Perioperative comprehensive geriatric assessment: what do we need to know?

ABSTRACT

As a consequence of an ageing population greater numbers of elderly patients are presenting for both elective and emergency surgery. These older patients typically present with an increased burden of age-related problems and multimorbidity, which is associated with an increased risk of adverse postoperative outcomes. Traditional preoperative assessment models are adept at discerning patients' suitability for anaesthesia and surgery, but there is minimal focus on improving postoperative outcomes.

Comprehensive geriatric assessment is a multidisciplinary approach used both to assess existing 'known' pathology and to screen for previously undiagnosed issues across medical, functional, social and/or psychological domains. This diagnostic phase then leads to the development and implementation of an individualized 'optimization' strategy across these domains. There is emerging evidence that comprehensive geriatric assessment and optimization in the surgical setting leads to improved outcomes, and it is reasonable to conclude that it would benefit the patient's long-term health.

Increasing numbers of older people are undergoing elective or emergency surgery as a consequence of an increasingly older population, advances in surgical and anaesthetic technique, and changing attitudes to older age. These interventions in older patients are successful in terms of improving symptoms, quality of life and improving life expectancy (Etzioni et al, 2003; DeFrances et al, 2008). However, older people present with increased burden of age-related problems and multimorbidity which is associated with an increased risk of adverse postoperative outcome (Hamel et al, 2005; Fines et al, 2006; Robinson et al, 2009; Makary et al, 2010; Partridge et al, 2014).

Despite these changes in the surgical population, traditional preoperative assessment models have persisted.

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These are adept at discerning patients' suitability for anaesthesia and surgery, and at estimating the implications of pre-diagnosed comorbidities, but have several disadvantages in the elderly population:

- There is minimal focus on improving postoperative outcomes
- There is often a reliance on input from other specialties instead of 'in-house' targeted optimization, causing significant delays and a disjointed pathway
- There is a lack of screening for previously undiagnosed comorbidities and geriatric syndromes, which may be relevant to the shared decision-making process, and which, if modified, may improve outcomes.

To address these issues, national reports such as the National Emergency Laparotomy Audit (2017) and *An Age Old Problem* (National Confidential Enquiry into Patient Outcome and Death, 2010) have advocated incorporating comprehensive geriatric assessment and optimization methodology into the perioperative pathway.

What is comprehensive geriatric assessment?

Comprehensive geriatric assessment is a multidisciplinary approach used both to assess existing 'known' pathology and to screen for previously undiagnosed issues across medical, functional, social and/or psychological domains. This diagnostic phase then leads to the development and implementation of an individualized 'optimization' strategy across these domains. The key components of comprehensive geriatric assessment are shown in *Table 1* (Partridge et al, 2014).

There is no single method for the application of comprehensive geriatric assessment. It should be considered as a framework to guide the health care of older patients with frailty and multimorbidity. Thus, it can and often should encompass multiple encounters with several health professionals over an extended time period. The comprehensive geriatric assessment skillset takes years of training to master. However, its principles and elements can be taught and applied in many different health-care settings.

Comprehensive geriatric assessment is now being used in the perioperative pathway, as such a holistic approach can facilitate thorough assessment and optimization of the older surgical patient and allow wider consideration of risk and benefit of a specific procedure for the individual patient. It can also be used to inform shared decision making about treatment options which may include surgery or other options such as medical management for symptoms.

The evidence for comprehensive geriatric assessment in older surgical patients

There is strong evidence that comprehensive geriatric assessment improves outcomes for patients in medical wards and in the community. In both these groups it reduces mortality, increases the chance of independent living, and confers a positive effect on physical function (Stuck et al, 1993; Ellis and Langhorne, 2005). A Cochrane meta-analysis of 29 trials and 13 766 hospitalized patients comparing comprehensive geriatric assessment with standard care reported that comprehensive geriatric assessment increases the likelihood that patients will be alive and in their own homes at hospital discharge. Comprehensive geriatric assessment also increases the likelihood that patients will be living at home at 3–12 months' follow up. Furthermore, comprehensive geriatric assessment reduced the risk of being admitted to a nursing home at up to 1 year after hospital admission (Ellis et al, 2017).

By contrast, evidence for comprehensive geriatric assessment in the anaesthesia or surgical setting is less robust, which may explain its current underuse. However, many studies showing no or minimal benefit have focused primarily on the assessment component of comprehensive geriatric assessment rather than the subsequent optimization phase. It is likely that the latter has much more impact in improving postoperative outcomes (Partridge et al, 2017).

A systematic review identified only five studies that combined both comprehensive geriatric assessment and optimization preoperatively: two randomized controlled trials and three before-and-after intervention studies. Both of the randomized controlled trials showed improved postoperative outcomes, as did two of the before-and-after studies (Partridge et al, 2014a).

A more recent large single-centre randomized controlled study looked specifically at preoperative comprehensive geriatric assessment in patients undergoing major vascular surgery. Comprehensive geriatric assessment identified previously unrecognized issues across multiple domains in these patients including ischaemic heart disease, cardiac failure, atrial fibrillation, chronic obstructive pulmonary disease, diabetes, cancer, cognitive impairment, chronic kidney disease and Parkinson's disease. Identification of these issues allowed both preoperative optimization and long-term follow up via primary care. Interventions included physiotherapy, occupational therapy and social worker referrals, medication changes, medical advice to ward teams, and advice on the postoperative level of care required. Comprehensive geriatric assessment was associated with a shorter length of hospital stay, lower incidence of complications and reduced postoperative institutionalization (Partridge et al, 2017).

A Canadian population-based cohort study published in December 2017, studying the impact of geriatric evaluation in over-65-year-olds undergoing elective non-cardiac surgery, showed that it conferred an improvement in 90-day survival (McIsaac et al, 2017).

While the evidence from these studies is encouraging, further research into this area of comprehensive geriatric assessment and optimization is needed to allow this area to be fully developed. The next step will require the funding of multicentre randomized control trials in this area.

Table 1. Components of comprehensive geriatric assessment

Domain	Items to be assessed
Medical	■ Comorbid conditions and disease severity ■ Medication review ■ Nutritional status ■ Problem list
Mental health	■ Cognition ■ Mood and anxiety ■ Fears
Functional capacity	■ Basic activities of daily living ■ Gait and balance ■ Activity or exercise status ■ Instrumental activities of daily living
Social circumstances	■ Informal support from family or friends ■ Social network such as visitors or daytime activities ■ Eligibility for being offered care resources
Environment	■ Home comfort, facilities and safety ■ Use or potential use of telehealth technology ■ Accessibility to local resources

How can comprehensive geriatric assessment be used in the perioperative pathway?

Conducting comprehensive geriatric assessment in the perioperative arena requires not only skills in comprehensive geriatric assessment but also knowledge of the pathway, the treatment options for the presenting complaint, common postoperative complications and the risk factors for developing these adverse events. This is illustrated in the following two examples.

Example 1

An 82-year-old man with osteoarthritis, uncontrolled atrial fibrillation and Parkinson's disease presents for a total hip replacement. He has a self-reported exercise tolerance of 50 yards and is a long-term smoker. He is found to be anaemic on routine blood tests.

Comprehensive geriatric assessment in this patient would involve:

Assessment of osteoarthritis and its impact on the patient

- Use of tools such as 'timed up and go' and 'gait speed' to assess mobility and help anticipate any perioperative fall risk

- Pain management (poorly controlled preoperative pain is predictive of chronic pain issues)
- Optimization of functional aspects (use of occupational therapy and physiotherapy to optimize function, provide adaptations, use prehabilitation exercises, predict likely postoperative care needs and implement a care package if necessary).

Assessment of atrial fibrillation
- Rate check using an electrocardiogram
- Consideration of aim of treatment (i.e. rate or rhythm control)
- Decision on best treatment option (e.g. avoid beta blocker in the case of postural hypotension secondary to Parkinson's disease, avoid digoxin when patient has electrolyte disturbances)
- Management of anticoagulation, decision on whether heparin bridging required.

Assessment of Parkinson's disease
- Multidisciplinary review of motor and non-motor symptoms
- Optimization of medication to control symptoms
- Planning the timely administration of dopaminergic medications through the perioperative period (these must be given on time)
- Planning an alternative route of dopaminergic drug administration (e.g. patches, nasogastric tube or infusion) if the oral route will be temporarily unavailable (e.g. 'nil by mouth' or vomiting)
- Planning for proactive identification and management of non-motor symptoms (e.g. planned prescription of Movicol for prevention of constipation).

Nutritional screening
- Dietary history to include screening for recent weight loss, gauging daily calorific intake and assessing risk of vitamin and mineral deficiencies based on dietary history
- Considering proactive nutritional supplementation in light of likely postoperative recovery timescale and ongoing burden of disease
- Considering dietitian referral in patients with severe nutritional deficiencies.

Assessment of mental health
- Use of cognitive screening tools – Montreal Cognitive Assessment Tool (*Appendix 1* online at www.bjhm.co.uk) and 4AT (Rapid assessment test for delirium detection) (*Appendix 2*)
- Use of mood screening tools, e.g. Hospital Anxiety and Depression Score (*Appendix 3*)
- Assessment of capacity
- Assessment and optimization of delirium risk including predisposing factors (e.g. hyponatraemia, pain), communicating risks of delirium with patient and carer, and making a plan for ward-based care.

Management of a new diagnosis of anaemia made on routine testing
- Consideration of cause using history, examination and laboratory markers
- Using patient blood management strategies, e.g. intravenous iron.

Shared decision making

Full, multidisciplinary discussion of risks and benefits of surgery, informed by the above assessment and optimization plan, in a format that the patient can understand.

The potential benefits of this are reduced pain and improved mobility (bearing in mind that if Parkinson's disease is the main limiter, mobility will not improve).

The potential risks include postoperative morbidity, mortality, and exacerbation of underlying comorbidity (e.g. delirium may worsen the underlying cognitive trajectory).

A perioperative care pathway should be put into place, including setting perioperative targets such as oxygen saturations, mean arterial pressures and fluid balance. Advanced care planning should include planning use of level 2 care and ceilings of care.

The principles of using comprehensive geriatric assessment in the emergency setting are the same as in the elective one. The main problem encountered is the time available to perform the assessment and instigate management of identified issues.

Example 2

A confused older patient presents to accident and emergency with peritonitis. Bowel perforation is confirmed on computed tomography. The patient is listed for an urgent laparotomy.

The urgent aspects of care should take priority, including assessment and management of sepsis, planning the postoperative care environment, and initiating appropriate monitoring and analgesia. In addition to this comprehensive geriatric assessment would involve:

Obtaining a collateral history via the patient's GP or family
- Full past medical history
- Assessment of premorbid functional level and cognitive function
- Medications review, including stopping any nephrotoxic medications and angiotensin-converting enzyme inhibitors preoperatively.

Capacity and consent
- Assessment of capacity to guide the consent process
- Identification of any legal arrangements for proxy decision making such as lasting power of attorney.

Early postoperative assessment of cognitive function and delirium risk
- Testing cognitive function with a tool such as the Montreal Cognitive Assessment tool (*Appendix 1*)

- Screening for anxiety and depression using Hospital Anxiety and Depression Score (*Appendix 3*)
- Monitoring for signs of delirium with daily Confusion Assessment Method or 4AT scoring (*Appendix 2*)
- Considering a medication compliance aid on discharge if necessary.

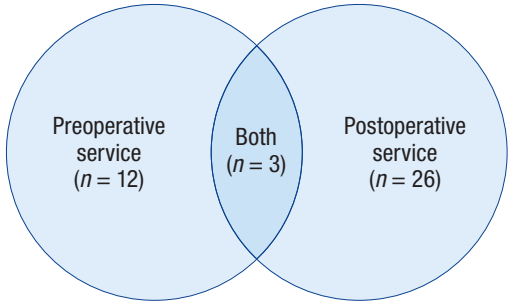
Nutrition care

- Assessment and optimization by a dietician early in the pathway to aid postoperative recovery and wound healing
- Seeking alternative nutritional arrangements in event of prolonged periods of 'nil by mouth'.

Rehabilitation and discharge planning

- Timely occupational therapy and physiotherapy involvement to identify falls risk and establish a proactive rehabilitation strategy and discharge plan (e.g. to a rehabilitation bed in a community hospital, rehabilitation and care provision at home, or discharge to institutional care), helping to reduce the length of hospital stay.

This example highlights that for comprehensive geriatric assessment to be effective it needs to be targeted, with hands-on care and follow through. Translating this to the perioperative setting means that the patient should be followed through his/her surgical pathway. This allows for proactive identification and management of anticipated postoperative complications with a directed multidisciplinary approach to facilitate rehabilitation and discharge.



Service		No
Method of risk assessment	Comprehensive geriatric assessment	12
	Comorbidities	8
	Frailty	6
	ASA	7
	POSSUM	1
	No risk assessment	1
Model of care	Reactive	10
	Proactive	11
	Combined	5
Optimization by	Geriatrician	4
	Geriatrician-led multidisciplinary team	9

Figure 1. Features of geriatric services provided by geriatric medicine in the UK (Partridge et al, 2014b). ASA = American Society of Anesthesiologists; POSSOM = Physiological and Operative Severity Score for the enUmeration of Mortality and Morbidity.

Putting comprehensive geriatric assessment into practice: national barriers to widespread uptake

Although there are some examples, the deployment of specialist geriatric services in perioperative medicine is limited, as highlighted by a survey of all 161 UK acute NHS health care trusts (Partridge et al, 2014b). Of 130 responders, only 38 provided geriatric medicine input into the care of older surgical patients. Twelve were providing comprehensive geriatric assessment services, with six carrying out a frailty assessment of elderly patients. Only three hospitals surveyed delivered both preoperative and postoperative services. The majority of respondents to the survey only provided 'reactive' postoperative services (*Figure 1*).

The authors of the survey highlight that difficulties in trying to implement these pathways are probably the result of a lack of adequate funding, with the majority of comprehensive geriatric assessment budgets coming from existing department funds for geriatric medicine.

Geriatrician involvement is key to an effective comprehensive geriatric assessment-based perioperative service, since their training is founded in comprehensive geriatric assessment methodology. They are well placed to lead such a service and up-skill both an immediate and wider multidisciplinary team. However, considering the above pressures on geriatrics services, one alternative would be to create training programmes and recruit anaesthetists who have an interest in the pre-assessment process. Another option could be to provide training to GPs in comprehensive geriatric assessment – one challenge being the extra workload this would place on an already strained primary care service.

To develop these services, resources need to be allocated through both funding and recruitment in all of the above specialties to facilitate the ideal progression of comprehensive geriatric assessment from primary care into the hospital environment.

Conclusions

Comprehensive geriatric assessment has been shown to be very effective in improving the health and wellbeing of elderly patients in the medical setting. There is emerging evidence for comprehensive geriatric assessment and optimization in the surgical setting, and it is reasonable to conclude that it would benefit these patients.

As life expectancy continues to increase, anaesthetists will encounter an increasing number of frail elderly patients

KEY POINTS

- As a consequence of an ageing population, greater numbers of elderly patients are presenting for both elective and emergency surgery.
- These older patients typically present with an increased burden of age-related problems and multimorbidity, which is associated with an increased risk of adverse postoperative outcomes.
- Traditional preoperative assessment models are adept at discerning patients' suitability for anaesthesia and surgery, but there is minimal focus on improving postoperative outcomes.
- Comprehensive geriatric assessment is a multidisciplinary approach used both to assess existing 'known' pathology and to screen for previously undiagnosed issues across medical, functional, social and/or psychological domains.
- This diagnostic phase then leads to the development and implementation of an individualized 'optimization' strategy across these domains.

presenting for more advanced and high-risk surgery. It follows that use of proactive comprehensive geriatric assessment techniques and optimization strategies will help reduce the risk of complications and improve postoperative outcomes. Development of pathways that involve geriatricians and introduce a more multidisciplinary approach to the care of the elderly surgical patient should be welcomed. **BJHM**

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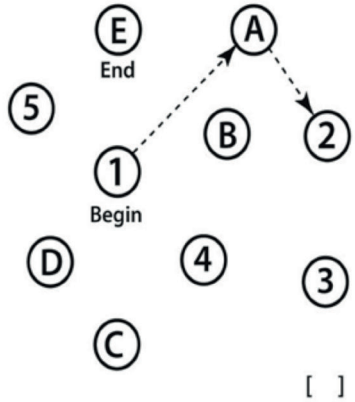
Appendix 1. The Montreal Cognitive Assessment Screening Tool (MOCA). Copyright Dr Z Nasreddine. Reproduced with permission. Copies are available at www.mocatest.org

MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

NAME :
Education : Date of birth :
Sex : DATE :

VISUOSPATIAL / EXECUTIVE



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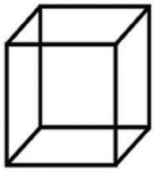


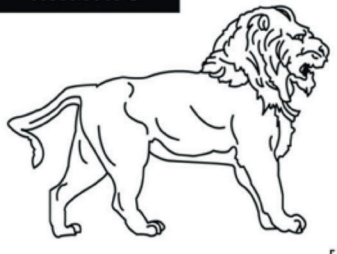
[ ] [ ]

Draw CLOCK (Ten past eleven)
(3 points)

[ ] Contour [ ] Numbers [ ] Hands

POINTS ___/5

NAMING



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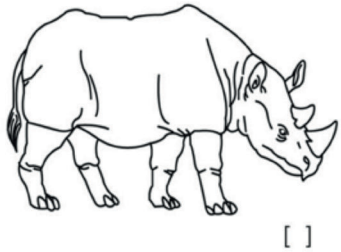

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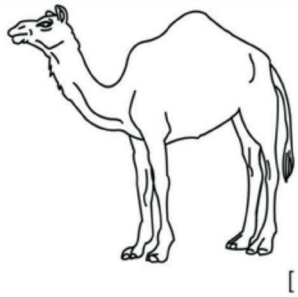

[ ]

___/3

MEMORY Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED
1st trial					
2nd trial					

No points

ATTENTION Read list of digits (1 digit/ sec.).

Subject has to repeat them in the forward order [ ] 2 1 8 5 4
Subject has to repeat them in the backward order [ ] 7 4 2

___/2

Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors

[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

___/1

Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65

4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0 pt**

___/3

LANGUAGE Repeat : I only know that John is the one to help today. [ ]
The cat always hid under the couch when dogs were in the room. [ ]

___/2

Fluency / Name maximum number of words in one minute that begin with the letter F [ ] _____ (N ≥ 11 words)

___/1

ABSTRACTION Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler

___/2

DELAYED RECALL

	Has to recall words WITH NO CUE	FACE [ ]	VELVET [ ]	CHURCH [ ]	DAISY [ ]	RED [ ]	Points for UNCUED recall only
Optional	Category cue						
	Multiple choice cue						

___/5

ORIENTATION [ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City

___/6

© Z.Nasreddine MD **www.mocatest.org** Normal ≥ 26 / 30

TOTAL ___/30

Add 1 point if ≤ 12 yr edu

Administered by: _____

Appendix 2. The 4AT rapid clinical test for delirium. Available from https://www.the4at.com/

4AT

(label)

Patient name:

Date of birth:

Patient number:

Assessment test for delirium & cognitive impairment

Date: Time:

Tester:

CIRCLE

[1] ALERTNESS

This includes patients who may be markedly drowsy (eg. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient. If asleep, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

Normal (fully alert, but not agitated, throughout assessment)	0
Mild sleepiness for <10 seconds after waking, then normal	0
Clearly abnormal	4

[2] AMT4

Age, date of birth, place (name of the hospital or building), current year.

No mistakes	0
1 mistake	1
2 or more mistakes/untestable	2

[3] ATTENTION

Ask the patient: "Please tell me the months of the year in backwards order, starting at December." To assist initial understanding one prompt of "what is the month before December?" is permitted.

Months of the year backwards	Achieves 7 months or more correctly	0
	Starts but scores <7 months / refuses to start	1
	Untestable (cannot start because unwell, drowsy, inattentive)	2

[4] ACUTE CHANGE OR FLUCTUATING COURSE

Evidence of significant change or fluctuation in: alertness, cognition, other mental function (eg. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs

No	0
Yes	4

4 or above: possible delirium +/- cognitive impairment
1-3: possible cognitive impairment
0: delirium or severe cognitive impairment unlikely (but delirium still possible if [4] information incomplete)

4AT SCORE ☐

GUIDANCE NOTES Version 1.2. Information and download: www.the4AT.com

The 4AT is a screening instrument designed for rapid initial assessment of delirium and cognitive impairment. A score of 4 or more *suggests* delirium but is not diagnostic: more detailed assessment of mental status may be required to reach a diagnosis. A score of 1-3 suggests cognitive impairment and more detailed cognitive testing and informant history-taking are required. A score of 0 does not definitively exclude delirium or cognitive impairment: more detailed testing may be required depending on the clinical context. Items 1-3 are rated *solely on observation of the patient at the time of assessment.* Item 4 requires information from one or more source(s), eg. your own knowledge of the patient, other staff who know the patient (eg. ward nurses), GP letter, case notes, carers. The tester should take account of communication difficulties (hearing impairment, dysphasia, lack of common language) when carrying out the test and interpreting the score.

Alertness: Altered level of alertness is very likely to be delirium in general hospital settings. If the patient shows significant altered alertness during the bedside assessment, score 4 for this item. **AMT4 (Abbreviated Mental Test - 4):** This score can be extracted from items in the AMT10 if the latter is done immediately before. **Acute Change or Fluctuating Course:** Fluctuation can occur without delirium in some cases of dementia, but marked fluctuation usually indicates delirium. To help elicit any hallucinations and/or paranoid thoughts ask the patient questions such as, "Are you concerned about anything going on here?"; "Do you feel frightened by anything or anyone?"; "Have you been seeing or hearing anything unusual?"

Appendix 3. Hospital Anxiety and Depression Score (HADS). From Zigmond and Snaith (1963).

Hospital Anxiety and Depression Score (HADS)

This questionnaire helps your physician to know how you are feeling. Read every sentence. Place an "X" on the answer that best describes how you have been feeling during the LAST WEEK. You do not have to think too much to answer. In this questionnaire, spontaneous answers are more important

A	I feel tense or 'wound up':	
	Most of the time	3
	A lot of the time	2
	From time to time (occ.)	1
	Not at all	0
D	I still enjoy the things I used to enjoy:	
	Definitely as much	0
	Not quite as much	1
	Only a little	2
	Hardly at all	3
A	I get a sort of frightened feeling as if something awful is about to happen:	
	Very definitely and quite badly	3
	Yes, but not too badly	2
	A little, but it doesn't worry me	1
	Not at all	0
D	I can laugh and see the funny side of things:	
	As much as I always could	0
	Not quite so much now	1
	Definitely not so much now	2
	Not at all	3
A	Worrying thoughts go through my mind:	
	A great deal of the time	3
	A lot of the time	2
	From time to time, but not often	1
	Only occasionally	0
D	I feel cheerful:	
	Not at all	3
	Not often	2
	Sometimes	1
	Most of the time	0
A	I can sit at ease and feel relaxed:	
	Definitely	0
	Usually	1
	Not often	2
	Not at all	3

D	I feel as if I am slowed down:	
	Nearly all the time	3
	Very often	2
	Sometimes	1
	Not at all	0
A	I get a sort of frightened feeling like "butterflies" in the stomach:	
	Not at all	0
	Occasionally	1
	Quite often	2
	Very often	3
D	I have lost interest in my appearance:	
	Definitely	3
	I don't take as much care as I should	2
	I may not take quite as much care	1
	I take just as much care	0
A	I feel restless as I have to be on the move:	
	Very much indeed	3
	Quite a lot	2
	Not very much	1
	Not at all	0
D	I look forward with enjoyment to things:	
	As much as I ever did	0
	Rather less than I used to	1
	Definitely less than I used to	2
	Hardly at all	3
A	I get sudden feelings of panic:	
	Very often indeed	3
	Quite often	2
	Not very often	1
	Not at all	0
D	I can enjoy a good book or radio/TV program:	
	Often	0
	Sometimes	1
	Not often	2
	Very seldom	3