Appendix 2. Facilitators and barriers for successful M&M at different levels for achieving change in healthcare with illustrative quotes.

Theme	Facilitator (F) and/or barrier (B)	Illustrative quote
I) Case level		
Type of case	Attractive topic (F)	*'Surgery (…) something technical, you can visualize, (…) makes it easier to remember and to disseminate it to others(…) It might be more, well, fun, to learn about something 'operative'.'(#8)*
	Clinical relevance (F)	'*While some topics may be less interesting (…) pressure ulcers or hospital acquired pneumonia for example, these are still of clinical relevance.'(#1)*
	Value for education/improvement(F)	*'A preference to discuss recent cases makes that you select a severe haemorrhage case while that actually went very well all year. It's key to identify and select real targets for improvement.'(#5)*
Information	Include local data (F)	*'Especially if you review your own numbers, that would provide valuable insights.'(#3)* *'(…) pneumonia, everyone will be like 'oh no, boring', but if you present a concise plan and numbers and those things, then, I think that'd be very nice, because that concerns everyone.'(#5)*
	Literature (F)	'*Why do I have to see 6000 graphs? (…) Just use the conclusions of the best papers (#1)'* '*Just a few relevant papers, somewhat related to your own patient population.'(#8)* '*Everyone thinks 'Well, how's our performance? Where are we compared to the literature?'(#9)* *'Nationally, globally, are we above or below the line?'(#11)*
	Skills education (F)	*'The presentation needs to include the very technical things, regarding surgical techniques.'(#6)* *'You just want to prevent those errors and that's purely technical I think.'(#10)*
	Information from those involved (F+B)	*F: 'If you've been involved, it's nice to present that case and the content benefits from it too.'(#9)* *B: 'The disadvantage of being emotionally involved is that you're sort of biased. [And can that bias impede learning?] Well yes, I think, cause it's only part of the story, from someone who's emotionally involved (…) difficult to keep it factual when the message is already 'coloured' .'(#7)*
	Addressing system factors (F)	'*I think, if the focus of the conference would shift towards system-level improvement, one would be more inclined to offer their opinion (…) it would yield more input.' (#5)*
	Addressing 'soft skills' (F)	'*That's where this conference should be about (…) because then you don't learn from each other about content knowledge, but behavioural aspects – something 'the department' still shares (#2)'* *'we are humans (…)let's go back to the moment it happened: What did you forget? What were you doing? Were you busy? (#7)*
Presentation	Qualified presenter (F)	'*It requires a skilful presenter otherwise, the pitfall is that it becomes a dry enumeration of things, while it should be lively, it's particularly all about the discussion.' (#11)*
	Proper preparation (F)	*[What makes that it does result in concrete targets?] 'The level of preparation by all means.' (#1)*
	Proper supervision (F)	*'As long as there's proper supervision. No, it's not about the presentation of course, it's about the well-thought construction of your story, all things sorted out and whether these are correct.'(#3)*
	Fixed format (F)	*'Yes I think that has benefits [a fixed format], it makes it easier to make, for residents, less time, and you don't provide them the space to stray off topic, that it'll get to lengthy.'(#4)*
II) Action level		
Type of plan	Attractive topic (F)	'*If it's about a thread that resorbs faster, we're all extremely eager to say: 'we should use thát!'(…) while if it's about antibiotics 1 day more or less, it really doesn't interest anyone.'(#1)*
	Clinically significant topic (F)	*'Patients might die (…) is life threatening, so then you've got an incentive to do something.'(#3)*

	More disciplines involved (B)	*'How many people in the organization are involved? Lessons [i.e. to improve future care] that involve thousands of stakeholders are more difficult than those you can realize on your own.' (#4)*
	Higher complexity (B)	*'Some things are technical, you can visualize them (…) a clear intervention, because you either do it or you don't – while others more greatly depend on multiple factors.' (#8)*
Planning	Explicitly formulated (F)	*'I think because, it is most interesting when you head home thinking 'Darn. I'll do that differently tomorrow'. (…) and preferably within 15 minutes. Short and concise'(#11)*
	Responsibility assigned (F+B)	*F: 'It shouldn't be non-committal, you should really earmark people.'(#11)* *B: 'If you just send someone off like 'you go do that', that won't work, it has been proven.' (#9)*
	Time frame determined (F)	*'Give it a month and then: 'Well a month ago we've discussed this, what has been done?' Then you really trigger someone.'(#5)* *'We'll discuss this in 3 months and then we'll assess progress, did anything change?' - that way it's not so vague. It will be remembered and will definitely have a follow-up attached to it. (#9)"*
	Included in protocols (F)	*'It's challenging to translate lessons learned into changes in protocols or policies, but once you've connected those, well yes, then you're really going to improve your quality. (#9)*
III) Individual level		
Motivation	Intrinsic motivation for QI (F)	*'In part it's about your motivation for that, that you just want to, just want to improve. If you're like 'it will all work out', yes, well, then nothing will happen.'(#1)*
	Interest in specific topic (F) (applicable, interest, urgency)	*'(…) when it's personal, when it's applicable to your own work, then you learn from it (…) also when it involves your own surgical service then it suddenly becomes top priority.'(#11)*
	Values/beliefs (F+B)	*F: '(…) experienced as a chore, which in itself isn't bad (…) some things are chores, but just need to be done' (#4)* *B:'If you consider your job to be solely about operating, then you're not interested (…)'(#11)*
	Other priorities/incentives (B)	*'[residents] don't do it [free up time for actions], because we rather do it in the evening to avoid missing surgeries, clinic or clinical.. that's the focus of our training, clinical practice'(#7)*
Participation	Personality (F+B)	*F:'It has to do with the type you hire. If it's the timid, anxious – yes, well then little will be said. But if you hire people with a big mouth, you will hear a lot of talking but not a lot of content (…) I think, you should tell the juniors: listen, if you don't dare, then you shouldn't be here.'(#2)* *B: 'I think that [fear of speaking up] is in part related to personality, I want to avoid offending others, so that's something that has to do with me personally rather than the environment.'(#7)*
Realization	Empowerment, control (F)	*'If it's about knot X instead of Y, that's something we can execute, we understand that, we are in control for that, and thus we will do it. (…) Surgeons are particularly in control in the OR.' (#7)* *'No matter how hard I'd try if they [anaesthesia] won't do something then they don't want and I can't influence that; while if a certain thread has better outcomes, I can change that myself.'(#9)*
	Forgetfulness (B)	*'But we haven't done that [actions] yet. Just because other things receive priority and because you simply forget about it.' (#8)*
IV) Social level		
Culture	Safe environment (F)	*'There needs to be an open environment, non-judgmental, I think that is the crux of the matter, because otherwise you won't learn anything, people will put their foot down and get angry.' (#9)*
	Team spirit (F+B)	*F: 'They [subspecialty]know what I'm worth and I know their capacities, which creates a safe environment [for speaking up].' (#1)* *B: 'It's considered 'not done' - to not support each other [in discussions] – it's disloyal.' (#7)* *'Backstabbing undermines team spirit and most people in surgery are team players (…) so you'll always behave in the interest*

		of the team.' (#8)
	Super specialization (B)	*'It's not 'us surgeons' anymore, it's a totally different organization.'(#2)*
Leadership	Reinforcing attendance (F)	*'It sounds bland, but it works, someone who says angrily: 'You have to attend, I'm the boss.'(#4)*
	Reinforcing actions (F)	*'It works to promote action (…) that you'll fulfil your commitments (…) when you fear that if you won't do it you will get a roasting.'(#7)*
	Hierarchy (F+B)	*F: 'It's [attendance behaviour] more due to hierarchy, e.g. if attending X is always there, you'd need a good reason to be absent when X is there. He's got more important stuff to do than you, so it's probably important then. I definitely think that works.'(#3)* *B:'If you really want to promote free speech, then faculty should emphasize that hierarchy is put aside during such a meeting.'* (#7)
	Exemplary behaviour (F)	*'I think if you're a resident on a rotation and a faculty member will also be absent, they you'd think, well why would I go? Yes, it's a sort of exemplary role.' (#1)*
Participants	Participation of experts (F)	*'Input from someone with experience, more 'master level' in addition to trainees. (…) Yes, [someone involved in the case] with enough 'flight hours' to be able to evaluate it.' (#1)* *'It's about content experts. (…) Half of our faculty members don't even know how to prescribe medications with the hospital software, so they shouldn't say anything about that.'(#2)*
	Interactivity (F)	*'[moderators]can evoke discussion by asking stimulating questions giving people in the audience the opportunity to respond.' (#12)*
	Audience composition/size (F+B)	*F: 'Some people are more receptive to critique than others.' (#4)* *'The conference benefits from high attendance rates.' (#8)* *B: 'Well that [courage to speak up] depends on who's present, their interests and whether you could damage people.(...) It's by all means safer to discuss things in a smaller group.' (#1)* *'I think in a smaller setting (…) less [plans] will 'get lost'. It's a disadvantage that you reach fewer people, but the advantage is that less is lost.' (#3)*
	Multidisciplinary participation (F+B)	*F: 'If a nurse was involved then she needs to be present too. (…) We could discuss interesting cases with other specialists (…) we can really learn a lot together.'(#6)* *B: 'For some, if, say, nurses and other people are present, you would perhaps be less inclined to tell your boss that something went not so well.'* (#5)
Moderation	Qualified moderator (F)	*'The role of the moderator, who has an important role in lowering the barrier [to speaking up] and be inviting, to create an environment that allows that. (#1)*
IV) Social level		
M&M format	Strong focus on improvement (F)	*'We should attribute more time to exploring how we're going to improve (…) this conference is meant to achieve improvement rather than to present the most exciting case of the month.'(#5)*
	M&M in specialist setting (F)	*'For subspecialist themes, I think the output will be much better if you'd discuss those in a smaller group within the surgical service, there will be a much safer environment too.'(#1)* *'Like love. I'm in love with my service and I'd do everything to ensure things run smoothly'(#6)* *'If it concerns your division, then you're really motivated to get those [complication] numbers down, then it suddenly becomes top priority.'(#11).*
	Communications (before/after) (F)	*'(…) to send out some sneak previews, that will motivate people to attend.' (#8)* *'If something derives from it, it'll be nice to know, but you'd have to keep the email short.'(#5)*
	Too many cases per meeting (B)	*'You won't make it [to discuss many cases] and it takes up so much energy and time, that you might miss lessons to be learned from cases.'(#8)*
	No tracking of actions (B)	*'And then what? It [action] ends up in a folder or email or something, that's not working.'(#3)*

		'You'd have to check whether it was actually done. [Is it now?] No.' (#12)
	No check/feedback on effect (B)	*'Did anything change? (…) Feedback needs to improve greatly, otherwise it's so useless.' (#10)* *'According to improvement cycles you need a check (...) also to see if it had the right effect.'(#12)*
Reporting	System for routine AE reporting (F)	*'You'd have to register otherwise you don't know what you're doing. It's a terrible task; I'm really bad at it. But yes, you have to, because you want to learn from your performance.'(#5)*
	Difficult access to data (B)	*'[Omitted because] it's a lot of work to retrieve data or we don't really know it that well.'(#12)*
	Lack of feedback from data (B)	*'The feedback is lacking. If you (…) only infrequently hear about an adverse event, you don't apply it to yourself. (…) It's all about feedback! Register, feedback, show the real world.'(#11)*
Staff	Dedicated quality committee/group (F)	'(…) *requires leadership to evoke actions at the right moments by saying 'OK now we have to do this and now that.' That requires a group within the department that stands for that.*' (#2). *'By embedding that [actions]in task forces because they'll put it on their agenda and have something to say about that topic, about quality.' (#11)*
	Super specialization (B)	*'It's difficult to find time to meet, because we all do different things. (…) We share the surgical department, but we don't share anything in terms of topics or daily practice.'(#2)*
	Staff turnover (B)	*'A hospital like this is run by temporarily staff, residents who rotate. You can't count on the collective memory, cause it disappears.' (#3)* *'Try to maintain such a thing! In the sense that, new people arrive constantly' (#4)*
	Other/conflicting expectations of staff (B)	'*As long as we expect single individuals to fulfil all these requirements for clinical practice, research, training, leadership ánd management - we'll miss important moments. (…) that is thé inhibiting factor! Too many tasks and too many different tasks.'(#2)* *'I find the work load on employees bizarre in certain cases. (…) It's just too much.'(#3)*
Time	Overall lack of time (B)	*'All conferences.. apparently everyone is a lot busier than 10 years ago. There's no time.'(#4)* *'To do a good job [as presenter], takes a lot of time. I think that's thé biggest bottleneck. I really think so, cause during working hours you just can't find the time for that.'(#12)*
	Receiving dedicated time for QI (F)	*'That [block OR time for M&M] provides you the space. (…) Apparently it's what we need.'(#9)* *'If we decide, and acknowledge [the importance], then give half a day.. I think that we should organize it in such a way, that residents receive half a day to do these things. We'd have to'.(#7)*
V) External level		
'Nature'	Inevitability of AEs (B)	*'Well.. whether you'd always learn from it.. in the sense that a year later they [AEs] will occur less often, I don't know. I think there's a certain lower limit you can't overcome.' (#4)*
Other hospitals	Benchmarking (F)	*'It's nice to benchmark to the rest of the world. How often does this happen here and somewhere else.. what are renowned centres, what're there numbers (…) can make it very urgent.'(#11)* *'If we exceed the global or European incidence rates, then you'd have a need to assess that trend.' (#6)*

QI, Quality Improvement. M&M, morbidity and mortality conference. AE, adverse event.