal failure and fortunately he had a son and now a kidney swap and he was apparently down to 7%, well he had renal failure according to the doctor, but these things don't mean anything unless you know precisely what they are talking about, if you see what I am saying'.

*Absolutely, so I suppose then it is how the information is presented to you?*

'Exactly you could say to me they are only working at 20% I don't know what that means, I take it it means there are more impurities getting through or not getting through or whatever'.

*So if something was able to maybe be visually shown which showed that situation, possibly it might help?*

'It may be too difficult to do that?'

### **Need for information cont...**

*Maybe too difficult, I don't know, but it would be something that would be interesting or useful maybe to know and it would help for information for yourself perhaps?*

'As far as I can gather from the from, I had met this afternoon with Dr Stewart who is one of the renal doctors here and presumably he will tell me what my percentage is now and it occurs to me what precisely causes the protein to leak through if the kidney is undamaged is my understanding and he said 'that it is a case of the fact that you suffer from hyper-tension' which I have done for several years, it damaged the kidneys evidence of some scoring on the kidneys, but what does that mean'.

*Right because you mentioned that earlier on, when you were looking at the pictures you said that it looked like there was scoring and was*

'Yes and does that cause the protein to leak through or stop the protein, I don't know. These are questions I would like to see answered in a clear manner shall we say'.

*Right okay.*

'I don't know if that answers your question?'

*It does answer my question because I suppose it is all about how the information is presented to you so that you are able to*

'I mean everybody knows generally that there are two kidneys, well you hope

and approximately where they are we hope, but they really don't tell you just what their true function and how they can fail and why that people are in the situation I'm in now wondering what is happening to my kidneys, that I would like a clearer explanation on, if they are only working 20% I don't know what that means'.

Participant 9I

'Well I know you said you were not a doctor but if you could have explained, well the one with the circle what is was, what it did, I know that the kidneys filter out the rubbish and that but it is not everybody, I know that because the girls through there just told me',

Participant 10J

### **Recommendations for improvement**

'would like to see the videos at a slower speed and finds the movement that is displayed in the 3D video sequence difficult.'

*do you feel that parts of the video sequence need further explanation?*

'on the whole apart from what has already been mentioned she finds the videos clear and that the voice describing the videos is helpful.'

Participant 4D

'Well, it is a bit difficult, I mean you have got it on the screen, that is my body and if I was to get that bit there cut out it would join up again and it would be fine, now they could do it on the screen as if they are having a wee mini operation, I know what computers can do, I worked packing them, but they could just as if it is happening at the time and then you yourself could see what the results would be'.

Participant 10J

### **Use of colours**

*How do you find the colours, looking at colours, do you think that is clear ?*

'Aye, it is all right, it is more realistic, because your kidneys are red anyway aren't they?'

Participant 5E

C It is not making it real for you?

13 No it is just like a photograph from something in space to me.

C Okay so that is a good comparison then

13 This is real it is like you have got the photos of somebody, I mean that is pure red and I don't think it is like that in our body.

C So you don't think it is red in your body?

13 No I don't think it is that.

C So are you okay with that, are you happy to look at the colours?

13 I don't know I ma just surmising it I don't think they are a purple colour aren't they in this

#### Participant 13

13 Well looking at them I sat for a minute and I saw them and sat and says that could be me, and the circle shows you the points and that is what is wrong with me, so what am I going to do about that, so that is the idea that I got, that is the impression that I got, so if you said we can sort that but it is up to you and you are sitting going 'well yeh' and that is not very nice and I think it would improve things, we are struggling with black and white, if you look at something and it looks like, you are watching black and white and you are watching the same picture in colour the colour automatically attracts you to it, it is like presentation on food isn't, if you food is laid out properly and you will eat it and if you just see it any other way, you think 'na not'

C Not interested?

13 No it is presentation, because it is the colour that attracts you to it.

#### Participant 13

#### Looking at own scans

*Okay and what I'll do is ask you another question, if the images that you saw of your own, if they were able to do that on the screen showed something quite serious would you still be comfortable to look at them?*

I would be because then I would know because doctors don't always tell you everything that they should tell you'. Participant 10J

'Ah, no I'd say fair actually, no I've been brought up with a sister being a sister and my dad was an ambulance driver, a long time ago when they had to do more then than what they do now'.

*So you have had family members who have been involved in things like that?*

'No thanks, it makes me sick'.

*Not something you would like to do yourself?*

'No, giving blood is okay, but getting blood, help'.

*So you are comfortable about things about yourself but you would rather not deal with it. How interesting do you think it is looking at information in the 3D form?*

'very interesting',

*Very interesting, great okay.*

I'll see how times are not and get a new computer' (laughs).

Participant 10J

'Yes and this is what is the matter with you, that is somebody else you see not me, see what I mean, if it was me and that was my kidneys then you could explain this is what the matter is with them.'

*Okay, that is an interesting point you are making as that actually comes up in one of the questions.*

'Because looking at the picture it is not me and if it were me I would be more interested and say, oh what is the matter, see what I mean.'

Participant 11

### **Anxieties over images**

'Well put it this way I was a chef and I was used to cleaning rabbits and everything and handling the insides and it didn't bother me.'

Participant 5E

'Well I've got to the age now where I just don't worry now.'

Participant 6F

'Yeh, the same sort of thing there, only bigger. I don't like the thought that is what I look like inside.'

Participant 7G

'No I've nothing to worry about because I don't know if I have got anything wrong.'

Participant 11



## Learning

'Well I wouldn't say I understand it and I wouldn't say I had learned anything from that.'

Participant 6F

*Okay and did you find that looking at the videos made you understand more about arterial disease?*

'Well you wouldn't know until you caught it then the doctor telling you what is wrong

*So it would be important what the doctor told you?*

'Yeh.'

*So that I showed you didn't really help?*

'No I reckon that didn't really help.'

*Okay so was it important to have somebody to speak to you?*

'To show you a picture just like that and say this is what is causing the trouble.'

Participant 11

*No, no, no, it is showing you preference for how you have information whether you would like it to be printed, maybe handed to you like this or whether you prefer to look at it on the screen or whether you like to have orally by a health professional or whether you maybe like to have, I've got a model as well to show you, whether you like to have it in form, so these are just a wee taster of some of the ways*

'Basically in my recollection when I was at college it is that very often the act of variety commits things to memory.'

Participant 12

C Three, okay. And did you find the three dimensional images that we showed you in the video here to be clear.

13 Far superior

C Far superior?

13 Oh, I

C And they were clear?

13 Oh yes, showed you more details.

## Learning (cont)

C Was there anything that you found not to be clear?

13 Not really, what I was looking at I was getting an idea I was seeing the narrowing, you saw the cells, you saw the blood and what else could you not see, the picture made me understand a lot more about that.

Participant 13

C Do you think anything would need further explanation or?

13 That short period of time and that short thing I went in and that is what I'm getting done, but I didn't know the reason, just to see if it was narrowing but when you see that now I understand it.

Participant 13

Oh yes, that helped fantastically, that was fantastic, by showing you and explaining it and then you know there is a circle in the black and white but when you notice it there, there are two joins and there is one join and it is like a finger and then you can see the cells going through the narrow end and you see it goes quickly through the normal end so it shows you better details.

Participant 13

## Benefits

*So it is not something that made you think ooh don't want to look at that?*

'No, it is good to know about how the body works and it might help a lot of people.'

Participant 6F

'No, I don't think so, nobody really, I mean that is the first time that I have sort of seen anything that explained it to me.'

*Right, so is there anything that you are thinking, or that didn't really make too much sense and it would help if it was a bit different?'*

'Maybe if I had been shown that sort of thing to start with when I first took my kidney trouble.'

Participant 17

*So would it help your understanding, and would you understand?*

'Let me make my mind up if I was to get anything done to them or not get anything done to them, if you are just getting information in general, that happened to him, it doesn't happen to me.'

*So it wouldn't be specific to yourself, so you would find that rather general so once again you would be preferable to see?*

'That is point that I'll make actually because you are keen to see the specifics because that would help your own specific situation.'

Participant 16

'Well I hadn't actually seen the arteries leading into kidneys before that and that was quite interesting to see how it happened.'

*So that is something new you have seen today?*

'Yes.'

*And did it tell you anything you hadn't known already or?*

'Well I suppose not really, just to see it makes it a bit more.'

*It helps you picture it?*

'Yes.'

*And did looking at the 3D images make you feel less worried or more worried or about the same as before or?*

'Well I don't think that has made any difference to what I actually feel and I can't say that I'm worried, I'm too old to be all that worried about it you know.'

*So looking though at what I gave you didn't make you too anxious?*

'No, no, not any more anxious than I was.'

*Right okay, and is there any improvements that you could suggest to what I showed you on the videos, maybe the speed, was the speed too fast or too slow or was there anything that could be, I'll let you have a think?*

'I don't think so, before it starts off with four little pictures and then increases the size, no I don't think there was anything wrong with it.'

*So the speed didn't go too fast for you?*

'No.'

*You wouldn't like a bit more time, so speed was okay. Was there anything that you thought could be more clear at all?*

'No, not really.'

Participant 15

*Well the purpose is to see patients preferences for information in different ways because as I said before I will be showing you some more information on screen.'*

'Is that how long have I got? Sort of thing'  
Participant 12

'I've been working with hydraulic system for most of my life, most of my working life and I think what we have got here, we have got a pump of the hydraulic system'

*So you understood that before you saw the information really that I showed you?*

'Well I think so, it is a flow and return sort of business isn't it.'

*So what I showed you did that help at all or not really?*

'Not really, well it confirmed the understanding that I had.'  
Participant 12

*So you could see what was happening there?*

'The flow is only as fast as its narrowest part, to let the fluid in the system and that is just engineering again.'

*It is*

'There is a little Italian gentleman called Venoli in hydraulics again and if you throttle a system then the amount of fluid passing per second is governed by the restriction.'

*Right so that has parallels actually. And I mentioned would you be comfortable to see your own images, if they were to show something quite serious would you still be comfortable to look at them or would you rather*

'Again I would want to know, can it be cut out? Or how long have I got? Should I go on a cruise?'

*And do you think looking at information on 3D would help you make decisions about any treatment you might have?*

'No whether I should, well it would help the doctor to advise me, it would show the options and I'd want to know the options.'

Participant 12

'Well you see I don't know what treatment they are going to give me if the kidney deteriorates in any way, last time I saw the consultant, it wasn't the same one I saw in July he says 'if it does get any worse he had something up my sleeve' but I don't know what he had up his sleeve,

but this one what he is trying to get me to do is to stop smoking, he says 'this vein you have got to watch that and if you continue smoking it is not going to help.'

*So you think that looking at something on a screen might make you understand more about why they are trying to explain it, so it might help why*

*Participant 14*

C Yes you are happy enough to look at them. And do you think that looking at information in 3D would help you with making decisions about treatment, do you think that would help?

13 Well I don't know if it would help you make treatment because you have got people who are professionals to tell you what treatment that you need but then I would understand it better, I would say well this is what I've got and I've got to cure this and I have got to understand, so it makes you understand more, I mean I am understanding now what they are going through there to do see what they can find out, what is causing my blood pressure like it is, like before I just take it for granted every day, I'm all right I've been like this for years but now when you see that I can see what they can do to your body, then it is making you understand more.

C So it is understanding more for when you speak to somebody else?

13 Oh yes it is making you more knowledgeable.

*Participant 13*

**Benefits (cont)**

I've got a doctor who does diagrams and that sort of thing and explains it and tries to show you but that is far superior, even if you went to your doctor and your doctor had that, he could put it up on the screen and show you I think it would be far superior.

*Participant 13*

8 Overall pictures helps enormously one is obviously narrowed and one is clear

*Participant 8*

8 Well it helps when you see the blood flowing and movement

*Participant 8*

C Right, and do you think that looking at 3D images would help you make decisions about treatment, I mean you mentioned actually that it would be

helpful actually if they showed you that extra bit, so, so far it has maybe not helped in that respect?

8 Only to an extent that if there was surgery involved for example, not that we are looking for that, I know what they have to do and they have to go away in here and that kind of thing, I've been told by the Professor who looks after me here and my health and my heart and surgery is not an option for me, that is with regard to the heart, the cardiac surgeon so whether that still applies to the kidneys, surgery is not for you per say or does that just apply to the cardiac thing, so I would be interested for example in finding out if I can get surgery for that bit and to what extent that would affect my cardiac situation.

Participant 8

### **Recognition**

'Ah now this is beginning to make sense you see.'

*That is showing the vessel you were looking at before*

'And the stenosis, the narrowing at the neck there and this is what they are wanting to know whether I've got it.'

*Right, okay so that was the first two dimensional video, we have also got one in the three dimensional which is the coloured pictures, would you like to see the other one first again or would you like to see*

'No that was fine.'

*Okay, so that is showing the*

'That is brilliant, that is brilliant, oh yes, and we have everything running about, yep, oh.'

*And that is showing the*

'That is right, yep, yep, yep, yep'

*As well as the kidneys.*

'Again highlighting the stenosis.'

*With movement this time?*

'Yep, yep yep.'

*As opposed to last time.*

'Oh, oh yes I see what that is yes.' (laughs)

Participant 7G

'I don't know which is the functional one but they are different.'

Participant 11

'Again they are different, the difference is up here, it looks like there are growths of some kind.'

Participant 11

'There is quite a narrowing again here.'

*Yes, there is*

'And there is some of the growths, a bit like cauliflower.'

*That is a good description actually yes*

'Is that tumours?'

Participant 12

'Is that a tumour do you know?'

Participant 12

C Well that is interesting that you point that out, I mean I don't have the medical qualifications to discuss these.

13 Just that you see it there, see how it is.

C Yes, well that is interesting so you are noting that the right hand kidney looks like it has bobbly bits on it

13 Aha.

C Right okay, I'll make a note of that. What I'll do is I'll put those down, if you want to have another look at them let me know. Plus we are showing patients information in this way, this is a model which shows various parts of the body and this has also got the kidneys, so this is another way that we can show patients information, so that is showing patients a model form.

13 It looks like two boxing gloves there eh (laughs)

Participant13

## **Benefit of 3D (preferences)**

'Oh well, yeh, now I've seen the 3D visualisation I would say health professional plus the 3D, if one could use that I'm sure that because of some consultants and GP, some doctors are not good at actually telling you what is going on and that can be, and that could help them and the patient, me'.

*Yes, okay so that*

'Written doesn't do anything and I don't have the internet and a lot of people my age don't'.

*So you are not keen to have something written to take away?*

'No, no, and beside you can get the wrong impression from either reading something, if you haven't got somebody explaining what the words mean you could get a wrong impression. Internet I think it is too easy to get the wrong things, the wrong information'.

*Well that is very true,*

'But if you are with a person you can say, 'what do you mean' instead of having to accept what is there'.

*Looking at the 3D and also having,.....* Participant 7G

*I wouldn't know actually, all I know is that this is one way of showing people Information*

'How exciting!' Participant 10J

'Well three dimensional are much more real.'

*So 3D was real, is there anything else that you were struck by when you looked at them or*

'More blood lusty.'

Participant 15

*Would you describe them as a bit more graphic really?*

'Yes, grizzly.'

*Grizzly, but you would prefer to look at the 3D*

'Yes you see the proper thing as it is.'

Participant 15



### **3D Preferences Contd**

'I said grizzly but that was in a sort of jocular, I didn't actually fine it.'

*Would you find that they were informative for you?*

'Informative.'

*Or they helped you*

'The sights weren't very pretty.'

Participant 15

C So what do you think that looking at the 3D adds compared to maybe looking at a scan or a model?

18 Maybe make it more real, realism.

Participant 18

### **Interested in health information**

*Okay, great. And generally speaking and I think I know the answer to this, do you find the topic of health information quite interesting? Or do you find it moderately interesting or*

'General topic'?

Yes

'This is getting political now (laughs) I don't like nanny-ing I was a smoker and really used to smoke Aaah when I was told this and told that, you can't do this, don't do that, and information is important but when it is critical information then of course, I just stick my toes in and that is just me.'

*So overall ...*

'I mean as long as it is pure information.'

*And accurate?*

'And accurate, but as long as it is not critical or telling you to do something'.

Participant 7G

*And would you say very interesting? (re with info)*

'Yeh, well it puts you in the picture, it shows you really what is the matter and you see what is the matter with you and not somebody else.'

*So you find the pictures help you see things?*

'See what other folk see when looking at it, puts you in the picture showing you, that is what is wrong with you.'

Participant 11

**2D**

'You see that has no relevance to my body [indicates 2D pictures], that has, the three dimensional has you see'.

*That is a very good point then, relevance,*

'That is some sort of amoeba floating about somewhere' [2D].

*If that is what you see then, then it is a good point actually to make, because it is important that they mean things to people*

'Only because we looked at that one, and I knew what we were talking about kidneys, I mean if I hadn't seen that and you produced that I would have thought, I might have thought that was lungs, you see what I mean?'

*The context?*

'Yeh, but having started off then oh well obviously yes that looks like a kidneys it is the right shape but it doesn't really look like a kidney but never mind obviously it must do and that of course meant nothing until I saw the other one, until I saw the three dimensional which then showed the flow and everything'.

Participant 7G

*And I don't know what your thoughts are on that, to see the kidneys in a form like that?*

'That gives you the impression that they are at the front actually.'

Participant 9I

*What I'll do is I'll move on to the questions and then if you want to refer back to any of the images just tell me. So what do you think the main differences are between looking at the two dimensional and the three dimensional for you?*

'I don't think there is a great deal of difference to a layman.'

Participant 12

'Aha, whereas had I been born 60 years later, three dimensional drawing images are the norm now.'

Participant 12

*I'll move on to some of the questions, so what would you say the main differences are between looking at the two dimensional and the three dimensional?*

'I didn't see much difference.'

Participant 14

'Well the three dimensional sort of pictures them more clearly but I understood both.'

*Understood both but more clearly the 3D?*

'Yes.'

Participant 14

### **Other Cont**

*So that is a two dimensional picture?*

'I've only got one of those.'

*So that is one kidney.*

'Aha.'

*Just have a look at them.*

'Main artery is leading down to the kidneys, do you want me to comment on Them?'

*You don't, you can have a look at all of them and then I can ask you some questions afterwards, if you have got any comments that you can think of at the time then let me have your thoughts.*

'My only comments is that these arteries, my arteries have become blocked, I Don't know what that is.'

*So that one is not very clear for you is it?*

'No.'

Participant 15

I it was quite interesting, because I'm seeing something that is going to come out in the future, this is going to be sitting in your hospital and you are maybe sitting and getting it done, or watching it getting done.

Participant 13

## Use of images

'Are these healthy kidneys or unhealthy kidneys, they seem to have a lot of marks on them?' (laughs). Participant 9I

8 A phrase that springs to mind is 'a picture is worth a thousand words'

Participant 8

## Example of Catherine being questioned

'Tell me I do have a question, when they said to me that you have protein leakage in you?'

*I'm not a medical background so I'm probably not the best person to ask because what I have got is the pictures .....*

Participant 9I

'Last time I got an MRI scan I got angioplasty, I wasn't very sure what was happening with angioplasty so this doctor at that time looking back his notes he said one kidney was more or less blocked off, non functioning and the other one had a slight blockage on it, the camera didn't pick up which one was which and then they put dye in and I was waiting for angioplasty and one kidney was perfect and the other one only had a slight blockage, how come the difference?'

Participant 16

'What is the actual arteries going to the kidneys, is that them there?'

Participant 16

'Is this the oesophagus?'

*Well I'm not medical so this is just to show patients and to see if they like looking at information in that way.*

'I don't know what they could be.'

*That is okay fine.*

'It could be something to do with the kidneys if this is the kidneys here.'

Participant 11

### **3D compared with model**

*What would you say that looking at the three dimensional imagery that I presented to you as compared to looking at say the model?*

'Well I think that the model is very useful it gives you an idea, as I say I assume, probably wrong, that kidneys have a filter function and this shows you what might be the filter part of it the fine membranes or whatever they are filtering out there'. Participant 9I

Thoughts, okay, then another way of showing patients information is showing them information in a model and this is an example of a model and if want to have a quick look at that, so that is another way patients can be shown information

18 I like that as you can hold onto it and see it and maybe better for the elderly might help the elderly you know to actually picture

C I suppose and maybe like put it closer to their face if they want to.

18 Yeh makes more sense to them. I feel a bit rotten here as I have got lots of medical knowledge.

Participant 18

### **Communication – health information**

*And I'll give you another sheet to look at but at the moment would you prefer to have information on your health and illness through, now what we have got are some options here for you to have a quick look at, for instance (a) would you prefer to have information on your health and illness through looking at a computer 2D visualisation like I have shown you on the screen or (b) would you prefer to have written information, or (c) would you like to download something yourself from the internet or (d) a health professional maybe telling you or what would your combination of the above be?*

'Well I think that downloading it wouldn't really serve any purpose as far as I'm concerned as fair enough I can see the picture and look at them but it doesn't mean a lot to me. I would certainly like it computer, it might, I would prefer (d) a GP or consultant or whatever to explain it'.

*So even without pictures etc you would just like explanation?*

'As I say it wouldn't mean a lot to me I don't think just downloading it without a description of what was what'.

*Would you be happy for the GP or consultant to show you information on a screen?*

'Yes, yes'.

*So overall you would say the most important to you would be (d) the health professional telling you and telling you clearly?*

'Yes and if necessary include written information'.

*And that is maybe something that you can maybe take home with you?*

'That is right'.

*And have a look at?*

'Yes'

*If you were to think about specifically treatment options how would you prefer to have that information, we have got some options here that are slightly different, for instance (a) would you like to have written information to discuss with family and friends, would you like to have computer 3D visualisation to discuss, (c) would you like maybe an audiotape to discuss with family or friends or (d) anything else, and that is looking at the treatment side of things?*

'I think a personal preference I would prefer to have (a) and possibly (b)

**Communication – health information cont..**

*A and B together?*

'I don't think an audiotape, personally'.

*No, but you did mention earlier on that you found it quite useful to have the audio input?*

'Yes'.

*But not just audio itself?*

'No'.

Participant 91

## Queries for John

'No, no I'm quite happy to look at these things, I find it fascinating but not sure what this is, wrinkle puzzles or something'.

*That would be, I don't exactly know what it would be, it is showing the flow.*

'And maybe narrowing there because it certainly, maybe it does narrow anyway but that is just a blow up of it, yep, well interesting'.

Participant 7G

'Are these actual photographs of kidneys?'

*These are scans that have been augmented with visual aids basically.*

'I see, on your computer?'

*Yes they are computer generated as far as I'm aware.*

'Well the reason wasn't healthy or unhealthy?'

*Well I don't know, is there anything that strikes you about any of them?*

'Well again they are dissimilar as far as I'm concerned, that one looks different to that one, I mean this one here is a different shape and I would say slightly bigger that is if it is possible to have a larger kidney'.

*And how about anything closer in, is there anything maybe that going towards the kidney that points at that out to you that there might be a difference?*

'No, there seem to be two rather than one and an outlet or whatever it is whether that is taking the blood in or not or blood back into the system I don't know'.

*Right I suppose there seems to be one there?*

'Yes, but this is an end on view is it?'

*Yes, and that is a closer up picture which may be helps slightly or not?*

'This is the same pair of kidneys is it?'

*Yes, thinking back to what you have just mentioned actually with the differences between them, maybe it being closer up might*

'Yes, has this been blown up on your computer or is it actual photograph, these weren't actually taken by a camera as it surely not?'

Participant ?

'Closer up yeh, this kidney is different from the other one according to that, is this all the waste?'

*That would be showing all the blood flowing?*

'Oh the blood, I thought it would have been the waste, now what way am I looking, oh I'm looking at it the right way, so it is either going to the kidneys or it is going to some other place (laughs).'

Participant 11



### **Queries for John cont.....**

*No, I don't think so no, they have been put together using computer imagery etc and once again I'll just show this last few.*

These have been circled for some reason or other haven't they, ah there is a bit missing here, there is a bit missing from this side here, this goes in here, this bits seems to be up in the air'.

*Right okay, so that is a good point to have made that there is a bit of not clear there in the image*

'It just seems to be hanging in mid air presumably it go to somewhere further in the back does it?'

*I don't know exactly, once again you can see here that there is something similar.*

Participant 9I

### **3D Images**

*And was there anything that you specifically felt about the three dimensional ones which were the ones that were in colour which you didn't prefer, is there anything that you thought?*

'I just didn't like them.'

Participant 17

*More detail and is there anything else that you can think of the differences between the two dimensional and the three dimensional or, difference in showing you the colours or, you made a bit of a face with these ones, was that the colour or the way it was shown, that is the three dimensional ones.*

'They are gooey.'

Participant 16

## **Patient Knowledge**

*One in Dundee and was that a similar scan to like what you are having today?*

Well I think so, you go in that tunnel, the only thing is I don't want dye, that blue dye put in'

*Well I don't know anything about the scans unfortunately.*

'My husband went into the kidney machine when he took ill he was originally it was in ?? but you wouldn't mind of that place but anyway it was a hospital outside Perth he went for this x-ray test and they discovered that he had kidney, TB of the kidney and they reckoned he must have picked it up abroad somewhere because he was in the navy but anyway he went, he got that blue dye put in him and he went to Glasgow in November and they took that dye out of his kidneys and they reckoned that was what caused his kidneys to collapse, so there is no way, I've seen it on the television and read about it so there is no way I'm going to have that.'

Participant 17

'The kidneys actually work and what the blood and that does.'

*So that is the three dimensional?*

'Yes.'

*Shows you how they actually work, okay that is good, and have you ever found it difficult to look at anything in three dimensional or is it.*

'I just need to watch Casualty.'

*So is that similar to what you sometimes see?*

'That doesn't bother me that is okay.'

Participant 17

'I would imagine one of them would be bowel\* function or less welcome than the other with the restriction and the same at the opposite side, I don't know.'

Participant 12

*I'll move on to some of the questions, so what would you say the main differences are between looking at the two dimensional and the three dimensional?*

'I didn't see much difference.'

Participant 14

'Well the three dimensional sort of pictures them more clearly but I understood both.'

*Understood both but more clearly the 3D?*

'Yes.'

Participant 14

### **Patient Knowledge Contd**

'Well they are not very pretty I'll say that, they are not at all pretty, this ones looks as though it has already started to go.'

*And that is the right one, so what is drawing you to that attention, what is drawing your attention to that?*

'Well it appears to be smaller and less well shaped and this is healthier looking than that, that doesn't look healthy.'

*And that is a closer look.*

'And that is where the blockage is or was, I don't have one there at all now, that is what is happening then.'

*Well the circle round it is indicating that it is drawing your attention to that portion of the picture to have a look at. And that is a closer up version.*

'Oh yes, this is much healthier looking.'

*Right so that is the left hand side one.*

'Well to me, a narrowing like that was arteries, pretty gruesome aren't they.'

*If you don't want to have a look at them.*

'No, I don't mind that, it is to actually see what is inside you, you know.'

Participant 15

'That is where things go wrong.'

*Aha, that is it drawing your attention to that part again, so these are showing you the two dimensional. I've also got a short little one that shows you the three dimensional ones in a little video and I'll put that one on and if you want to see either of them again or any of it again let me know. That was it showing you it spinning around a wee bit, rotating.*

'Stenosis I have not heard that word before.'

Participant 15

'Because that is the one that hasn't developed.'

*That is the one that hasn't*

'Developed, it hasn't grown.'

*Is that what you think you view?*

'Yes.'

Participant 14

C Well the circle is obviously drawing your attention to that, so it is to see whether or not you can pick out any sort of difference maybe between that and maybe the other side.

13 One connecting, one is not connecting. Is that two different kind of entries, that one seems to be all in, that one seems to be in.

C So there looks like there is a difference there too

13 I think there is a lot of difference there, I mean that is joined, this sort of bubbly

Participant13

Oh that one is a bit, oh not right either is it, that is the red cells that is clogged it must be clogged

C That is what it is looking like, Oh that one is actually upside down

18 Okay am I supposed to comment on them?

Participant18

8 My understanding is with my having heart trouble it is generally speaking blood vessels are narrows but it is only the blood vessels that are narrowed in my body, other vessels are narrows as well, so it may as well be this bit here, I'm not medical so I'm just guessing, this bit here is just not allowing the free flow of fluid.

Participant 8

## Own Scan

'Yeh that gives information in general for kidneys and what is supposed to happen and what doesn't happen when the arteries but that is somebody in general that is not me, it is not you, suppose if they are closed there it doesn't mean to say they are closed in the same place in me.'

Participant 16

*But would you be happy enough or comfortable enough to see in three dimensional the, in this form or would you prefer not to?*

'Well I know that there are many people who wouldn't want to but I wouldn't mind, it wouldn't upset me in any way.'

Participant 15

'I would want an understanding of it (own scan) I would want to see if it was possible.'

*It would help with your understanding?*

'Yes, it would help with my understanding.'

*And do you think that looking at the three dimensional images would help you making decisions about what the treatment would be, would that help with your understanding?*

'I would think so yes.'

*Why do you think that would help?*

'Well, I can't explain it.'

*You would understand more?*

'You would understand the treatment, what treatment that you were going to get, you have got a visual understanding of it.'

*So you would understand the treatment and it would help visually?*

'Yes.'

Participant 15

*Okay and if your own images that you saw as mentioned if you were to see anything of your own, and it were to show something quite serious, would you still want to see it in a screen or would you rather not?*

'Well it would depend on the patient, I think.'

*And how about yourself, would you be?*

## Own scan (cont)

Well I would like to know and I wouldn't like to know and I would leave that up to the doctor

*Okay so the doctor*

'Yes because he knows me.

*Discretion?*

Participant 11

'Well it is clear as far as it goes but without other training.'

Participant 12

'I think they are fairly self explanatory but it is one of those things that you are more concerned with how your own is performing than'

Participant 12

C So it is seeing your own images?

13 I don't know if it would be black and white or coral but it would show where your own problems are and make you think and I think it would help all them that are bad with drink and that because here is your body and what it does to it, is that how you want it, and no seeing it would put you off I think.

Participant 13

C And if you own images were to show something quite serious would you still be quite keen to see them on a screen?

18 Yes

C And why is that?

18 Just pure nosiness, it is me it is my body

Participant 18

C Would you be comfortable to look at your own 3D images if they were able to put them on a screen

8 Absolutely, yes I would be interested in what was happening to me.

Participant 8

## Improvements

*And can you suggest any improvements to any of the videos that I showed you?*

'For my benefit I prefer to see my kidneys'

*Okay right, see your own*

'When they take the x-ray and all the rest of it I prefer to see what is actually happening to me, not interested in what is happening to him or in general what is going to happen to me.'

Participant 16

C Did you think that anything needed further explanation in either of the sequences or would have helped to have had further explanation?

18 What they can do maybe to help, if there is a problem.

Participant 18

C Yes, was that both of them or did you find one more clear than the other?

8 No I understood the message that you were trying to get over, something stuck in my mind, I as going to ask you a question anyway 'do it necessarily mean surgery' the treatment that they decide on might mean taking a pill rather than

Participant 8

8 Well it did not go on for example to say what happens to the blood after it gets to the kidneys and perhaps....

C What happens next?

8 What happens next then, might help, yes.

C Okay, right

8 And it kind of begs the question of 'what about the kidney if it is damaged, what happens next to there are well and to what extent does that affect your performance for example the other kidney can it compensate or not'

Participant 8

## **Other**

'When you see the like of Casualty and that and they are doing operations and that ahhh'

Yes

'It turns the stomach doesn't it, well mine'  
Participant 16

'I'm not squeamish.'

*Okay so what will I do*

'I watch 'Casualty'.'  
Participant 15

## **Model**

*...then we have also got a model to have a look as well, that is another way of showing patients information*

'Yuk'

*You don't like that one, that is okay we can keep it covered up actually.*

'I'm not that squeamish.'  
Participant 15

'Well mine, no somebody else, because it is me that is complaining, see what I mean.'

*And what do you think looking at the three dimensional adds compared to maybe looking at information in the model form?*

'Well that could come after.'

*You think the model after?*

'After you have seen your own kidney on the picture on the screen then the doctor could inform you, well this is what is wrong this is the blockage that is not going into this part of the kidney, it is like that.'

*So you think that might be quite useful afterwards?*

'That would be useful afterwards so the patient can see inside their kidney and where it is wrong.'

Participant 11



## **Improvements**

*Well anything that you think of really, what would improve the information I showed you?*

'I think sometimes to ponder, if I was being interviewed by a doctor and something was being explained to me, I very often think questions that an hour later or a week later you would say 'I wish I had asked him that.'

Participant 12

## **Words used**

'I think they are factual.'

Participant 12