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# The malignant wound assessment tool: a validation study using a Delphi approach

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Malignant wounds, caused by the direct invasion of cancer into the skin, occur in cancer patients with primary skin tumours and as cutaneous metastasis in approximately 10% of patients with metastatic internal malignancies. Malignant wounds have a profound impact on patients, family members and health care providers. The assessment of the patient with malignant wounds can be complex and there is no widely accepted, consistent approach. Valid, descriptive survey research methods were used to develop the Malignant Wound Assessment Tool (MWAT). The authors developed two versions of the MWAT: a brief clinical version (MWAT-C) and a more detailed research version (MWAT-R). Domains include clinical wound features, physical effects and emotional and social impacts of the wound. The two tools underwent content and construct validity testing using a Delphi process. An international panel of professionals with clinical or research expertise related to malignant wounds was formed. Panelists participated in two rounds of review for each tool. Development and face validity testing of the MWAT-C and MWAT-R tools through the Delphi process have resulted in tools ready for clinical application and will support clinical and research activities to improve care for patients with this devastating condition. *Palliative Medicine* (2009); 23: 266–273

**Key words:** assessment tool; cancer; Delphi technique; malignant wound; palliative care; validation

## Introduction

Cancer is a highly prevalent and serious public health issue. Malignant wounds result from the direct invasion of cancer into the skin. In a previous study, Lookingbill, *et al.* reported that approximately 10% of patients with metastatic disease have cutaneous metastasis.<sup>1</sup> More recently, Maida, *et al.* (2008) reported that malignant wounds occur in 14.5% of patients with advanced cancer.<sup>2</sup> Resulting cancer growth through the skin may lead to a range of complications including infection, fistulas, vessel compression and blockage, hemorrhage and airway obstruction.<sup>3</sup> Assessment and management of the patient with a malignant wound combines wound care, patient self-assessment and social and psychological sup-

port aimed at promoting independence and improving quality of life.<sup>4–6</sup>

Oncology and palliative care literature has highlighted the need to develop a specific malignant wound assessment tool to support an individualised plan of care that is linked with quality of life outcome measures.<sup>3,7,8</sup> Although a number of wound assessment tools have been described, a validated, evidence-based assessment tool for these patients is not yet reported in the literature. The natural history and clinical circumstances of benign and malignant wounds markedly differ, and published tools on *benign* wound assessment<sup>9–14</sup> fall short of addressing the complex presentations of cancer wounds and the needs of patients and their care providers.

Malignant wound assessment tools found within the literature describe a range of important manifestations of malignant wounds. The Wound and Symptoms Self-Assessment Chart<sup>15</sup> measures the severity of symptoms and problems associated with fungating wounds. The Treatment Evaluation by Le Roux's (TELER) system of clinical note taking provides outcome measurement specific to dressings and the impact of the dressing from the patient's

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perspective.<sup>16</sup> Foltz<sup>17</sup> has identified six activities specific to malignant wound care. The Schulz-Malignant Wound Assessment Tool more comprehensively focused on a palliative assessment capturing the perspectives of both patient and clinician, encompassing clinical features of the wound, techniques used in management of the wound and patient concerns related to functional, social and emotional domains. Although the domains were validated by patients and clinicians,<sup>6,18,19</sup> the format of the tool required further adaptation that would promote comprehensive, consistent evaluation and documentation of findings.

We recognised the need for researchers and clinicians to have a tool available to systematically assess and document malignant wounds. Such a tool would facilitate more accurate descriptions and interpretations of clinical findings and patient needs. To accomplish this, we further developed and validated a tool based on the tool described by Schulz and colleagues through creation and validation of two separate versions: the Malignant Wound Assessment Tool – Clinical (MWAT-C; a brief clinical version) and the Malignant Wound Assessment Tool – Research (MWAT-R; a more detailed multipurpose version to support research in the area of malignant wounds).

## Methods

### Initial development of the Malignant Wound Assessment Tools (MWAT-C and MWAT-R)

Descriptive survey research was conducted to determine tool content.<sup>18</sup> It captured demographics, specific symptom areas and wound specifics. Symptom areas were separated into information obtained from the patient directly and observations from the health care provider. Most questions were phrased in an open-ended format.

A team of individuals with expertise in malignant wound assessment and treatment, research tool development, tool validation or data analysis were invited to participate in further development of the MWAT. Many of these individuals were members of a nationally funded cancer pain research team (<http://www.cancerpainnet.ca>), with the addition of two expert wound management nursing specialists. The team decided to create two tools, one for research purposes (MWAT-R) and one for clinical use (MWAT-C). This decision was based on the level and type of data needed to ensure that there were tools to support work in each environment.

### Study design

A Delphi process<sup>20–22</sup> was used to gather expert opinion and determine the level of consensus regarding each of the items on the MWAT-C and the MWAT-R. An international expert panel was formed, including experts from

North America, United Kingdom, Denmark and New Zealand. The panel participated in two anonymous survey rounds, after which pre-determined criteria for panel consensus was reached.

### Expert panel selection

The expert panel was populated using three approaches. First, potential panel members were approached when a Medline search identified them as having authored high-impact publications on the topic of malignant wounds. Second, members of a professional society or nursing association with expertise in the area of malignant wounds were canvassed. Third, individuals were directly referred to us by leaders in the field. Based on these criteria, 47 individuals were identified. These potential panel members were contacted by e-mail to determine interest in participating in the study. Three individuals were unable to be contacted due to e-mail address failure; thus, 44 individuals were assumed to have received the invitation to participate in the Delphi study. Proposed panel members were informed that they would be receiving the tool more than once, but as the study team was unsure of how many rounds would be required to obtain consensus, a final number of rounds could not be estimated at that time. Each panel member was given the option to review the clinical tool, the research tool or both. Of the 44 individuals sent invitations, 30 (68%) agreed to participate. They formed the expert panel for round 1. Of the remaining 14 invitees, three individuals declined to participate, citing a lack of expertise and no reply was received from the other 11 invitees prior to the start of the first round of review. Two additional panel members joined the panel prior to the second round of Delphi review as a result of additional referrals and they were included in round 2.

### Delphi process

For each round of Delphi review, panel members were asked to complete evaluation surveys electronically and to return the surveys by e-mail to an administrative assistant who was independent of the study, which ensured confidentiality and anonymity. Panelists were asked to return the surveys within three weeks of receipt. Three reminders were sent by e-mail, and surveys were accepted until one week after the requested due date. For both the rounds, consent was implied by the return of the completed surveys, which was explained to panel members in the instructions.

Responses were collated and sent to each study team member for review. Team members independently considered feedback and either accepted the recommendations or prepared discussion points for scheduled teleconferences. Based on panelists' agreement scores and comments and dialogue by the team, revisions to items were made. The

revised tools were then sent to panel members for a second round of review. The process for reviewing, returning, collating, discussing and amending the tools was the same in round 2 as for round 1. A third round was not required as pre-determined criteria for consensus of all items was achieved and data saturation was reached.

### Evaluation surveys

Two evaluation surveys were prepared, one for the MWAT-C and one for the MWAT-R. The surveys contained multiple sections, consisting of a series of 5-point Likert scale questions with space for comments and free text. Panelists were asked to evaluate each tool's instructions, demographic section and wound classification system. In addition, panelists completed an item-by-item evaluation for each tool, critiquing items pertaining to physical effects of the wound, clinical wound features and emotional and social impacts. Panelists were asked to rate each item in terms of its *relevance*, *clarity* and the *adequacy and appropriateness* of its *response format* and *response options*. Additional space for comments on each item was provided. Evaluation surveys also collected panelist demographic information.

Minor changes were made to the evaluation surveys prior to the second round of the Delphi review process as a result of the feedback received in round 1. The format and appearance of the evaluation surveys did not change.

### Delphi process data analysis

Quantitative data from the two-tiered Delphi process were analyzed using descriptive statistics. Panel members were assumed to be in agreement with a statement if they scored either +1 (agree) or +2 (strongly agree) on a 5-point Likert scale ranging from -2 to +2 (strongly disagree to strongly agree). Consensus was defined a priori as greater than 50% of panelists being in agreement with a statement. If 50% of panelists or fewer were in agreement with an aspect of an item (e.g., item clarity), then the specific item was deemed to require revision, and the study team used the qualitative comments from the panelists to guide revisions. In some cases, revisions to items with agreement scores exceeding 50% were considered when multiple panelists had the same or similar suggestions.

## Results

Response rates for the two rounds are shown in Table 1.

### Delphi process: MWAT-C results

#### *Instructions for completion*

Based on the panelists' feedback, the instructions were revised to better define the purpose of the tool and each

**Table 1** Response rates

	MWAT-C		MWAT-R	
	Sent	Returned	Sent	Returned
Round 1 ( <i>n</i> = 30)	29	24 (83%)	26	16 (62%)
Round 2 ( <i>n</i> = 32)	31	14 (45%)	27	13 (48%)

of its sections and to clarify how each section was meant to be completed. It was also necessary to emphasise that the tool was not meant to comprehensively assess each wound-related symptom, but was meant to guide the clinician in determining the symptoms requiring a more in-depth assessment.

#### *Patient demographics section*

Seventy percent of round 1 panel members were in agreement with the adequacy of the patient demographics section. Some wound-specific parameters were moved from the demographics section to the clinical assessment section and other minor amendments were made. Following round 2, 86% of panelists agreed with the adequacy of this section. Minor edits were implemented.

#### *Item-by-item evaluation*

Panel members evaluated the relevance, clarity, response format and response options for each item. For some items, due to the way in which the clinical tool was formatted and also for brevity, panelists evaluated the adequacy of either the *response format* or the *response options*, whichever was considered more appropriate. The percent of panel members in agreement with the different evaluation categories for each item is shown in Table 2. In general, the level of agreement with most items, averaged across the four evaluation categories, increased markedly from round 1 to round 2. Specific examples of revisions made to individual items based on the panelists' comments are outlined in Table 3; panel members suggested minor amendments meant to improve precision and clarity, and when agreed upon by the study team, such changes were made to several items.

Certain domains such as social functioning, support and emotional functioning were critically explored and stimulated significant debate and discussion, especially when considered within the context of clinical evaluation. In the original MWAT-C tool, the clinician was asked to 'observe' these domains; however, several panel members expressed concern over how these could be 'observed'. The word 'observe' was removed from the clinical assessment section for these domains, but space was still provided for the clinician to document his/her assessment of the domain and/or any relevant observations. The

**Table 2** Agreement scores for MWAT-C items: round 1 vs round 2

Malignant wound-related clinical domain	Relevance		Clarity		Adequacy of response format		Adequacy of response options		Row average	
	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
<b>Patient-reported items</b>										
Wound pain	100	100	50	86	42	79	N/A	N/A	64	88
Wound odour	100	100	67	85	74	77	N/A	N/A	80	87
Wound exudate	100	100	52	85	46	85	N/A	N/A	66	90
Wound bleeding	100	100	75	92	ND	ND	63	83	79	92
Wound-related swelling	96	86	75	100	71	100	N/A	N/A	81	95
Other symptoms	ND	100	ND	100	ND	100	N/A	N/A	ND	100
Physical function	92	100	58	92	57	92	N/A	N/A	69	95
Social interactions	100	100	79	93	74	93	N/A	N/A	84	95
Support	ND	100	ND	85	ND	85	N/A	N/A	ND	90
Emotional status	100	100	100	79	83	79	N/A	N/A	94	86
Overall concern	96	93	78	92	86	93	N/A	N/A	87	93
<b>Clinical assessment items</b>										
Wound pain	100	100	61	N/A	ND	100	43	N/A	68	100
Wound odour	100	100	58	77	52	85	N/A	N/A	70	87
Wound exudate	100	100	63	92	ND	ND	52	92	72	95
Wound bleeding	100	100	74	85	ND	ND	71	85	82	90
Wound-related swelling	96	86	78	93	ND	ND	67	86	80	88
Other symptoms	ND	100	ND	N/A	ND	100	N/A	N/A	ND	100
Physical function	92	100	61	100	61	92	N/A	N/A	71	97
Social interactions	100	100	57	N/A	43	79	N/A	N/A	67	90
Support	ND	100	ND	N/A	ND	92	N/A	N/A	ND	96
Emotional status	100	100	63	N/A	61	79	N/A	N/A	75	90
Wound location	ND	100	ND	92	ND	93	N/A	N/A	ND	95
Wound size <sup>a</sup>	88	85	79	71	71	64	N/A	59	79	70
Wound shape	67	83	46	75	38	92	N/A	N/A	50	83
Wound bed	100	100	88	93	79	93	79	93	87	95
Peri-wound skin	87	100	78	100	57	100	ND	92	74	98
Column average	96	97	69	89	62	89	63	84	75	92

N/A, not applicable; ND, not done.

<sup>a</sup>Average of three items related to wound size.

instructions to the tool were also modified to guide tool users based on this discussion.

Following round 2 of review, several items remained unchanged due to high panelist agreement scores and few comments. Minor revisions were made to other items when multiple panel members had similar suggestions. Two clinical assessment items related to wound size remained contentious among panel members after round 2. These items concerned the change in wound size and the rate of wound change. Panelists indicated that, without asking the patient, assessing changes in wound size and rates of change would be difficult, especially during the first encounter with the patient. Furthermore, the time frame over which the clinician was asked to assess the change in wound size was not clear. As a result, this item was revised to capture changes in wound size since the last recorded measurement, with an option to select 'this is the first recorded measurement'. The rate of wound change item was revised to allow the clinician to query the patient as to whether, in the patient's opinion, the wound had become larger, smaller, or had not changed, over the past month.

## Delphi process: MWAT-R results

### *Instructions for completion*

The tool's instructions for completion were revised to clarify how each section was meant to be completed.

### *Patient demographics section*

Revisions were made to the patient demographics section to mirror the information captured in the MWAT-C patient demographics section. Minor edits were incorporated in response to the round 2 feedback.

### *Item-by-item evaluation*

Panel members reviewed each item according to relevance, clarity, response format adequacy and appropriateness and response option adequacy and appropriateness. The percent of panelists in agreement with these evaluation categories is shown in Table 4. For simplicity, some items are grouped according to their clinical domain. In general, agreement scores across most items and evaluation categories were higher for the research tool than the clinical tool. As per the evaluation of the MWAT-C, the level of agreement with most items, averaged across the four evaluation

**Table 3** Examples of revisions to MWAT-C items following round 1 review

Clinical domain	Original question	Agreement score	Reviewer comments <sup>a</sup>	Revised question
<b>Patient-reported items</b>				
Wound exudate	a) 'Any drainage? b) Do dressings work?'	Clarity = 52%	Clarify what is meant by 'do dressings work?' (n = 13). Add a question on frequency of dressing changes (n = 5).	a) 'Do you have any drainage from the wound? b) Do dressings prevent leakage? c) Number of dressing changes per day: _____ d) Comment: _____'
Wound swelling	'Any swelling?'	Clarity = 75%	Specify swelling in the area of the wound (n = 5).	'Do you have any swelling in the area of the wound? (Comment)'
Physical function	'How does it affect ability to function?'	Clarity = 58%	Change 'it' to 'the wound' (n = 4). Define 'ability to function' (n = 10).	'Does the wound affect your physical movement in your daily living? (Comment)'
<b>Clinical assessment items</b>				
Social interactions	'Observe: _____' <i>Response format: open ended.</i>	Clarity = 57% Response format = 43%	This is a difficult concept to 'observe' (n = 10)	The word 'observe' was removed but space was still provided to allow the clinician to document his/her assessment of the behavior, as appropriate.
Wound shape	'What is the pattern of wound spread?' <i>Response format: open ended.</i>	Clarity = 46% Response format = 38%	Clarify 'wound spread'. (n = 7)	'Describe the pattern of the wound, and diagram if necessary.' <i>The response format remained open ended but a space was provided to diagram the wound.</i>

<sup>a</sup>The number in parentheses (n=) refers to the number of reviewers expressing each comment.

categories, increased from round 1 to round 2. Specific examples of revisions made to individual items based on the panelists' comments are given in Table 5.

Some concern was expressed over assessing sensitive, emotional issues using direct questions with numeric rating scale answer formats. Some panel members suggested using open-ended, interview-style questions to gently draw out emotional concerns. We thus eliminated several questions related to different emotions and incorporated the following open-ended question: 'How does living with the wound make you feel?' There were similar reservations about the sensitive nature of self/body image. Three questions on self-image/body-image/self-esteem were deemed repetitious. Therefore, we condensed these questions into the following open-ended question: 'Does the wound affect the way you see yourself?'

Following round 2, most MWAT-R items remained unchanged due to high panel member agreement scores and few comments. With respect to three patient-reported items related to wound exudate, panelists indicated that the items were ambiguous as to whether they pertained to drainage from the wound or leakage from the dressing. These items were revised to provide clarification. The clinical assessment items related to wound size were revised to mirror the changes made to the MWAT-C. The items

related to wound complications continued to score poorly, and after much discussion by the study team, they were deleted from the tool.

### Delphi process: malignant wound classification system

As both the MWAT-C and MWAT-R include the same malignant wound classification system, the agreement scores and comments from the two panels on this section were combined. The percent of panelists in agreement with the adequacy of the malignant wound classification system remained unchanged from round 1 to round 2, at 75%. Minor revisions were made following each round of review to address panelists' comments.

### Discussion

Palliative care is a complex area of practice owing to the many relevant clinical dimensions that are often present within the care setting: physical, psychological, social and others. Tools that support standardized approaches to comprehensive patient assessment have strengthened the quality of palliative care delivery and also promoted research aimed at identifying novel treatments in a wide range of clinically important areas. Malignant wounds are

**Table 4** Agreement scores for MWAT-R items: round 1 vs. round 2

Malignant wound-related clinical domain	Relevance		Clarity		Adequacy of response format		Adequacy of response options		Row average	
	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2	Round 1	Round 2
<b>Patient-reported items</b>										
Wound pain (6 items)	100	98	93	98	90	95	91	95	93	97
Wound odour (3 items)	96	100	90	100	92	100	94	100	93	100
Wound exudate (3 items)	98	90	90	87	83	90	93	77	91	86
Wound bleeding (4 items)	98	98	81	98	85	96	100	92	91	96
Wound-related swelling (4 items)	86	82	88	90	79	87	68	85	80	86
Physical function (2 items)	97	100	97	100	91	96	88	96	93	98
Appetite (2 items)	94	92	93	92	87	92	N/A	100	91	94
Peri-wound skin (4 items)	92	92	84	100	90	100	87	100	88	98
Emotional status (7 items)	97	100	85	100	86	100	N/A	N/A	89	100
Self-esteem (3 items)	98	100	81	100	87	100	N/A	N/A	89	100
Ability to cope (1 item)	100	100	75	85	81	100	N/A	N/A	85	95
Social interactions (5 items)	98	95	81	90	76	87	N/A	N/A	85	91
Overall concern (1 item)	100	100	94	92	100	92	N/A	N/A	98	95
<b>Clinical assessment items</b>										
Wound location (1 item)	100	100	100	100	100	100	100	N/A	100	100
Wound size (3 items)	89	86	78	75	72	68	N/A	66	80	74
Wound shape (1 item)	73	82	60	80	73	82	N/A	N/A	69	81
Wound bed (1 item)	94	100	81	100	75	100	67	92	79	98
Wound odour (2 items)	97	96	81	95	75	96	56	96	77	96
Wound exudate (2 items)	100	100	84	100	93	96	88	100	91	99
Wound bleeding (2 items)	97	100	91	92	91	83	93	91	93	91
Wound-related swelling (1 item)	ND	92	ND	92	ND	92	ND	92	ND	92
Complications (2 items)	100	83	93	55	97	55	90	55	95	62
Physical function (3 items)	98	96	83	92	90	92	91	92	91	93
Peri-wound skin (6 items)	87	92	83	96	78	83	73	75	80	86
Column average	95	94	86	93	85	91	84	88	86	93

N/A, not applicable; ND, not done.

prevalent and can be a source of great suffering. To foster improved clinical care and to support high-quality research in the management of malignant wounds, we have developed and validated clinical and research malignant wound assessment tools.

### Strengths of the current study

Published reports indicate that palliative care tools are most effective when they are simple, of low burden for patients to complete and address multiple dimensions encompassing the broad range of the needs of cancer

patients and their families. The MWAT-C is designed to reflect these principles.<sup>23</sup>

Much research is needed to design and test novel interventions to improve care for patients with malignant wounds, and a detailed and valid assessment tool is an essential component of any such research program.

The Delphi process has been identified as an effective means to validate assessment tools in palliative care through input of experts in a wide range of domains.<sup>24-26</sup> The use of a web-based process promotes international input, supports a rapid turn-around time, is inexpensive, and facilitates a broader uptake of a tool in a

**Table 5** Examples of revisions to MWAT-R items following round 1 review

Clinical domain	Original question	Agreement score	Reviewer comments <sup>a</sup>	Revised question
<b>Patient-reported items</b>				
Wound-related swelling	'Do you notice swelling (edema) because of the wound?'	Clarity = 81%	Patients may not know whether any observed swelling is 'because of' the wound ( <i>n</i> = 5).	'Do you notice swelling in the area of the wound?'
Peri-wound skin	'Has the normal skin around the wound changed?'	Clarity = 81%	Remove 'normal' ( <i>n</i> = 3).	'Has the skin around the wound changed?'
<b>Clinical assessment items</b>				
Wound growth	'What is the rate of wound growth?' <i>Response format: open ended.</i>	Clarity = 67% Response format = 67%	This parameter would be difficult to assess through clinical examination only, especially during the initial assessment ( <i>n</i> = 6) Provide descriptors ( <i>n</i> = 5).	'Rate of wound change in past month:' Response options: <input type="checkbox"/> slow <input type="checkbox"/> fast
Wound odour	'What is the cause of the odour?' <i>Response options:</i> <input type="checkbox"/> sloughing necrotic tissue <input type="checkbox"/> foul exudate <input type="checkbox"/> infection <input type="checkbox"/> fever <input type="checkbox"/> erythema	Clarity = 75% Response options = 56%	Remove 'fever' and 'erythema' ( <i>n</i> = 6). Add an 'other' category ( <i>n</i> = 2).	'What is the cause of the odor?' (check <input type="checkbox"/> all that apply) <i>Response options:</i> <input type="checkbox"/> sloughing necrotic tissue <input type="checkbox"/> foul exudate <input type="checkbox"/> infection <input type="checkbox"/> other (specify): _____

<sup>a</sup>The number in parentheses (*n*=) refers to the number of reviewers expressing each comment.

range of practice settings and cultures of care. We incorporated these principles in the design of the validation process for the two MWAT tools.

### Weaknesses of the current study

Validation of palliative care tools is an iterative process, over time. Initial validation through a Delphi process is not the end of the validation process. Qualitative studies to promote patient input<sup>24</sup> and continued improvement over time through feedback from users are still needed for the MWAT tools.

Some minor operational issues were encountered. A significant decrease in participation from the first round to the second round occurred. However, the percentages of participation are within range of reported Delphi processes for other tools. The two tools require further input from both patients and their care givers, adding to its complexity. Also, the tool has not been translated into other languages and therefore needs further work to be widely used in non-English-speaking countries.

### Conclusions

Validity testing of the MWAT-C and MWAT-R tools through the Delphi process has resulted in tools that can

support clinical and research activities in malignant wounds designed to improve care for patients. Next steps will include dissemination of the tools for routine use after further validation and reliability studies involving patients in various practice settings and a range of research settings.

### Author Disclosure Statement

No competing financial interests exist.

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### References

- 1 Lookingbill, DP, Spangler, N, Helm, KF. Cutaneous metastases in patients with metastatic carcinoma: a retrospective study of 4020 patients. *J Am Acad Dermatol* 1993; **29**: 228–236.
- 2 Maida, V, Corb, M, Dolzykhov, M, Ennis, M, Irani, S, Trozzolo, L. Wounds in advance illness: a prevalence and

- incidence study base on a prospective case series. *Int Wound J* 2008; **5**: 305–314.
- 3 Seaman, S. Management of malignant fungating wounds in advanced cancer. *Semin Oncol Nurs* 2006; **22**: 185–193.
  - 4 Haisfield-Wolfe, ME, Baxendale-Cox, LM. Staging of malignant cutaneous wounds: a pilot study. *Oncol Nurs Forum* 1999; **26**: 1055–1064.
  - 5 Naylor, WA. A guide to wound management in palliative care. *Int J Palliat Nurs* 2005; **11**: 572–579.
  - 6 Schulz, VN. Malignant wounds and pressure ulcers. In: MacDonald, N, Oneschuk, D, Hagen, N, Doyle, D, (eds), *Palliative medicine: a case-based manual*, 2nd ed. New York: Oxford University Press; 2005. p. 333–348.
  - 7 Naylor, W. Part 2: symptom self-assessment in the management of fungating wounds. <http://www.worldwidewounds.com/2002/july/Naylor-Part2/Wound-Assessment-Tool.html> [accessed 2.07.08].
  - 8 Lazelle-Ali, C. Psychological and physical care of malodorous fungating wounds. *Br J Nurs* 2007; **16**: S16–S24.
  - 9 Bolton, L, Van, RL. Wound dressings: meeting clinical and biological needs. *Dermatol Nurs* 1991; **3**: 146–161.
  - 10 National Pressure Ulcer Advisory Panel. Pressure ulcer definition and stages. [http://www.npuap.org/documents/PU\\_Definition\\_Stages.pdf](http://www.npuap.org/documents/PU_Definition_Stages.pdf) [accessed 2.07.08].
  - 11 Lavery, LA, Armstrong, DG, Harkless, LB. Classification of diabetic foot wounds. *Ostomy Wound Manage* 1997; **43**: 44–43.
  - 12 Beebe, HG, Bergan, JJ, Bergqvist, D. Classification and grading of chronic venous disease in the lower limbs. A consensus statement of the North American Society of Phlebology. *Dermatol Surg* 1995; **21**: 642–646.
  - 13 van Rijswijk, L. Wound assessment and documentation. In: Krasner, DL, Rodeheaver, GY, Sibbald, GR, (eds), *Chronic wound care: a clinical sourcebook for healthcare professionals*, 3rd ed. Wayne (PA): HMP Communications; 2001. p. 101–115.
  - 14 Weir, D. Pressure ulcers: assessment, classification, and management. In: Krasner, DL, Rodeheaver, GY, Sibbald, GR, (eds), *Chronic wound care: a clinical sourcebook for healthcare professionals*, 3rd ed. Wayne (PA): HMP Communications; 2001. p. 619–927.
  - 15 Grocott, P, Brown, N, Cowley, S. Quality of life: assessing the impact and benefits of care to patients with fungating wounds. *Wounds* 2005; **17**: 8–15.
  - 16 Grocott, P. Developing a tool for researching fungating wounds. <http://www.worldwidewounds.com/2001/july/Grocott/Fungating-Wounds.html> [accessed 2.07.08].
  - 17 Foltz, AT. Nursing care of ulcerating metastatic lesions. *Oncol Nurs Forum* 1980; **7**: 8–13.
  - 18 Schulz, VMN. The development of a malignant wound assessment tool. Unpublished thesis, Edmonton, Alberta, Canada: University of Alberta; 2001. <http://www.collectionscanada.ca/obj/s4/f2/dsk3/ftp04/MQ60406.pdf> [accessed 2.07.08].
  - 19 Schulz, V, Triska, OH, Tonkin, K. Malignant wounds: caregiver-determined clinical problems. *J Pain Symptom Manage* 2002; **24**: 572–577.
  - 20 Dalkey, NC. The Delphi method: an experimental study of group opinion. Santa Monica (CA): Rand Corp.; 1969.
  - 21 Boberg, AL, Morris-Khoo, SA. The Delphi method: a review of methodology and an application in the evaluation of a higher education program. *Can J Program Eval* 1992; **7**: 27–39.
  - 22 McKenna, HP. The Delphi technique: a worthwhile research approach for nursing? *J Adv Nurs* 1994; **19**: 1221–1225.
  - 23 Chochinov, HM, Hack, T, McClement, S, Kristjanson, L, Harlos, M. Dignity in the terminally ill: a developing empirical model. *Soc Sci Med* 2002; **54**: 433–443.
  - 24 Hagen, NA, Stiles, C, Nekolaichuk, C, Biondo, P, Carlson, LE, Fisher, K, *et al*. The Alberta Breakthrough Pain Assessment Tool for cancer patients: a validation study using a Delphi process and patient think-aloud interviews. *J Pain Symptom Manage* 2008; **35**: 136–152.
  - 25 Biondo, PD, Nekolaichuk, CL, Stiles, C, Fainsinger, R, Hagen, NA. Applying the Delphi process to palliative care tool development: lessons learned. *Support Care Cancer* 2007; **16**: 935–942.
  - 26 Nekolaichuk, CL, Fainsinger, RL, Lawlor, PG. A validation study of a pain classification system for advanced cancer patients using content experts: the Edmonton Classification System for Cancer Pain. *Palliat Med* 2005; **19**: 466–476.