

## Appendix G Example Think-Aloud – ST06

Evaluation: ST06.

Software: Internet Explorer 6, Sun J2SDK 1.4.1\_01

Location: Westmead Hospital Pathology Museum

Sex: Female

Age: 25

Year in medical school: 4

Previous Simulator Use: No

Previous experience with the management of hyperlipidaemia: Yes

Previous experience with the management of Glycogen Storage Disease : No

Evaluation Started: 15:45:10

Evaluation Finished: 17:09:35

Total Duration: 1:24:25

Having read the introduction to the case student six said she wanted to know if there was a past history of hyperlipidaemia. Using the category lists, she asked this question and read the response. She then indicated that because the condition had been present in childhood, then a familial disorder needed to be considered. Having said this, the next question she asked concerned past drug or medication use. The patient had not been taking any medication. ST06 then asked if there was any family history of illness. The patient responded that there was none. The patient was then asked her age. Having learnt that the patient was relatively young, at 29 years of age, ST06 inquired about intercurrent illness by asking the question, "do you have any current illness at the moment?". This was asked using the free-text method. There was no match, so she then entered, "past medical history?" which matched the question in the database: "Other

past medical history including psychiatric or surgery?" The response to this question was the information that the patient suffered Type 1B Glycogen Storage Disease. Having read this information, ST06 said, "I need to look it up". She was given the information sheet on Type 1B GSD. She then asked, "any other medical problems?" This free-text search only matched the previous question. I indicated, that all the patient's past medical history was included in the response to the previous question. Further questioning of the patient by the student was related to family history, allergies, and diet. The student also asked the patient's occupation. Knowing that this was not in the database, I said the patient worked as a clerk.

A total of 8 questions were matched and asked. Nine questions were asked using free-text with 5 suitable matches.

This student did not use the medical record component.

At the hypothesis screen, ST06 indicated that the patient had hyperlipidaemia secondary to type 1B Glycogen Storage Disease.

Student six indicated that she wanted the patient's vital signs. Including; body mass index, temperature, blood pressure, pulse, and respiratory rate. She was able to find all the items except the respiratory rate, as this had not been included in the patient model. This student then conducted her examination using the information-sheet as a prompt. Having read that hyperuricaemia and gout are a feature of type 1B GSD, she examined all the major joints for the range of movement [my thought on this was that it was not required, as the patient did not have symptoms of joint disease]. She then read that

hepatomegaly was a feature and so proceeded to palpate the abdomen and discovered that the patient did, in fact, have an enlarged liver. ST06 also examined the patient for enlarged kidneys by palpating the abdomen. She indicated this was done on the basis that these patients can get renal disease [I noted that the renal disease that these patients get is associated with scarred small kidneys, rather than the ballotable kidneys seen with polycystic kidney disease]. Reading down the list of long-term complications in the information sheet, she learnt that some patients developed pulmonary hypertension. Based on this a cardio-respiratory examination was commenced. ST06 indicated that she wanted to know about the patient's posture, in case there was a suggestion of osteoporosis. I indicated the patient's posture was normal. Again this information was not included in the patient model. Lastly, she conducted an inspection of the patient for xanthoma and xanthelasma.

ST06 then clicked on the investigations link, and was displayed the hypotheses screen. No information was added or changed. The user clicked on the hyperlink again, and was shown the investigations screen. The user clicked on the haematology test category link. From this list she selected a full blood count (FBC) and prothrombin time (PT). She then clicked on the blood test group link. As a result of the length of the test list within this category, ST06 was not able to find the tests she was looking for. She then used the search facility to find the tests she was wanted. As each test was requested, ST06 would review the results, if they were available. Investigations requested include: FBC, PT, EUC, LFT, Total Cholesterol, LDL-C, HDL-C, Urate and Glucose. The student asked if she could order a urinalysis. I indicated that it was not possible to do so, as this test was not included in the investigation database [This was added before the next evaluation]. I indicated the urinalysis was normal.

This student wanted to refer the patient to a specialist. However, I indicated that for the purposes of this case, she would need to manage the patient. She then asked one more question, to determine what other health professionals were looking after the patient. She learnt that the patient was under the care of an Immunologist, for the infective complications of the inborn error of metabolism. Based on this information, ST06 indicated that she would not manage the infective problems at this time or prescribe GM-CSF (Granulocyte/Macrophage – Colony Stimulating Factor).

At this point, ST06 clicked on the management hyperlink, and was again displayed the hypothesis screen. Again, no changes were made. ST06 indicated that she wanted to educate the patient about their disease. I indicated that, "education" was not available within the program. The final management options chosen were a diet high in carbohydrate but low in saturated fat, allopurinol, and gemfibrozil. The patient follow-up period was set to two months.

End of consultation 1:

Duration of consultation 1: 15:45:10 to 16:27:38 equals 0:42:28

Time spent assigning relevance: 16:27:50 to 16:36:31 equals 0:08:41

Time spent reviewing charts: 16:36:58 to 16:41:49 equals 0:04:51

Consultation 2:

At the beginning of the second consultation, ST06 tried to ask, "how have things been?" No matches were found, so she then asked, "any problems?" This matched, "Have you had any problems with the medications you are on?" Student six then asked about the

patient's diet and learnt that it had not changed. No examination was performed and ST06 then proceeded to order a FBC, Total Cholesterol, HDL cholesterol, LDL cholesterol, LFT, Urate, EUC, and Triglyceride. When viewing the triglyceride, she noted that it was very high at 4.5 mmol/L. [This raised an interesting problem. Because she had not ordered the triglyceride previously, she did not know that the triglyceride had been much higher on the first consultation, and that the Gemfibrozil had been remarkably effective. Thus, she in fact thought that the Gemfibrozil had been ineffective. Knowing that there was no way for her to know this information, I told her that if she had measured the triglyceride at the first consultation she would have found a value of 12 mmol/L, Therefore the Gemfibrozil had been very effective. If I had not told her this, she would have stopped the Gemfibrozil in appropriately. In retrospect it could be argued that I should have let her do so, as this suboptimal action would be taken in real-life if the triglycerides had not been measured at the first consultation. However, I also believe, that not informing her would have lead to a missed opportunity, to point out that the triglycerides should have been ordered at the first consultation. [This raises an interesting question on how to handle this when the application is used "unassisted". Perhaps when feedback is given on the critical actions that were missed, we should also provide the information that would have been available had this action been selected?].

The management was maintained and the patient reviewed in a further two months.

End of consultation 2:

Duration of consultation 2: 16:42:43 to 16:48:04 equals 0:05:21

Time spent assigning relevance: 16:48:09 to 16:48:49 equals 0:00:40

Time spent reviewing charts: 16:48:55 to 16:50:42 equals 0:01:47

### Consultation 3:

Four questions were asked in consultation 3 relating to side-effects of medication (none), change in weight (none), diet (unchanged), and use of cornstarch (don't like it). No examinations were performed. The same investigations were performed as for consultation 2. Student six added fish oil supplements and ceased the high carbohydrate diet. Follow-up was again set for two months.

While reviewing the charts and the student read that the case-authors had thought that a question on muscle-aches and pains was critical. She said that she thought this was only relevant for statin therapy. I indicated that rhabdomyolysis and myalgia could be a side effect of fibrates [evidence of reflection!].

### End of consultation 3:

Duration of consultation 3: 16:51:06 to 16:55:43 equals 0:04:37

Time spent assigning relevance: 16:55:48 to 16:56:42 equals 0:00:54

Time spent reviewing charts: 16:56:45 to 16:58:45 equals 0:02:00

### Consultation 4:

At the beginning of the fourth consultation the student noted that the patient had had an adverse reaction to Gemfibrozil. This time she did ask about muscle aches and pains. Again no examination was performed and the investigations were the same with the addition of creatine kinase, as a marker of muscle injury or damage. Gemfibrozil was ceased, cornstarch was commenced, and fish oil was maintained. Follow-up was set to one month.

End of consultation 4:

Duration of consultation 4: 16:59:26 to 17:05:50 equals 0:06:24

Time spent assigning relevance: 17:06:02 to 17:07:01 equals 0:00:59

Time spent reviewing charts: 17:07:06 to 17:09:35 equals 0:02:29

End of case reached.