Appendix E: Methodological quality

Epidemiology review

General Medicine					
Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study Quality (P=prevalent data, I = incident data, O = occurrence rate)
Pitkala (64)	230	Not given	Yes	At admission	Moderate (P)
Edund (21)	400	Not given	Yes	At admission	Moderate (P)
Holden (34)	216	Not given	Yes	Every 2 days	Moderate (P)
					Moderate (O)
McCusker (51) 1552 83.6 (7.4)		83.6 (7.4)	Yes	At admission & once again during	High (P)
		first week		first week	Low (O)
Rockwood (69)	247	79	Yes	At admission	Moderate (P)
Cole (16)	484	Not given	Yes	At admission	Moderate (P)
Martin (49)	156	76.4 (6.5)	Yes	Daily until d14, discharge or death	Moderate (I)
Leslie (45)	919	80 (6.5)	Yes	Daily until discharge	High (I)
O'Keefe (58)	225	Not given	No	At least every 24 hours	Moderate (O)
Naughton (57)	374	81 (6.2)	No	Once on day 4 of admission	Low (O)
Adamis (7)	94	82.1 (6.2)	No	Every 3+/-1 day until d18 & again 10d later	Low (O)
Faezah (25)	400	Not given	Yes	Daily until discharge	High (O)
Inouye (36)	107	Not given	Yes	Daily until discharge	Moderate (O)
Jones (39)	491	79 (6)	Yes	Alternate days & at discharge	Moderate (O)

Inouye (37)	196	Not given	Yes	Daily until discharge	High (O)
Inouye (38)	727	78.9 (6.9)	No	Within 48 hours of admission & at discharge	Low (O)
Inouye (36)	174	Not given	Yes	Daily until discharge	Moderate (O)

Stroke Medicine					
Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study quality
Caeiro (15)	190	63.6 (12.8)	No	Once at admission	Moderate (P)
Henon (33)	202	75	Yes	Daily until discharge/death	Moderate (O)

Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study quality
Uldall (78)	110	42	No	Examined ever 24-48 hours until discharge	Low (O)
Breitbart (14)	244	39.2 (8.8)	Yes	Daily until discharge	Moderate (O)

Medical ICU							
Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study quality		
Ely (24)	111	55.3 (17.4)	Yes	Daily until discharge	Moderate (O)		
Milbrandt (53)	224	56 (17)	Yes	Daily until discharge	Moderate (O)		
Pisani (63)	178	74.2 (8.3)	No	Daily Monday to Friday until discharge			
McNicoll (52)	118	76	No	Daily for 6 days of the week until discharge	Moderate (O)		
Peterson (62)	614	52.5 (17.5)	Yes	At least once daily until discharge	High (P) High (I)		
Thomason (77)	261	56 (18)	Yes	At least twice daily until discharge	Moderate (O)		
Lin (47)	102	73.9 (3.5)	Yes	Daily for the first 5 days of admission	Low (O)		
Surgical ICU				· · · · · · · · · · · · · · · · · · ·			
Pandharipande (60)	100	Not given	Yes	Daily, maximum 10 days or discharge	Moderate (O)		
Robinson (68)	144	64 (9)	Yes	Daily until discharge	Moderate (O)		
Robinson (67)	49	64 (7)	Yes	Daily until discharge	Low (O)		
Balas (10)	114	75	Yes	Daily until discharge	Moderate (O)		
Trauma ICU							
Angles (9)	69	44 (2)	Yes	Daily until discharge	Low (O)		
General ICU				·			
Roberts (66)	185	61	Yes	Twice daily until discharge	Moderate (O)		
Ouimet (59)	820	Not given	Yes	Daily until discharge	High (O)		
Van Rompaey (80)	523	64	Unclear	Unclear	Potential for bias (O)		
Dubois (18)	216	Not given	Yes	Daily until d5	Moderate (O)		

Emergency Department									
Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study quality				
Han (32)	341	Not given	Yes	At admission	Moderate (P)				
Lewis (46)	385	Not given	Yes	At admission	Moderate (P)				
Naughton (56)	188	79.7 (6.5)	Yes	At admission	Moderate (P)				
Elie (23)	447	Not given	Yes	At admission	Moderate (P)				

Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium preop (post admission)	Frequency of assessment	Study quality
Koebrugge (43)	73	Not given	No	3 x Daily until discharge	Low (O)
Greene (30)	100	64.7 (7.7)	No	Daily post op until d3/discharge	Low (O)
Franco (26)	500	Not given	No	Daily post op until d4	Moderate (O)
Rudolph (73)	1161	68.9 (5.9)	Yes	Daily until d7 or discharge	Moderate (O)
Marcantonio (48)	1341	68 (9)	Yes	Daily from d2 post op to d5 post op	Moderate (O)

Study	Sample	Age	All participants	Frequency of assessment	Study quality	
- a a g	Size	(Mean, SD)	assessed for delirium preop (post admission)			
Orthopaedics (Acu	ute Hip Fractu	ure)		· · · · · · · · · · · · · · · · · · ·		
Edlund (20)	101	79.5 (7.7)	Yes	d1, d3 & d7 postoperatively	Moderate (P)	
					Low (O)	
Furlaneto (27)	103	Not given	Yes	Daily until discharge Mode		
				Moderate (I)		
Goldenberg (29)	77	81.9 (7.5)	Yes	Daily until discharge	Low (P)	
			Low (I)			
Santana (75)	34	Not given	Yes	Twice daily until d5 post op	Potential for bias (O)	
Bickel (12)	200	73.8 (9)	Yes	Daily post op (duration not stated)	Moderate (O)	
Galanakis (28)	105	74.9	Yes	Daily post-op d1 to d7	Moderate (O)	
Edlund (22)	54	77	Yes	Post op d1 and d7 only	Potential for bias (O)	
Milisen (54)	60	80	No	d1, d3, d5, d8 & d12 post op	Low (O)	
Morrison (55)	541	Not given	yes	daily post op, 5 days per week	Moderate (O)	
Holmes (35)	731	82.1	No	Once between d2 & d5 post op	Low (O)	
Kagansky (40)	137	82.5 (5.3)	Yes	At admission & d7 post op	Low (O)	
Brauer (13)	571	Not given	No	Daily for 5 days of the week	Moderate (O)	
Orthopaedics (Ele	ctive)					
Contin (17)	236	Not given	Yes	d2 and d7 post op	Low (O)	
Galanakis (28)	105	74.9	No	daily d1 to d7 post op	Moderate (O)	
Bickel (12)	200	73.8 (9)	Yes	Daily pre-op & post op	Moderate (O)	
Orthopaedics (Spi	nal Surgery)			· · · · ·		
Kawaguchi (42)	341	59.2	No	Daily assessment & CAM if change in mental status	Moderate (O)	

Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium preop (post admission)	Frequency of assessment	Study quality	
Cardiac Surgery						
Rudolph (72)	80	Not given	Yes	Daily to discharge	Low (O)	
Rudolph (71)	36	68.9	Yes	Preop & postop d2 & d5	Potential for bias (O)	
Santana (74)	220	Not given	No	Daily evaluation post op until d5	Moderate (O)	
Rolfson (70)	71	Not given	Yes	Twice daily post op until d4	Low (O)	
Koster (44)	112	70 (7.3)	Yes	Daily d1-d5 post op	Moderate (O)	
Van der Mast (79)	296	63 (11)	No Daily from d2-d5 post op		Moderate (O)	
Vascular Surgery						
Benoit (11) 102 Not given No		No	Postop until d6 (frequency unclear)	Low (O)		
Sasajima (76)	110	71.6 (6.6)	No Daily postop d2-d7		Moderate (O)	
Neurosurgery						
Ramirez (65)	202	Not given	Yes	Daily until discharge	High (O)	
Hepatobiliary Surg	ery					
Yoshimura (81)	100	Not given	Yes	Daily for 2 weeks	Moderate (O	
Urology						
Hamann (31)	10071.9Yesdaily post op until d7		daily post op until d7	Moderate (O)		
Gynaecology						
McAlpine (50)	103	Not given	No	Post op d1 & subsequently if confusion noted	Low (O)	

Psychiatry					
Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study quality
Patten (61)	401	35.5	Yes	Daily chart review & DSI/CAM repeated if change noted	Moderate (O)

Long term care					
Study	Sample Size	Age (Mean, SD)	All participants assessed for delirium within 24 hours of admission	Frequency of assessment	Study quality
ala (64)	195	Not given	No	Once (point prevalence)	Low

Information for Patients

Author (year)	Theoretical a	pproach	Study	design	Data Collect	ion		Validity		Ethics
	Qualitative Study approach	purpose	us resea	ble/rigoro arch nethodol	Data collection methods		Role of researcher described	Context clearly described	Metho reliable	
Duppils (2007)	Appropriate Clear		Defensit		Appropriate	1	Clear	Clear	Reliab	
	exper deliric surge there 'sund	scribe patients' ience of being us post hip ry. In this study were 6 owners' and 9 post lirium patients.	To explo experien depth re qualitativ approac	ice in quires /e study	Semi-structured interviews were conducted with question guide. interviews were recorded except	a All tape	Researcher/ interviewer had met patients during delirium episode.	Setting was in hospital except two patients. There was no discussion of context bias.	Only o method was us - intervie with ta recordi	d Committee approval ew pe
					Ana	lysis				
	Sufficiently rigorous Rigorous	· · ·		<i>Reliable</i> Reliable			incing findings ncing			Adequate conclusions Adequate
	analysis with use of			ty in Two researchers ws due undertook the analysis.		Well supported themes with quotations presented.		Findings are desc of the experience.		See narrative

Author (year)		Theoretical ap	proach	Study design		Data collection		Validity		Ethics
Gagnon (2002)	Qualitative Approach	Study purpose		Defensible/rigoro research design/methodolo		Data collection methods	Role of researcher described	Context clea described	rly Methods reliable	Reporting of ethical considerations
	AppropriateClearThis study describes the development and implementation of a psychoeducational intervention based upon focus group consultations, peer review and user interviews.Phase 1 aimed to develop the framework of an optimal psychoeducational intervention about delirium; phase 2 was the development of a brochure to be used as part of the psychoeducational intervention and phase 3 included the implementation and evaluation of the intervention.		to a nal a 2 was a to f a used nal d to the and	The design is		Appropriate Data collection methods were well described.	Unclear The researcher's role was to train and observe staff in the implementation of the intervention. It is unclear whether the families involved in receiving or not receiving the information understood that a study was being conducted.	Clear The context was a 15 be hospice and context bias was discuss and includes the implications the setting, i terminal care	collected by telephone about two weeks after the death of the patient.	Not sure/not reported Ethics approval not discussed. Issues about disclosure of information were discussed.
						Analysis				
	Sufficiently rigorous	Are	the data 'r	a 'rich'? Relia		able analysis	Convincing findings		Findings relevant	Adequate conclusions
	Not sure/not reported	Rich	า		Relia		Convincing	0	Relevant	Adequate
	Analytic methods are de Some non-validated sca	les used. the	usual care interventio		care	responses of givers were stically analysed.	Statistical tables presented. Com from carers are v summarised.	ments vell	Although delirium in end of life settings is excluded from this review, these findings represent the only informational tool described in the literature reviewed fro this question. It appeared to be generalisable to the larger population of delirium patients and thei carers and was therefore included.	research led to the implementation of a psychoeducational tool as part of routine care in research setting.

Author (year)	1	heoretical approach	Study design	Data collection		Validity		Ethics	
Granberg (1998)	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	Data collection methods	Role of researcher described	Context clearly described	/ Methods reliable	Reporting of ethical considerations	
	Appropriate Clear		Defensible	Appropriate	Clear	Clear	Reliable	Clear	
	Qualitative study appropriate for focus on the patient perspective of the ICU syndrome.	Aim: To gain insight and to describe and analyse the patient experience in order to gain knowledge and understanding of the ICU syndrome and the development of this syndrome.	Method: Hermeneut approach – to attain deeper understandin the text of the intervi- through the research preconceptions and reasoning.	a interviews were ng of conducted with a ews question guide.	Research explained more than once to the patient.	Settings described in context. Bias discussed.	Methods appropriate to not investigation.	Study had Ethics Committee approval.	
	Analysis								
	Sufficiently rigorous	Are the	lata 'rich'?	Reliable analysis	Convincing	findings	Findings relevant	Adequate conclusions	
	Rigorous	Rich		Reliable	Convincing		Relevant	Adequate	
	texts in a systematic manger. good deta		r maintained with tail and depth. sons made across while still maintaining incompatibilities.		is findings with data.	sented n reference to	See narrative.	See narrative.	

Author (year)	Т	heoretical approach	Study design	Data collection		Validity		Ethics			
Granberg (1998)	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	Data collection methods	Role of researcher described	Context clearly described	Methods reliable	Reporting of ethical considerations			
	Appropriate	Clear	Defensible	Appropriate	Clear	Clear	Reliable	Clear			
	Descriptive study of patient experiences requires qualitative approach.	Aim: To describe patients' experience of being delirious post hip surgery. In this study there were 6 'sundowners' and 9 post op delirium patients.	To explore experience ir depth requires qualitative study approach.	Semi-structured interviews were conducted with a question guide. All interviews were tape recorded except one.	Researcher/interviewer had met patients during delirium episode.	Setting was in hospital except two patients. There was no discussion of context bias.	Only one method was used – interview with tape recording.	Study had Ethics Committee approval.			
	Analysis										
	Sufficiently rigorous	S Are the c	lata 'rich'? Re	liable analysis	Convincing findings	F	indings relevant	Adequate conclusions			
	Rigorous		/not reported Re	liable	Convincing		elevant	Adequate			
	with use of metaphor. of interview		ews due to the ability and part	o researchers undertoo analysis. There was r ticipant feedback due t er age.	o quotations presented.		indings are descriptive of e experience.	See narrative.			

Author (year)		Theoretical approa	h Study design	Data collection		Validity		Ethics			
	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	methods	Role of researcher described	Context clearly described	Methods reliable	Reporting of ethical considerations			
Harding (2008)	Appropriate	Clear	Defensible	Appropriate	Not described	Clear	Reliable	Not sure/not reported			
Harding (2008)	Purpose of study: to better understand the experience of delirium in the population under review	To understand the experience of older patients with delirium after reparative hip surgery.	Phenomenological	Semi structured interview schedule which covered 'unusual experiences' explanations for these experiences and discussing unusual experiences.	Role of researcher was not described in detail.	The context specifically chosen to address the needs of older people after reparative hip fracture		Ethics Committee approval not reported.			
	Analysis										
	Sufficiently rigorous	Are th	e data 'rich'?	Reliable analysis	Convincing find	ings Fine	dings relevant	Adequate conclusions			
	Not sure/not reporte	ed Not s	ire/not reported	Not sure/not reported	Convincing	Rel	evant	Adequate			
	Analysis methods n not described in det		th contextual elements scribed	Details of data analysis not described.	Well supported	themes. See	narrative.	Conclusions and interpretation are linked to data and limitations were discussed. The results are consistent with other studies in this field.			

Author (year)		Theoretical a	approach	Study design		Data collection			Validity			Ethics
Laitinen (1996)	Qualitative Approach	Study pur	rpose	Defensible/rigorous research design/methodology		Data collection methods	Role of resea described	archer	Context clear described	ſy	Methods reliable	Reporting of ethical considerations
	Appropriate	Clear		Defensible		Appropriate	Clear		Clear		Reliable	Not Sure/Not Reported
	Patient descriptions aide in deeper understanding of the phenomenon.	Aim: To c and reflec patients' experienc confusion pump deli	ct on ce of i ('post	Method: Phenomenological – hermeneutic approa which was well described and justifie	ch	Tape recorded unstructured dialogue.	Hermaneutic approach wa described.		Discussion of setting was adequate and taken into acc (ICU)	ł	Only one method was used – open dialogue as a part of the process of the research method.	Not reported.
	Analysis											
	Sufficiently rigorous	;	Are the d	ata 'rich'?	Relia	able analysis	Convincing findi		ings Findi		ngs relevant	Adequate conclusions
	Not sure/not reporte	ed	Not sure/	not reported	Not s	sure/not reported	Convinci		•	Relev	vant	Adequate
	Themes were not lis thematic analysis w well described. Five were discussed but clear if these repres themes.	as not e areas it is not	diversity	well described but of perspective and ons were not d.	Not r	reported	See narr	ative.		See r	narrative.	See narrative.

Author (year)	1	Theoretical approach	Study design	Data collection		Validity		Ethics		
Margery (2005)	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	methods	Role of researcher described	Context clearly described	Methods reliable	Reporting of ethical considerations		
	Appropriate	Clear	Defensible	Appropriate	Clear	Clear	Reliable	Clear		
	Descriptive study aiming to provide rich detailed description requires qualitative methods.	Describes ICU memories in context of other memories	Method: Questionna to guide case select followed by interviev	ion of methods of	Research clearly explained to patient.	Settings and inclusion criteria was defined. Bias not discussed.	Interviews were taped. Questionnaires were used initially.	Ethical approval given.		
	Analysis									
	Sufficiently rigorous		lata 'rich'?	Reliable analysis	Convincing	findings Fin	dings relevant	Adequate conclusions		
	Rigorous	Rich		Not Sure/not reported	Convincing	Rel	evant	Adequate		
	Analysis used Morse and Field(1996) method of thematic analysis		Il described and bd. Not stated if more than on researcher analysed the d participants gave feedbacl		lata or					

Author (year)	Т	heoretical approac	n Study design	Data collection		Validity		Ethics		
Mc Curren (2003)	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	methods	Role of researcher described	Context clearly described	Methods reliable	Reporting of ethical considerations		
	Appropriate	Clear	Defensible	Appropriate	Clear	Clear	Reliable	Clear		
	A phenomenologic approach to elicit patient experiences is appropriate	Aim: To describe delirium based or the lived experience of hospitalised elders and to investigate how patients give meaning to the experience.		Tape recorded interviews (14) were conducted.	As per phenomenological method.	Target population was older adults in hospital or recently discharged.	One method was used – reliable open interview technique.	Ethics Committee approval given.		
	Analysis									
	Sufficiently rigorous	Are the	data 'rich'?	Reliable analysis	Convincing find	lings Fine	dings relevant	Adequate conclusions		
	Rigorous	Rich		Reliable	Convincing	Rel	evant	Adequate		
	reviewers who analysed the although tapes and elicited clear comparate		as reported as 'rich' h there was no rative analysis across groups of patients.	re was no the data and there was 'pee analysis across de-briefing' as well.		arly See adequate	e narrative.	See narrative.		

Author (year)	1	Theoretical approach	Study design	Data collection		Validity		Ethics			
Stenwall (2008)	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	Data collection methods	Role of researcher described	Context clearly described	Methods reliable	Reporting of ethical considerations			
	Appropriate Clear Purpose of study: to explore Aim: To understand th experience of older patients delirium wher encountering professional carers and ch relatives.		Defensible	Appropriate C	Clear	Clear		Clear Study had Ethics Committee approval.			
			Method: latent conte analysis.	ent Comments: Open interviews specifically addressed research question.	Questions provided.	The context specifically chosen to address the needs of older people.					
	Analysis										
	Sufficiently rigorous	Are the	data 'rich'?	Reliable analysis	Convincing find	ings Find	lings relevant	Adequate conclusions			
	Rigorous	Not sure	/not reported	Reliable	Convincing		evant	Adequate			
	Seven steps (Grane Lundman) in procec Analysis by two auth Comments by two n authors. Consensus methods used.	lure. no desci nors. nore	contextual elements ibed.	al elements See above.		themes. See	narrative.	Conclusions and interpretation are linked.			

Author (year)		Theoretical approach	Study design	Data collection		Validity		Ethics	
itenwall (2008)	Qualitative Approach	Study purpose	Defensible/rigorous research design/methodology	Data collection methods	Role of researcher described	Context clearly described	Methods reliable	Reporting of ethical considerations	
	Appropriate	Clear	Defensible	Appropriate	Clear	Clear	Reliable	Clear	
	In order to elucidate an experience, qualitative methods are appropriate.	Aim: To elucidate and understand the lived experience of close relatives encountering an older person with acute confusional syndrome.	Method: A phenomenological methodology was used to abstract the experiences of relative of patients with acute confusional syndrome	minutes each were tape recorded.	A description of the phenomenological reduction was provided.	Participants, settings and potential biases were well described.	Methodology was adequate for the purposes of this research. Only one method was used.	Ethics Committee approval given.	
	Analysis								
	Sufficiently rigoro	ous Are the d	lata 'rich'?	Reliable analysis	Convincing find	ings Fi	indings relevant	Adequate conclusions	
	Rigorous	Rich		Reliable	Convincing	R	elevant	Adequate	
	authors. although		contract across f vas lacking (ethnicity	ct across the data and discrepancies		ed and So d.	ee narrative.	See narrative.	