**Supplementary table 1 Barriers and enablers to CIMT program adherence mapped to the Capability, Opportunity, Motivation – Behaviour (COM-B) system and domains of the Theoretical Domains Framework (TDF)**

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| **COM-B**  | **TDF**  | **Themes – key barriers**  | **Exemplar quote**  |
| **Capability – Physical** Skills, abilities or proficiencies acquired to perform the behaviour  | **Physical skills** An ability or proficiency acquired through practice   | Experiences of fatigue  | *“You always are going to fatigue, mentally especially. Everyone thinks physically you are going to fatigue and yeah, that’s true, but mentally fatiguing I think was worse, especially when you did… harder [tasks] … it really takes it out of you and you get crazy tired after, you have to go and have a nanna nap, it’s like I’ve never had to go and lie down and have a couple of hours nap before, it’s crazy.”* (Participant 008) *“Well there was a lot that you had to do. You would feel tired, because it wasn’t just that, you’d have physio as well.”* (Participant 043)  |
|   |   | Experiences of musculoskeletal pain  | *“Well my arm never got [tired but], my elbow used to get a bit sore.”* (Participant 018)  |
|   |   | Therapy activities were too challenging  | *“There were tasks where I had to press buttons and my fingers could not grasp the controller … and sometimes if you ask the nurses for help, they just stare at you blank.”* (Participant 041)  |
| **Capability – Psychological** The capacity to engage in the necessary thought processes to perform the behaviour  | **Knowledge** An awareness of the existence of something  | Education and expectations of program not clearly communicated   | Interviewer: *“So, what were your reasons then for participating in the CIMT program when the staff mentioned it to you?* Participant 047: *That's the thing, the only complaint I have about it was the lack of information about it. People were saying, this is relatively new… But they were limited in their information they passed on to me.”*  |
| **Opportunity – Physical** The physical environment to allow performance of the behaviour   | **Environmental context and resources** Any circumstance of a person’s situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour  | Travelling to and from hospital to receive a CIMT program   | Interviewer: *“What were the challenges, for you and your family, in attending the program?* Participant 048: *“Actually getting there [laughs]… Because I can’t drive… I had my wife to take me some days, but she has to work other days and then my son was off, so he had to take me and pick me up. So, it was a bit challenging for them.”*  |
|   |   | Program not well organised or well structured   | “*Yeah, especially sitting at the table … doing the hand exercises. You were left to your own devices to a degree. They’d say ‘OK, away you go’ … and then you’d count how many times you could do them or how many times they wanted you to do them. But that’s about it.*” (Participant 007)  |
| **Opportunity – Social** The cultural milieu that supports the behaviour  |   | Nil key barriers identified in this component  |   |
| **Motivation – Automatic** Desires and impulses to perform the behaviour   | **Emotion** A complex reaction pattern, involving experiential, behavioural and physiological elements, by which the individual attempts to deal with a personally significant matter or event  | Found program challenging and frustrating in the first few days of the program    | “*Yeah it was pretty much the first 2 days I had a lot of frustration. I didn’t know if I believed in the program. Because … I didn’t really notice anything the first day. All that I felt was a bit of pain in my shoulder and stuff, but the third day is where… everything changed for me. I started seeing progression in my right hand and my right arm.”* (Participant 003) *“Just getting the – picking the things up with my left hand I’d get really frustrated … I couldn’t pick up things properly … I’d feel like picking it up and throwing it. I’d get so frustrated, but my teacher that I had, XXX [occupational therapist], she was excellent. She taught me how to control my temper as well as how to use my arm properly.”* (Participant 043)  |
|   |   | Frustration with pre-CIMT level of arm function  | *“Just the things that I couldn’t do, simple things like carrying or turning on a tap, I found that hard to do … it’s just the easier things in everyday life you think it’s easy but once you’re in that … then you find out that it takes a lot of effort.”* (Participant 002)  |
|   |   | Repetitions of exercises was boring   | Participant 004: *“It was just the repetition, repeating it, repeating it, repeating it, and that’s you … get bored … you realise after the next day … um, it’s just repetitious, that’s the most annoying part …”* Interviewer: *“So it just gets boring?”* Participant 004: *“Yeah monotonous, yeah boring, just repeating doing that same thing, but the benefits out of it far outweigh that, you get over that, you know.”*  |
| **Motivation – Reflective** Self-conscious planning and beliefs about the behaviour  | **Beliefs about capabilities** Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use  | Loss of motivation and frustration during program due to lack of improvement in arm function  | *“When I began with the program, I was convinced that it would show some results. Then, you just keep on with it; you eventually lose heart, give up.”* (Participant 041)  |

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| **COM-B**  | **TDF**  | **Themes – key enablers**  | **Exemplar quote**  |
| **Capability – Physical** Skills, abilities or proficiencies acquired to perform the behaviour  | **Physical skills** An ability or proficiency acquired through practice  | Adjusting the task or taking breaks when fatigued  | *“The trainer listened to me very, very well. So, if I found something difficult or something a little bit challenging, I could talk to her and she adjusted and adapted it.”* (Participant 060)   |
|   |   | Shaping tasks were set at the right level of challenge  | *“You probably couldn’t see it in the class but then going away and looking at it in hindsight later on that day or maybe the next day, it’s the repetition and how much it helps but you wouldn’t see it … but you’d go back to class and do the same thing and then you’d do it quicker and probably not as challenging … You try to do things enough over a sustained period of time and you eventually get it.”* (Participant 049) *“… It wasn’t just doing one activity for the whole 2 weeks and it just became easy, it was always stepping it up and throwing a different activity at me. It was keeping me on my toes.”* (Participant 008)  |
| **Capability – Psychological** The capacity to engage in the necessary thought processes to perform the behaviour  | **Cognitive and interpersonal skills**  An ability or proficiency acquired through practice  | Mental preparedness for a program  | Participant 008: *“I knew the program was going to be hard, but it was harder than I thought, but being mentally prepared for it helped me through it and reaping the rewards was really, really good.”* Interviewer: *“What do you think helped you mentally prepare for it then?”* Participant 008: *“I guess just telling myself, you know, not to get overwhelmed by it and not to, I guess, if you fail at something not to let it get to you. Yeah, ’cause if, you know, if you make a mistake, it’s not a big deal.”*  |
|   | **Knowledge** An awareness of the existence of something  | Education about program and expectations of program clearly communicated   | *“Well I wanted to get better as quick as I could and as good as I could. And that seemed to be the way to go. They made it sound very hard and rewarding so I attacked it.”* (Participant 010)   |
|   | **Behavioural regulation** Anything aimed at managing or changing objectively observed or measured actions  | Coaching and feedback supported motivation  | Participant 003: *“There was some motivation off the physios … they showed me the right technique … making it easier for my shoulder …”* Interviewer: *“So that feedback and coaching throughout the sessions was helpful?”* Participant 003: *“Yeah, just helped me, it was helpful. I realised what I needed to do to make it better.”*  |
| **Opportunity – Physical** The physical environment to allow performance of the behaviour  | **Environmental context and resources** Any circumstance of a person’s situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour)  | Structured program supported motivation  | *“They were coming out here, sometimes twice a day. Well, 10 days they did it for. I'd see them once a day at least or … sometimes twice, which was good. Like, let’s go and get into it.”* (Participant 047)  Participant 031: *“It kept me motivated, having two people come. Again, psychologically, it made me look after myself a little bit better because people were coming… My wife liked it because I swept the floor twice a day …”* Interviewer: *“As part of your homework?”* Participant 031: *“As part of my homework, yeah [laughs].”*  |
|   |   | Receiving CIMT at home was viewed positively   | *“I'd be saying to anyone that has a stroke, that program, you've got to do it, because it’s intense, it gets you going, and it helps you set the goals that you want. Particularly, coming to the house, you don't have to worry about any transport or waiting around at the hospital or anything like that. I would promote it.”* (Participant 031)  |
|   |   | Filled the time  | *“Yes, as I said, everything was a pleasure to do, it wasn’t a task. It passed the time; it was better than looking at the four walls and the ward. It was something to do. Because I couldn’t concentrate on reading, so this was a good wee pastime for me.”* (Participant 001)  |
|   |   | Use of interpreters and translated resources supported program engagement   | Interviewer: *“How did you find doing all the questionnaires in Mandarin and the language barrier?”* Participant 032: *“Yeah. It was okay”.* Supporter: *“[They] did it just through the interpreter.”* (Participant via interpreter)  |
| **Opportunity – Social** The cultural milieu that supports the behaviour  | **Social influences** Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours  | Family involvement in CIMT program  | *“With the wife, she used to come around and we did a lot of, a lot of work outside of that time. Used the glove, for most things after hours, and weekends... I kept it going as much as I could … And it was through the wife mainly … being there all the time and supporting me and helping me with it, that it just kept me going.”* (Participant 010)  |
|   |   | Family support during program   | *“I’d go to my parent’s house and I’d open the door with my left hand. My dad’s going, ‘that’s what you should be doing!’ You want to use it or lose it. So, it doesn’t matter how long it took me to open it, just keep trying, don’t give up on yourself.”* (Participant 028) *“My children were happy to come along and say, ‘what have you done today mum?’, you know, and I’d show them, like we’d do our high fives … they were like, ‘wow you did it mum’, ‘wow that’s stronger, that’s so good’ … and just their reaction kept me going because I wanted to impress them all the time.”* (Participant 037)  |
|   |   | Support from other CIMT group participants   | *“With that group it was great to talk to fellow stroke survivors … so as a group you sort of bounce off each other, and then we’d give confidence to maybe one or two and then they’d bounce back and give you confidence, ‘oh come on [Participant 034], you’re doing good!’ It was a very good set-up.”* (Participant 034)  |
|   |    | Staff and student support during CIMT program  | *“I got it [support] in the rehab unit, every one of them. And university students as well. They were great as well … The OTs and the physios, they both had something to contribute.”* (Participant 001) *“But [the way] XXX [occupational therapist] would talk – talking to me like she was – she knew that I could do it. That myself, in my mind, I thought I wouldn’t be able to. She really worked on me, very hard. She encouraged me. Some of the exercises I thought which were almost impossible. But she made it possible for me.”* (Participant 029)  |
| **Motivation – Automatic** Desires and impulses to perform the behaviour  | **Emotion** A complex reaction pattern, involving experiential, behavioural and physiological elements, by which the individual attempts to deal with a personally significant matter or event  | Program was enjoyable  | Participant 045: *“I thought it was something different. Then when I actually went and did it, I thought, ooh, this is more fun [laughs].”* Interviewer: *“More enjoyable than what you’d expected?”* Participant 045: *“Yeah, I thought it was going to be dull and boring, but it wasn’t. It was really good.”*  |
| **Motivation – Reflective** Self-conscious planning and beliefs about the behaviour   | **Social/professional role and identity** A coherent set of behaviours and displayed personality qualities of an individual in a social or work setting  | Perceived high level of self-motivation   | *“I’m lucky, because … pretty early in my recovery I understood that it was me that was going to make myself better. That it was down to how much effort I put in, to how much better I make myself. No-one else is going to do it for me, I’m the only one who can do it. It doesn’t matter how smart you guys are, because I’ve got to use that to my advantage.”* (Participant 038)  |
|   | **Beliefs about capabilities** Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use  | Self-belief   | *“I do believe I will gain back my ability, it may not be 100% but at least if you gain back ability 60 to 70% that is good enough for me … The biggest challenge was to tell myself that I know that I can get better and I even dream of it.”* (Participant 005)  |
|   | **Intentions** A conscious decision to perform a behaviour or resolve to act in a certain way  | Commitment to succeed  | *“Well the challenge was to get to the end of it. To make sure that I didn’t give up and, with the family there, I had my wife and son and daughters coming in and out all of the time, making sure that I didn’t give up, but I had no intentions of giving up. I just, that was the goal, to get to the end of it.”* (Participant 010)  |
|   | **Goals** Mental representations of outcomes or end states that an individual wants to achieve  | Program was tailored to person’s goals and interests   | *It was personalised which was really, really good … Some of the OTs were very creative with setting up different activities for me … I took in my foam head and a wig and my blow dryer and brushes and my clips and we worked on picking up my clips and blow drying my hair, which was really good because it’s something I have mastered in my life that all of a sudden I felt like I was an apprentice again … and to be able to do that, and to know that I managed it, was just euphoric… I just got to learn to use my hand in a different way now.”* (Participant 037) Participant 021: *“I work as a panel beater and I use screws and all that so that motivated me.”* Interviewer: *“So did they incorporate those kinds of things into your practice? Doing things with screws?”* Participant 021: *“Yep, yeah they did.”*  (Participant via interpreter)  |
|   | **Beliefs about consequences** Acceptance of the truth, reality or validity about outcomes of a behaviour in each situation  | Seeing improvements in arm function  | *“Well, I think when you see the improvement, and you know what you’re like when you start, and then all of a sudden, things start to look better and better and better, and the more you worked your arm it looked better, that motivated me to just keep on going with it.”* (Participant 010)  |