MEASURING ONCOLOGY NURSING-SENSITIVE PATIENT OUTCOMES:
EVIDENCE-BASED SUMMARY

1. **Outcome:** Nausea and vomiting

2. **Category:** Symptom experience

3. **Definitions:**

"**Nausea** is an unpleasant feeling in the back of the throat and stomach that may or may not result in vomiting" (NCCN, 2004, pp. 5-6). Some terms that people use to describe nausea are "sick to my stomach," "queasy," or "butterflies."

"**Vomiting** is often confused with nausea, but it is in fact a separate symptom. Vomiting is a forceful contraction of the abdominal (stomach) muscles to cause stomach contents to come up through the mouth" (NCCN, 2004, p.7). It is frequently referred to as "throwing up."

Retching is a "rhythmic and spasm-like contraction of the diaphragm and abdominal muscles. Retching is not the same as nausea and vomiting." (American Cancer Society [ACS] and National Comprehensive Cancer Network, [NCCN], 2001, pp. 5-6).

Acute-onset nausea and vomiting "usually occur a few minutes to several hours after the chemotherapy is given and go away within the first 24 hours. The vomiting will be at its worst usually after 5 or 6 hours" (ACS and NCCN, 2004, p. 7).

Delayed-onset vomiting occurs > 24 hours after chemotherapy. With some chemotherapy regimes it may last 6 to 7 days (ACS and NCCN, 2004).

Anticipatory nausea and vomiting are learned from previous experiences or associations (ACS and NCCN, 2001).

Breakthrough vomiting occurs despite prophylactic treatment and requires additional therapy (ACS and NCCN, 2004).

Refractory vomiting is when the person has become "refractory" (no longer responding) to treatment to prevent nausea and vomiting and may occur after one, a few, or several chemotherapy treatments despite prophylactic treatment (ACS and NCCN, 2004).

American Cancer Society and National Comprehensive Cancer Network. (2004). Nausea and vomiting treatment guidelines for patients with cancer. Retrieved
July 23, 2004, from Nausea and Vomiting Treatment Guidelines for Patients with Cancer

4. Integrative Reviews and Meta-Analysis

del Giglio, A., Soares, H.P., Caparroz. C., & Castro PC. (2000). Granisetron is equivalent to ondansetron for prophylaxis of chemotherapy-induced
nausea and vomiting: Results of a meta-analysis of randomized controlled trials. *Cancer, 89,* 2301–2308. PubMed Abstract

Devine, E.C. & Westlake, S.K. (1995). The effects of psychoeducational care
provided to adults with cancer: Meta-analysis of 116 studies. *Oncology Nursing Forum, 22,* 1369–1381. PubMed Abstract

Ioannidis, J.P.A., Hesketh, P.J., & Lau, J. (2000). Contribution of dexamethasone
to control of chemotherapy-induced nausea and vomiting: A meta-analysis of randomized evidence. *Journal of Clinical Oncology, 18,* 3409–3422.
PubMed Abstract

Morrow, G.R. (1992). Methodology and assessment in clinical anti-emetic
research: A meta-analysis of outcome parameters. *British Journal of Cancer, 19*(Suppl.), S38–S41.
PubMed Abstract

Pan, C.X., Morrison, R.S., Ness, J., Fugh-Berman, A., & Leipzig. R,M. (2000). Complementary and alternative medicine in the management of pain,
dyspnea, and nausea and vomiting near the end of life: A systematic review. *Journal of Pain and Symptom Management, 20,* 374–387. PubMed Abstract

Sloan, J.A., Goldberg, R.M., Sargent, D.J., Vargas-Chanes, D., Nair, S. Cha, S.S., et al. (2002). Women experience greater toxicity with fluorouracil-based chemotherapy for colorectal cancer. *Journal of Clinical Oncology, 20,* 1491–1498. PubMed Abstract

Smith, M.C., Holcombe, J.K., & Stullenbarger, E. (1994). A meta-analysis of

intervention effectiveness for symptom management in oncology nursing research. *Oncology Nursing Forum, 21,* 1201–1210. PubMed Abstract

Tramer, M. R., Carroll, D., Campbell, F.A,, Reynolds, D.J, Moore, R.A., & McQuay, H.J. (2003). Cannabinoids for control of chemotherapy induced nausea and vomiting: Quantitative systematic review. *BMJ, 323*(7303), 16–21. PubMed Abstract

5. Guidelines and Standards:

The National Comprehensive Cancer Center (NCCN) and American Cancer Society (ACS) developed treatment guidelines for preventive treatment, breakthrough treatment, subsequent cycles, delayed nausea and vomiting, and anticipatory nausea and vomiting (www.nccn.org)

NCCN and ACS. (2004). Nausea and vomiting treatment guidelines for patients with cancer. Retrieved July 23, 2004, from Nausea and Vomiting Treatment Guidelines for Patients with Cancer

The World Health Organization (WHO) identified a grading scale for acute and subacute toxic effects of nausea and vomiting. WHO. (1979). WHO handbook for reporting results of cancer treatment. Geneva: Author. Retrieved July 23, 2004, from WHO Handbook for Reporting Results of Cancer Treatment

American Society of Health System Pharmacists. (1999). ASHP therapeutic guidelines on the pharmacologic management of nausea and vomiting in adult and pediatric patients receiving chemotherapy or radiation therapy or undergoing surgery. *American Journal of Health System Pharmacy*, *56,* 729-764; (www.guideline.gov).

American Society of Clinical Oncology's (ASCO's) Recommendations for the Use of Antiemetics: Evidence-Based, Clinical Practice Guidelines
Recommendations for the Use of Antiemetics: Evidence-Based, Clinical Practice Guidelines

Gralla, R.J., Osoba. D., Kris, M.G., Kirkbride, P., Hesketh, P.J., Chinnery, L.W., et al. (1999). Recommendations for the use of antiemetics: Evidence-based, clinical practice guidelines. American Society of Clinical Oncology. *Journal of Clinical Oncology, 17*, 2971–2994.

6. Tables of tools to measure oncology nursing-sensitive outcome: Nausea and Vomiting

Table A: Description of Tools

Name of Tool	Author/Year	Domains of Factors	# of Items	Scaling	Scoring	Language
Functional Living Index Emesis (FLIE)	Lindley et al; 1992	Effect of nausea and vomiting (NV) on physical activity, social and emotional function, and eating	18 9-nausea 9-vomiting	1—7, 7-point scale	A global score for NV is obtained by summing the items.	English French Japanese
Morrow Assessment of Nausea and Emesis (MANE)	Morrow, 1984	Anticipatory and Post-treatment nausea and vomiting •Frequency during and after treatment •Duration •Severity •Time when worse	16	Severity— 6-point scale Occurrence – yes or no Duration – number of hours	Occurrence, severity, and duration of pre- and post-treatment nausea and vomiting is assessed individually.	English Chinese (www.qolid.org/public/MANE.html) Portugese (14th international conference)
Index of Nausea, Vomiting, and Retching (INVR)	Rhodes & McDaniel, 1999	Nausea, vomiting, retching (NVR), and the components (frequency/amount, duration, severity, distress) of each symptom	8-total 5-occurrence 3-distress	5-point Likert Scale	A global score for NVR. Subscale scores for occurrence (five items) and distress (three items), and for individual symptoms	English Japanese Chinese Korean

Table B: Psychometric Properties of Tools

Name of Tool	Populations	Reliability	Validity	Sensitivity	Clinical Utility
Functional Living Index Emesis (FLIE)	1- Patients with breast cancer (Bonneterre et al., 1996) 2- 133 patients with cancer receiving cyclophosphamide-based chemotherapy (Crucitt et al. 1996) 3- 115 outpatients receiving either granisetron or ondansetron (Farley et al. 1997) 4- 338 patients (primarily with lung cancer) receiving ondansetron with other antiemetics (Lebeau, 1997) 5- 355 chemotherapy-naïve patients (Martin, 2003) 6- Japanese patients with cancer (Satou, 2002) 7- 66 radiaotherapy patients (Sykes, 1997)	Cronbach's alpha 0.9 Pearson item-scale correlations 0.40 to 0.82 pretreatment and 0.81 to 0.96 post-treatment	Factor Analysis (values not reported) Pearson correlation with nausea and vomiting –0.65 and 0.68 Correlation with FLIC nausea factor 0.83	Differentiated between antiemetic groups (two items) Lower FLIE scores in patients receiving highly emetogenic chemotherapy (three items) Anticipate FLIE Japanese version will be useful in assessing change in quality of life due to nausea and vomiting (six items)	Ease of use Provides information about the effect of nausea and vomiting on functional status. Correlates with quality of life measures.

Name of Tool	Populations	Reliability	Validity	Sensitivity	Clinical Utility
Morrow Assessment of Nausea and Emesis (MANE)	1- 133 patients with cancer receiving cyclophosphamide-based chemotherapy (Crucitt et al. 1996) 2- 63 female patients with cancer (breast, GU, lung and lymphoma) receiving their first course of chemotherapy (Hickock et al., 2001) 3- 72 adults aged 66–85, with solid tumors or hematological malignancies, undergoing antineoplastic therapy (Mantovani et al., 1996) 4- 133 adults, with breast, lung, colorectal, and lymphoma (Martin et al, 2003) 5- 71 chemotherapy-naïve Chinese women with breast cancer (Molassiotis et al., 2001) 6- 1,413 outpatients in four community-based practices, data collected between 1987and 1995 (Roscoe et al., 2000) 7- 10 male and 10 female Portuguese patients with cancer (Alves-Guerreiro et al., 2003)	Test-retest reliability: 0.72 to 0.96 (Morrow, 1984)	Convergent validity 0.26 to 0.33; Divergent validity: –0.04 to 0.08	Expectations of developing nausea positively correlated with anticipatory nausea ($r = 0.41$, $p = 0.001$) (two items). 76% developed nausea within five days; 73% had delayed nausea during cycle 1 (two items). 81.7% experienced acute nausea and 88.7% experienced delayed nausea; occurrence of nausea/vomiting at initial treatment strongly predictive of nausea/vomiting at later treatments (six items). Portuguese version reliability 0.83. Non-significant correlations between anticipatory and post-chemotherapy nausea and vomiting (seven items)	Primarily used with antiemetic studies. Long (> 24 hour) time frame
Index of Nausea, Vomiting & Retching (INVR)	1- 60 Japanese inpatients with cancer receiving chemotherapy (Arakawa, 1997). 2- 17 women (59% Caucasian) with breast cancer who experienced nausea with prior chemotherapy. (Dibble et. al., 2000) 3- Adults > 65 (N = 102) and <65 (N = 25) receiving outpatient chemotherapy (Dodd et al., 1996). 4- 117 adult chemotherapy and 60 pregnant Chinese patients (Fu et al., 2002). 5- 20 children receiving chemotherapy and their parents (Lo & Haymann, 1999). 6- 159 adult patients: obstetrical (40), oncological (60), and medical/surgical (59) (Rhodes & McDaniel, 1999).	INVR: Spearman Correlation Total: 0.87 Individual items: 0.71 to 0.95 Equivalency: 79%–98% ($p = 0.05$) INV-2: Split-half reliability 0.90 Cronbach's Alpha 0.98	INVR - Spearman's correlation, $r = 0.87$ INV-2 – Spearman's correlation, $r = 0.87$	Decrease in nausea and vomiting in both groups (one item) Differences existed between the two groups in regard to nausea experience ($p < 0.01$) and nausea intensity (two items) Significantly greater nausea, vomiting and retching in younger patients (three items) Parent and child ratings for total scores were highly correlated (five items).	Ease of use. Provides information about nausea, vomiting, and retching total experience, occurrence, distress, and individual symptoms. 12-hour time frame Used with varied populations.

7. References related to instruments to measure outcome (as noted in 4 and 5 above)

Functional Living Index Emesis

Bonneterre, J., Schraub, S., Lecomte, S., & Mercier, M. (1996). Quality of life as an outcome in breast cancer. *Pharmacoeconomics, 9*(Suppl. 2), 23–29.

Crucitt, M.A., Hyman, W., Grote, T., Tester, W., Madajewicz, S., Yee, S., et al. (1996). Efficacy and tolerability of oral ondansetron versus prochlorperazine in the prevention of emesis associated with cyclophosphamide-based chemotherapy and maintenance of healthrelated quality of life. *Clinical Therapeutics, 18,* 778–788.

Farley, P.A., Dempsey, C.L., Shillington, A.A., Kulis-Robitaille, C., Colgan, K., & Bernstein, G. (1997). Patients' self-reported functional status after granisetron or ondansetron therapy to prevent chemotherapy-induced nausea and vomiting at six cancer centers. *American Journal of Health-System Pharmacy, 54,* 2478–2482.

Lebeau,B., Depierre, A., Giovannini, M., Riviere, A., Kaluzinski, L., Votan B., et al. (1997). The efficacy of a combination of ondansetron, methylprednisolone and metopimazine in patients previously uncontrolled with a dual antiemetic treatment in cisplatin-based chemotherapy. The French Ondansetron Study Group. *Annals of Oncology, 8,* 887–892.

Martin, A.R., Carides, A.D., Pearson, J.D., Horgan, K., Elmer, M., Schmidt, C. et al. (2003). Functional relevance of antiemetic control. Experience using the FLIE questionnaire in a randomised study of the NK-1 antagonist aprepitant. *European Journal of Cancer, 39,*1395–1401.

Satou, A., Yamazaki, T., Nukariya, N., Nakamachi, M., Shimada, K., Matsukawa, M., & Kurihara, M. (2002). Development of a Japanese version of the FLIE. *Gan to Kagaku Ryoho [Japanese Journal of Cancer and Chemotherapy], 29,* 281–291.

Sykes, A.J., Kiltie, A.E., & Stewart, A.L. (1997). Ondansetron versus a chlorpromazine and dexamethasone combination for the prevention of nausea and vomiting: a prospective, randomised study to assess efficacy, cost effectiveness and quality of life following single-fraction radiotherapy. *Supportive Care in Cancer, 5,* 500–503.

Lindley, C.M., Hirsch, J.D., O'Neill, C.V., Transau, M.C., Gilbert, C.S., & Osterhaus, J.T.(1992). Quality of life consequences of chemotherapy-induced emesis. *Quality of Life Research, 1,* 331–340.

Morrow Assessment of Nausea

Alves-Guerreiro, J., Lowe-Strong, A.S., Walsh, D.M., Lopes, B.C., Costa, R., Rosado, R., et al. (2003). Development of a Portuguese version of the Morrow Assessment of Nausea and Emesis (MANE) Questionnaire: Moving physical therapy forward [Abstract]. *14th International World Confederation for Physical Therapy Congress.*

Crucitt, M.A., Hyman, W., Grote, T., Tester, W., Madajewicz, S., Yee, S., et al.

(1996). Efficacy and tolerability of oral ondansetron versus prochlorperazine in the prevention of emesis associated with cyclophosphamide-based chemotherapy and maintenance of health-related quality of life. *Clinical Therapeutics, 18,* 508–518.

Hickok, J.T., Roscoe, J.A., Morrow, G.R., Stern, R.M., Yang, B., Flynn, P.J., et al. (1999). Use of 5-HT3 receptor antagonists to prevent nausea and emesis caused by chemotherapy for patients with breast carcinoma in community practice settings. *Cancer, 86,* 64–71.

Mantovani, G., Astara, G., Lampis, B., Bianchi, A., Curreli, L., Orru ,W., et al. (1996).
Evaluation by multidimensional instruments of health-related quality of life of elderly cancer patients undergoing three different "psychosocial" treatment approaches. A randomized clinical trial. *Supportive Care in Cancer, 4,* 129–140.

Martin, C.G., Rubenstein, E.B., Elting, L.S., Kim, Y.J., & Osoba, D. (2003). Measuring chemotherapy-induced nausea and emesis. *Cancer, 98,* 645–655.

Molassiotis, A., Yung, H.P., Yam, B.M., Chan, F.Y., & Mok, T.S. (2002). The effectiveness of progressive muscle relaxation training in managing chemotherapy-induced nausea and vomiting in Chinese breast cancer patients: A randomised controlled trial. *Supportive Care in Cancer, 10,* 237–246.

Morrow, G. (1984). Assessment of nausea and vomiting: Past problems, current issues and suggestions for future research. *Cancer*, *53,* 2267-2278.

Roscoe, J.A., Morrow, G.R., Hickok, J.T., & Stern, R.M. (2000). Nausea and vomiting remain a significant clinical problem: trends over time in controlling chemotherapy-induced nausea and vomiting in 1413 patients treated in community clinical practices. *Journal of Pain and Symptom Management, 20*, 113–121.

Index of Nausea and Vomiting

Arakawa, S. (1997). Relaxation to reduce nausea, vomiting, and anxiety induced by chemotherapy in Japanese patients. *Cancer Nursing, 20,* 342–349.

Dibble, S.L., Chapman, J., Mack, K.A., & Shih, A. (2000). Acupressure for nausea: Results of a pilot study. *Oncology Nursing Forum, 27,* 41–47. Oncology Nursing Forum

Dodd, M.J., Onishi, K., Dibble, S.L., & Larson, P.J. (1996). Differences in nausea, vomiting, and retching between younger and older outpatients receiving cancer chemotherapy. *Cancer Nursing, 19,* 155–161.

Fu, M.R., Rhodes, V., & Xu, B. (2002). The Chinese translation of the Index of Nausea,Vomiting, and Retching. *Cancer Nursing, 25,*134–140.

Lo, L.H. & Hayman, L.L. (1999). Parents associated with children in measuring acute and delayed nausea and vomiting. *Nursing and Health Sciences, 1,* 155–161.

Rhodes, V.A. & McDaniel R.W. (1999). The Index of Nausea, Vomiting, and Retching: a new format of the Index of Nausea and Vomiting. *Oncology Nursing Forum, 26*, 889–894. Oncology Nursing Forum

8. Summary of key evidence and gaps in current evidence-base

del Giglio, A., Soares, H.P., Caparroz. C., & Castro PC. (2000). Granisetron is equivalent to ondansetron for prophylaxis of chemotherapy-induced nausea and vomiting: Results of a meta-analysis of randomized controlled trials. *Cancer, 89,* 2301–2308.

Evidence:

- Both ondansetron and granisetron have similar antiemetic efficacy for prophylaxis of chemotherapy-induced nausea and vomiting.

Gaps:

- Only the first chemotherapy cycle was considered in studies with a crossover design.
- Data on the efficacy of granisetron and ondansetron for acute nausea and vomiting are lacking over multiple chemotherapy cycles.
- The study of delayed nausea and vomiting was limited.
- The instruments for measuring nausea and vomiting were not mentioned.
- Further randomized control trials are needed to confirm the effectiveness of granisetron and ondansetron for delayed nausea and vomiting.

Devine, E.C. & Westlake, S.K. (1995). The effects of psychoeducational care provided to adults with cancer: Meta-analysis of 116 studies. *Oncology Nursing Forum, 22,* 1369– 1381.

Primary Authors: A nurse was the primary author in 34% of the studies.

Evidence:

- The effect of psychoeducational care (interventions) on nausea was greater where subjects had documented nausea, vomiting, and anxiety.
- The effects of psychoeducational care on nausea were larger in later chemotherapy cycles (e.g., fourth or fifth)
- Psychoeducational care has a beneficial effect on nausea and vomiting.
- The magnitude of this effect on nausea varies somewhat across chemotherapy cycles.

Gaps:

- Nausea and vomiting were measured in a variety of ways.
- Many instruments did not have reported reliability and validity.
- Researcher-created questionnaires were common.
- The terms nausea, vomiting, and retching are often used synonymously.
- Few potential moderators of treatment effectiveness were reported consistently.
- Most studies used systematic desensitization and muscle relaxation with guided imagery or meditation
- The concomitant relationship of other symptoms to nausea, vomiting, and retching is unknown.

Ioannidis, J.P.A., Hesketh, P.J., & Lau, J. (2000). Contribution of dexamethasone to control of chemotherapy-induced nausea and vomiting: A meta-analysis of randomized evidence. *Journal of Clinical Oncology, 18,* 3409–3422.

Evidence:

- Dexamethasone is effective in protecting from emesis both in the acute and delayed phases (emesis avoided in one of six patients treated).

Gaps:

- No studies were found that gave corticosteroids only for the delayed-phase coverage.
- Confusion of terminology in the manuscript is noted regarding *delayed emesis defined as vomiting or retching* occurring more than 24 hours after chemotherapy and up to 5 to 8 days.
- "*More emphasis on vomiting because it is more objective to determine, but data on nausea control were also collected, as well as data on control of both nausea and vomiting, wherever available."*
- *Dexamethasone is effective in protecting from emesis both in the acute and delayed phases, with emesis* avoided in one patient out of six treated.
- Instruments for measuring nausea, vomiting, and retching are not mentioned.
- Not all patients were chemotherapy naïve.
- Information about alcohol consumption was not standardized across trials to allow meaningful interpretation.
- Some patients were pre-selected on the basis of poor or partial anti-emetic response during the first cycle.
- Subjects in most studies were not stratified to type of neoplastic disease.

Morrow, G.R. (1992). Methodology and assessment in clinical anti-emetic research: A meta analysis of outcome parameters. *British Journal of Cancer, 19*(Suppl.), S38–41.

Evidence:

- The major clinical advances in the control of chemotherapy-induced nausea and vomiting have largely occurred through the study of antiemetic agents.
- The development of psychometrically sound research tools and rigorous methodology has improved the management of chemotherapy-induced nausea and vomiting.
- The effect of an antiemetic regimen was found to be dependent on how the outcome was quantified and independent of the type of outcome measured.
- The application of findings from well designed studies can contribute to the overall success of antiemeti

Gaps:

- Retching is not mentioned as a separate symptom.

Pan, C.X., Morrison, R.S., Ness, J., Fugh-Berman, A., & Leipzig. R.M. (2000). Complementary and alternative medicine in the management of pain, dyspnea, and nausea and vomiting near the end of life: A systematic review. *Journal of Pain and Symptom Management, 20*, 374–387.

Primary Authors: physicians

Evidence:

- There are data to support the use of some complementary and alternative medicine modalities in terminally ill patients.

Gaps:

- Large-scale trials in terminally ill patients with nausea and vomiting that is not associated with chemotherapy are needed.
- Controlled trials for complementary and alternative medicine modalities in the treatment of nausea, vomiting, retching in hospice patients are unavailable.

Sloan, J.A., Goldberg, R.M., Sargent, D.J., Vargas-Chanes, D., Nair, S. Cha, S.S., Novotny, P.J., Poon, M.A., O'Connell, M.J., & Loprinzi, C.L. (2002). Women experience greater toxicity with fluorouracil-based chemotherapy for colorectal cancer. *Journal of-Clinical Oncology, 20,* 1491–1498.

Evidence:

- Provides data for the existence of a sex-dependent toxicity difference.
- Confirmed an earlier finding that women receiving 5-fluouracil chemotherapy in a five-day bolus schedule experience toxicity across cycles more frequently and with more severity than men.

Gap:

- Physician rated end points for each toxicity type and all side effects including nausea, a subjective symptom.

Smith, M.C., Holcombe, J.K., & Stullenbarger, E. (1994). A meta-analysis of Intervention effectiveness for symptom management in oncology nursing research. *Oncology Nursing Forum, 21,* 1201–1210.

Primary Author: One author may be a registered nurse.

Evidence:

- Improvement was observed in nausea and vomiting relief for seven of the nine interventions reported.
- Individual study effects for relief of nausea and vomiting revealed low to moderate effects on improvement range

- The relaxation group of studies showed a low average effect (d = 0.17), with no significance and no improvement.

Gaps:

- Demographic data were not consistently reported.
- Limited attention was given to healthcare (treatment) costs.
- Lack of valid and reliable instruments for studying patients with cancer was noted.
- Insufficient numbers of studies on a symptom or with a particular intervention restrict appropriateness for practice recommendations.
- Wide variation of developmental age and interventions for nausea and vomiting were noted in the nine studies reviewed.
- A theory base in oncology nursing research was lacking.

Tramer, M. R, Carroll, D., Campbell, F.A,, Reynolds, D.J, Moore, R.A., & McQuay, H.J. (2003). Cannabinoids for control of chemotherapy induced nausea and vomiting:Quantitative systematic review. *BMJ, 323(7303),* 16–21.

Evidence:

- In selected patients, cannabinoids may be useful as mood-enhancing adjuvants for controlling chemotherapy-related sickness.
- Across all trials, cannabinoids were more effective than active comparators and placebo.
- At the end of 18 crossover trials, between 38% and 90% of the patients *preferred* cannabinoids.
- Side effects happened significantly more often with cannabinoids.

Gaps:

- There were no comparisons of cannabinoids with a serotonin (5-HT3 receptor antagonist).

9. Recommendations

Practice

The instrument to measure nausea, vomiting, and retching must be chosen carefully to ensure accurate and comprehensive assessment. Important criteria are to

- Use self-report instruments rather than observational assessment when ever feasible.
- Use tools with known psychometric properties (i.e., reliability and validity).
- Look for clarity, precision, cultural sensitivity, and understandable wording in the self-report tool.
- Choose an instrument with an easy-to-read format.

- Ascertain and describe the specific symptoms and the components to be measured Determine a time frame for recall of the symptom experienced.
- Consider the purpose for which the instrument is intended, such as characterizing a patient population (e.g., demographics, type of cancer, type of treatment) or type of symptom (e.g., chemotherapy-related [acute or delayed], anticipatory, chronic).
- Consider the ease of scoring and type of score (e.g., total instrument, subscale scores for each individual symptom or component).

Careful assessment of concomitant symptoms with reliable and valid instruments is essential.

Nurses and other clinicians should continue to explore where and how to incorporate psycho-educational interventions in their practice.

Systematic desensitization and muscle relaxation with guided imagery or meditation has a beneficial effect on nausea.

Education

- Psycho-educational treatments may be effective in managing nausea, vomiting, and retching.
- Systematic desensitization and muscle relaxation with guided imagery or meditation has had beneficial effects on nausea.
- Randomized trials show cannabinoids may be slightly better than conventional antiemetics for treating chemotherapy induced emesis
- Patients prefer cannabinoids, but they are also toxic.
- Global assessments without information about the individual symptoms have hindered progress in understanding nausea, vomiting, and retching and the development of effective interventions.
- Educational materials with an appropriately tested reading level for patient home use are recommended for better learning.
- Pharmacologic and nonpharmacologic interventions do not exert equivalent effects on concomitant symptoms

Research

- Large multisite studies of well-designed randomized studies are needed.
- Randomized intervention studies of complementary and alternative medicine modalities as a treatment for nausea, vomiting and retching in different populations (ethnicity, age, stage of illness) are needed.
- Patterns of nausea, vomiting, and retching with varied emetogenic chemotherapy protocols and specific treatment strategies are needed.
- Patterns of the occurrence and distress of the individual symptoms of nausea, vomiting, and retching in chemotherapy-naïve patients and those previously treated should be determined.

- Studies should look at the effectiveness of psychoeducational care for nausea, vomiting, and retching across multiple cycles of chemotherapy in patients who are chemotherapy-naïve and those with a previous course(s).
- Complete reporting of population descriptions should include those who decline study participation.
- Studies should look at the relationship of concomitant symptoms to the individual symptoms of nausea, vomiting, and retching.
- The effectiveness of nursing interventions with varied chemotherapy regimes in diverse patient populations (e.g., adult, pediatric, chemotherapy naïve, secondary chemotherapy, hospice, palliative care) needs to be determined.
- Accurate measurement of the concomitant nausea, vomiting, and retching is crucial to determine symptom patterns and make comparisons. (Pharmacologic and non-pharmacologic interventions do not exert equivalent effects on these unique symptoms).
- Continued testing and reporting of reliability and validity of instruments used to measure nausea, vomiting, and retching for patients with cancer should be performed.
- To build the science of oncology nursing, research endeavors need to be described more fully in reports.
- Studies should be conceptualized based on nursing theory.
- Further randomized control trials are needed to confirm the effectiveness of newer antiemetic regimens for delayed nausea and vomiting.

10. Links:

http://www.nccn.org/patients/patient_gls.asp

11. Current research:

ONS Foundation-funded research
http://www.ons.org/research/funding/Projects/index.shtml

"Symptom Clusters in Children/Teens on Cisplatin or Ifosfamide," Marilyn Hockenberry, PhD, RN, Baylor College of Medicine

Cancer Research-UK http://www.ncri.org.uk/home/index.cfm

Tamoxifen Chemoprevention Trial

National Institutes of Health – funded research http://www.nih.gov/

Development of Poly-L-Glutamic Acid Paclitaxel Conjugate (National Cancer Institute [NCI])Effects of Acupuncture on Pain, Nausea, Quality of Life (NCI

Impact of Hypnosis for Breast Surgery Side Effects (NCI)
Presurgery Hypnosis--Benefits Analysis in Breast Cancer (NCI)
Treating Chemotherapy Induced Nausea with Acupressure (NCI)

Symptom Clusters in Cancer Patients Undergoing Treatment (National Institute of Nursing Research)
Psychoimmune Outcomes: Intervention in Breast Cancer
TNF Blockade in Pancreatic Cancer Patients (NCI)
Ginger Control of Chemotherapy Induced Nausea and Emesis (National Center for Complementary and Alternative Medicine)

Department of Defense: Congressionally Directed Medical Research Programs http://cdmrp.army.mil/default.htm

A Controlled Study Using Acupuncture as an Adjuvant to Treat Chemotherapy-Induced Nausea and Vomiting Acustimulation for the Control of Chemotherapy-Induced Nausea in Breast Cancer http://www.cancer.org/docroot/RES/RES_0.asp

American Cancer Society and National Comprehensive Cancer Network. (2001). Preventive treatment, breakthrough treatment, subsequent cycles, delayed nausea and vomiting, and anticipatory nausea and vomiting. In *Nausea and vomiting treatment guidelines for patients with cancer* (pp. 5–6). Retrieved July 23, 2004, from Nausea and Vomiting Treatment Guidelines for Patients with Cancer

Alves-Guerreiro, J., Lowe-Strong, A.S., Walsh, D.M., Lopes, B.C., Costa, R., Rosado, R., et al. (2003). Development of a Portuguese Version of the Morrow Assessment of Nausea and Emesis (MANE) Questionnaire; Moving physical therapy forward [Abstract]. *14th International World Confederation for Physical Therapy Congress.*

Arakawa, S. (1995). Effectiveness of progressive muscle relaxation in reducing nausea,vomiting, and anxiety induced by chemotherapy in Japanese patients. *Dissertation Abstracts International: Section B: the Sciences & Engineering, 56(5).*

Arakawa, S. (1997). Relaxation to reduce nausea, vomiting, and anxiety induced by chemotherapy in Japanese patients. *Cancer Nursing. 20,* 342–349

ASHP therapeutic guidelines on the pharmacologic management of nausea and vomiting in adult and pediatric patients receiving chemotherapy or radiation therapy or undergoing surgery. (1999). *American Journal of Health System Pharmacists, 56,* 729–764

Bonneterre, J., Schraub, S., Lecomte, S., & Mercier, M. (1996). Quality of life as an outcome in breast cancer. *Pharmacoeconomics. 9 Suppl 2*, 23–29.

Crucitt, M.A., Hyman, W., Grote, T., Tester, W., Madajewicz, S., Yee, S., et al. (1996). Efficacy and tolerability of oral ondansetron versus prochlorperazine in the prevention of emesis associated with cyclophosphamide-based chemotherapy and maintenance of healthrelated quality of life. *Clinical Therapeutics, 18,* 778–78

del Giglio, A., Soares, H.P., Caparroz. C., & Castro P.C. (2000). Granisetron is equivalent to ondansetron for prophylaxis of chemotherapy-induced nausea and vomiting: results of a meta-analysis of randomized controlled trials. *Cancer, 89*, 2301–2308.

Devine, E.C. & Westlake, S.K. (1995). The effects of psychoeducational care provided to adults with cancer: meta-analysis of 116 studies. *Oncology Nursing Forum, 22*, 1369–1381. Oncology Nursing Forum

Dibble, S.L., Chapman, J., Mack, K.A., Shih, A. (2000). Acupressure for nausea: Results of a pilot study. *Oncology Nursing Forum, 27,* 41–47. Oncology Nursing Forum

Dodd, M.J., Onishi, K., Dibble, S.L., & Larson, P.J. (1996). Differences in nausea, vomiting, and retching between younger and older outpatients receiving cancer chemotherapy. *Cancer Nursing, 19,* 155–161.

Farley, P.A., Dempsey, C.L., Shillington, A.A., Kulis-Robitaille, C., Colgan, K., & Bernstein, G. (1997). Patients' self-reported functional status after granisetron or ondansetron therapy to prevent chemotherapy-induced nausea and vomiting at six cancer centers. *American Journal of Health-System Pharmacy, 54,* 2478–2482.

Fazeny-Dorner, B., Veitl, M., Wenzel, C., Brodowicz, T., Zielinski, C., Muhm M. et al. (2002). Alterations in intestinal permeability following the intensified polydrug-chemotherapy IFADIC (ifosfamide, Adriamycin, dacarbazine). *Cancer Chemotherapy and Pharmacology, 49,* 294–298.

Fu, M.R., Rhodes, V., & Xu, B. (2002). The Chinese translation of the Index of Nausea,Vomiting, and Retching. *Cancer Nursing, 25,*134–140.

Gralla, R.J., Osoba. D., Kris, M.G., Kirkbride, P., Hesketh, P.J., Chinnery, L.W., et al. (1999). Recommendations for the use of antiemetics: Evidence-based, clinical practice guidelines. American Society of Clinical Oncology. *Journal of Clinical Oncology, 17,* 2971–2994.

Gilbert, C.J., Ohly, K.V., Rosner, G., & Peters, W.P. (1995). Randomized, double-blind comparison of a prochlorperazine-based versus a metoclopramide-based antiemetic regimen in patients undergoing autologous bone marrow transplantation. *Cancer, 76,* 2330–2337

Hickok, J.T., Roscoe, J.A., Morrow, G.R., Stern, R.M., Yang, B., Flynn, P.J., et al. (1999). Use of 5-HT3 receptor antagonists to prevent nausea and emesis caused by chemotherapy for patients with breast carcinoma in community practice settings. *Cancer, 86,* 64–71.

Ioannidis, J.P.A., Hesketh, P.J., & Lau, J. (2000). Contribution of dexamethasone to control of chemotherapy-induced nausea and vomiting: A meta-analysis of randomized evidence. *Journal of Clinical Oncology, 18,* 3409–3422.

Lebeau,B., Depierre, A., Giovannini, M., Riviere, A., Kaluzinski, L., Votan B., et al. (1997). The efficacy of a combination of ondansetron, methylprednisolone and metopimazine in patients previously uncontrolled with a dual antiemetic treatment in cisplatin-based chemotherapy. The French Ondansetron Study Group. *Annals of Oncology, 8,* 887–892

Lindley, C.M., Hirsch, J.D., O'Neill, C.V., Transau, M.C., Gilbert, C.S., & Osterhaus, J.T. (1992). Quality of life consequences of chemotherapy-induced emesis. *Quality ofLife Research, 1,* 331–340.

Lo, L.H. & Hayman, L.L. (1999). Parents associated with children in measuring acute and delayed nausea and vomiting. *Nursing and Health Sciences, 1,* 155–161.

Mantovani, G., Astara, G., Lampis, B., Bianchi, A., Curreli, L., Orru ,W., et al.

(1996). Evaluation by multidimensional instruments of health-related quality of life of elderlycancer patients undergoing three different "psychosocial" treatment approaches. A randomized clinical trial. *Supportive Care in Cancer, 4,* 129–140.

Martin, A.R., Carides, A.D., Pearson, J.D., Horgan, K., Elmer, M., Schmidt, C. et al. (2003). Functional relevance of antiemetic control. Experience using the FLIE questionnaire in a randomised study of the NK-1 antagonist aprepitant. *European Journal of Cancer, 39,* 1395-1401.

Martin, C.G., Rubenstein, E.B., Elting, L.S., Kim, Y.J., & Osoba, D. (2003). Measuring chemotherapy-induced nausea and emesis. *Cancer, 98,* 645–655.

Ming, J.L., Kuo, B.I., Lin J.G., & Lin, L.C. (2002). The efficacy of acupressure to prevent nausea and vomiting in post-operative patients. *Journal of Advanced Nursing, 39,* 343– 351.

Molassiotis, A. (2000). A pilot study of the use of progressive muscle relaxation training in the management of post-chemotherapy nausea and vomiting. *European Journal of Cancer Care, 9,* 230–234.

Molassiotis, A., Yung, H.P., Yam, B.M., Chan, F.Y., & Mok, T.S. (2002). The effectiveness of progressive muscle relaxation training in managing chemotherapy-induced nausea and vomiting in Chinese breast cancer patients: A randomised controlled trial. *Supportive Care in Cancer, 10,* 237–246.

Morrow, G. (1984). Assessment of nausea and vomiting: Past problems, current issues and suggestions for future research. *Cance*r, *53,* 2267–2278.

Morrow, G.R. (1992). Methodology and assessment in clinical anti-emetic research: A meta analysis of outcome parameters. *British Journal of Cancer,19*(Suppl.), S38–41

Morrow, G.R., Roscoe, J.A., Hickok, J.T., Stern, R.M., Pierce, H.I., King, D.B., et al. (1998). Initial control of chemotherapy-induced nausea and vomiting in patient quality of life.*Oncology, 12*(3, Suppl. 4), 32–37.

Mullin, S.M., Fletcher, D.M. & Tyler, L.S. (1998). Mail-in questionnaire for monitoring nausea and vomiting in oncology outpatients. *American Journal of Health-System Pharmacy, 55,* 1903–1906.

Pan, C.X., Morrison, R.S., Ness, J., Fugh-Berman, A., & Leipzig. R,M. (2000). Complementary and alternative medicine in the management of pain, dyspnea, and nausea and vomiting near the end of life: A systematic review. *Journal of Pain and Symptom Management, 20*, 374–387

Rhodes, V.A., & McDaniel R.W. (1999). The Index of Nausea, Vomiting, and Retching: A new format of the Index of Nausea and Vomiting. *Oncology Nursing Forum, 26*, 889–894. Oncology Nursing Forum

Roscoe, J.A., Morrow, G.R., Hickok, J.T., & Stern, R.M. (2000). Nausea and vomiting remain a significant clinical problem: trends over time in controlling chemotherapy-induced nausea and vomiting in 1413 patients treated in community clinical practices. *Journal of Pain & Symptom Management, 20*, 113–121

Satou, A., Yamazaki, T., Nukariya, N., Nakamachi, M., Shimada, K., Matsukawa,

M., et al. (2002). Development of a Japanese version of the FLIE. *Gan to Kagaku Ryoho [Japanese Journal of Cancer and Chemotherapy], 29,* 281–291.

Sloan, J.A., Goldberg, R.M., Sargent, D.J., Vargas-Chanes, D., Nair, S. Cha, S.S., et al. (2002). Women experience greater toxicity with fluorouracil-based chemotherapy for colorectal cancer. *Journal of Clinical Oncology, 20*, 1491–1498.

Smith, M.C., Holcombe, J.K., & Stullenbarger, E. (1994). A meta-analysis of intervention effectiveness for symptom management in oncology nursing research. *Oncology Nursing Forum, 21,* 1201–1210.

Sykes, A.J., Kiltie, A.E., & Stewart, A.L. (1997). Ondansetron versus a chlorpromazine and dexamethasone combination for the prevention of nausea and vomiting: a prospective, randomised study to assess efficacy, cost effectiveness and quality of life following single-fraction radiotherapy. *Supportive Care in Cancer, 5,* 500–503.

Tramer, M. R, Carroll, D., Campbell, F.A,, Reynolds, D.J, Moore, R.A., & McQuay, H.J. (2003). Cannabinoids for control of chemotherapy induced nausea and vomiting:Quantitative systematic review. *BMJ, 323(7303),* 16–21.

World Health Organization. (1979). WHO Handbook for Reporting Results of Cancer Treatment. Geneva: Author. Retrieved July 23, 2004, from WHO Handbook for Reporting Results of Cancer Treatment

Authors:
Verna Rhodes, RN, EDS, FAAN, Emeritus Faculty, University of Missouri – Columbia
Roxanne McDaniel, PhD, RN, Associate Professor, University of Missouri – Columbia

Last updated: June 22, 2004