**Appendix 2: Definitions and/or examples of components regarding outcomes of interest**

| Nursing subsystems | Dimensions/*Indicators* | Definition and/or examples of components | References |
|---|---|---|---|
| Nursing resources (structure) | Nursing staff supply | The effectiveness of diverse activities that govern nursing staff intake (planning, recruitment, selection) and deployment; must ensure an adequate balance with the demand for nursing services. | [1]Dubois et al. 2013 |
| | *Quantity* | Total number of workers in defined occupational groups; nurse-patient ratios. | [2]Dubois et al. 2009 |
| | *Quality* | Professional backgrounds, skills, job title, qualifications, expertise and experience in order to achieve optimal patient care. | [1,2]Dubois et al. 2013; 2009 |
| | *Skill mix* | Role enhancement (e.g expanding scope of practice, developing new competencies and assuming new responsibilities), role enlargement (e.g diversification and expansion of nurses' skill repertoires), role substitution and role delegation. | [2]Dubois et al. 2009 |
| | Time and efficiency | Time devoted to perform general and specific tasks related to direct or indirect care. | [3]Rouleau et al. 2017 |
| | *Time management* | Time devoted to perform a task (in general). For instance, using e-learning intervention could be "time consuming" or "time saving". | [3]Rouleau et al. 2017 |
| | *Time spent with patient care* | Time allocated to patient care discussed with the use of e-learning interventions. | [3]Rouleau et al. 2017 |
| | *Documentation time* | Time allocated to document nurses' activities. | [3]Rouleau et al. 2017 |
| | Management of working conditions | Depends on resources and employment characteristics. | [1]Dubois et al. 2013 |

| | | | |
|---|---|---|---|
| **Nursing resources (structure)** | *Physical, material and technological resources* | Different types of material resources (e.g. physical facilities, technologies, financial resources, organizational configurations) that are required to support nurses in the performance of their roles. | [1]Dubois et al. 2013 |
| | *Employment conditions* | Employment characteristics such as workload, scheduling, overtime, employment status, labour relationships. | [1]Dubois et al. 2013 |
| | Nursing staff maintenance | Depends on various factors such as quality of life at work and satisfaction or dissatisfaction with working conditions. | [1]Dubois et al. 2013 |
| | *Health and quality of life at work* | E.g. Work-related accidents, illnesses, injuries | [1]Dubois et al. 2013 |
| | *Satisfaction with working conditions* | E.g. Job satisfaction or dissatisfaction related to working conditions | [1]Dubois et al. 2013 |
| | *Absenteeism* | Can be caused by many factors | [1]Dubois et al.2013 |
| | *Retention/Turnover* | Capacity to recruit new nurses and retain those already employed. | [1]Dubois et al. 2013 |
| **Nursing services** | Nurse practice environment | E-learning can be seen as way to support nursing work and create a professional practice environment for nurses. | [4]Lake, 2002 |
| | *Information quality and access* | The use of e-learning interventions could improve or alter information quality and access regarding for example patient issues, clinical data, medication information/profile, and other information (policies, guidelines, drug resources, patient files). | [3]Rouleau et al. 2017 |
| | *Nurse autonomy in their role* | Shared governance, nursing responsibility, authority, accountability. | [5]Currie et al. 2005 |
| | *Intra and interprofessional collaboration* | Communication and collaboration among nursing staff; collegiality between nurses and other professional groups. | [1]Dubois et al. 2013 |
| | *Decentralization of decision-making* | Decentralization of decision-making with responsibilities for nursing services devoted to the nursing unit. | [1]Dubois et al. 2013 |
| | *Support from co-workers and managers* | E.g. A supervisory staff that is supportive (or not) of the nurses. | [4]Lake, 2002 |

| Nursing services | Nursing processes | Are linked to what nurses do (nursing interventions). | [1]Dubois et al. 2013 |
|---|---|---|---|
| | *Quality of documentation* | The extent to which e-learning interventions could improve or alter the quality of documentation regarding, for example, patient care and nursing activities. | [3]Rouleau et al. 2017 |
| | *Learning* | Acquisition of declarative (knows) and procedural knowledge (knows how), described in a general way. | [5]Moore et al. 2009 |
| | *Nurses competencies and skills* | E.g. Decision support/decision-making, observation skills, clinical judgment, critical thinking. | [3]Rouleau et al. 2017 |
| | *Nurse-patient relationship* | E.g. The use of e-learning interventions to create pathways for communication, new types of bonds between nurses and patients, establish trust, create a sense of connection. | [3]Rouleau et al. 2017 |
| | *Assessment, care planning and evaluation* | Assess patient's physical and mental condition, taking biopsychosocial aspects into consideration. Evaluate and update, in writing, information about the patient's condition and the care provided in the therapeutic nursing plan, nurses' notes, etc. Plan interventions using healthcare assessment tools (pain scale, wound assessment tool). Involve the patient and the patient's family in care planning. The nurse participates in designing, applying, and updating patient care programs. | [6]D'Amour et al. 2012 |
| | *Teaching of patients and families* | Assess the specific information and education needs of each patient and his/her family. Verify that the patient and family have understood the teaching provided. Use teaching strategies that are adapted to each patient and family in accordance with the patient's level of autonomy. Check the quality of patient education provided on the unit. | [6]D'Amour et al. 2012 |

| Nursing services | Communication and care coordination | Communicate to members of the team all information that could affect the coordination of care. Coordinate the work of the nursing team to meet the needs of the patient and family as well as the interventions of the interprofessional team. Convey all relevant information to healthcare professionals in other institutions in order to ensure continuity of care. Participate in interprofessional team meetings or activities. Ensure continuity of care. | [6]D'Amour et al. 2012 |
|---|---|---|---|
| | Knowledge updating and utilization | Keep knowledge up-to-date. Improve nursing practice based on new knowledge derived from best practices and research in nursing science or in health. Knowledge exchange with the nursing team knowledge emerging from research. Different types of knowledge exist, such as declarative knowledge (know), procedural knowledge (know how to do something) and competence (know how). | [5,6] D'Amour et al. 2012; Moore et al., 2009 |
| | Integration and supervision of staff | Participate in identifying in-service education needs in workplace. Being involved in the orientation and training of nursing students or of newly hired staff. Act as a mentor or educator for newly hired staff. Develop and conduct training activities for the care team, in accordance with nurses skills. | [6]D'Amour et al. 2012 |
| | Quality of care and patient safety | Report clinical situations in which deficiencies in quality and safety of care are identified, and propose courses of action to improve them. Improve the quality and safety of care by updating practices. Be a part in the evaluation of quality and safety of care and in developing nursing practice. | [6]D'Amour et al. 2012 |
| | Problem and symptoms management | Nursing interventions intended to have effect on symptoms management, such as pain and fatigue (e.g. evaluation, use of non pharmacological approaches, patients' education) | [7]Dubois et al. 2015 |

| Nursing services | *Promotion/prevention* | Nursing interventions intended to promote health-related behaviours in order to prevent disease or the apparition of complications. For example: interventions for preventing falls among elderly people, for preventing pressure ulcers, vaccination, smoking cessation interventions, etc. | [7]Dubois et al. 2015 |
|---|---|---|---|
| | *Hospital community integration and discharge planning* | Care organization, resources planning depending of patients' health status when they leave the hospitals | [7]Dubois et al. 2015 |
| | Professional satisfaction | Resulting from nursing processes and from specific aspects that influence their perception of their ability to accomplish their daily assignments and enjoy the work itself. | [1]Dubois et al. 2013 |
| | *Nurses perspectives of the quality of care provided* | According the nurses' perspectives, the way they evaluate the quality of care they provided. For example: improvement (or not) of quality of care and patient safety, nurses' perceptions that technologies reduce medication errors and improve medication administration processes, the provision of comprehensive and adaptive care related to the patients' needs. | [3]Rouleau et al. 2017 |
| | *Nurses satisfaction or dissatisfaction using e-learning* | Overall acceptance of e-learning interventions, and their satisfaction with them described in general way (e.g. their degree of satisfaction or dissatisfaction). Other elements to consider: system navigability (e.g. complexity, ease of use, user-friendliness, and flexibility), nurses' attitudes, concerns about patients' privacy, and perceived benefits or inconveniences. | [3]Rouleau et al. 2017 |
| | Nursing sensitive outcomes | The desirable end result of the interactions between nursing resources (structure) and nursing services (processes) is to improve patients' conditions. | [1]Dubois et al. 2013 |
| | *Patient experience* | Patients' perspectives about care received, for example, in terms on care continuity, engagement in care, respect of their preferences, quality of communication with healthcare professionals, etc. | [1]Dubois et al. 2013 |

| Change in patients' outcomes | *Patient comfort and quality of life related to care* | Nursing system performance reflects the extent to which patients' needs in relation to personal hygiene, nutrition, management of symptoms (pain, dyspnea), and continence are met, unnecessary interventions (physical or chemical restraints, nasogastric tubes, prolonged use of urinary catheters) are avoided, and patients' respect is ensured throughout the episode of care. | [1]Dubois et al. 2013 |
|---|---|---|---|
| | *Patient empowerment* | Ability to achieve appropriate self-care. Adoption of health-promoting behaviours. | [1]Dubois et al. 2013 |
| | *Patient functional status* | This category of indicators covers essential end results and benefits that reflect what happens in people's lives as a result of nursing care interventions. In the models examined, these indicators encompass diverse aspects of patients' general functional status and conditions, including physical, psychosocial and cognitive status, as well as recovery of initial health status and nutritional status. | [1]Dubois et al. 2013 |
| | *Risk outcomes and safety* | Safety-related outcomes considered potentially sensitive to nursing: patient falls, injuries, medication errors, pulmonary infections, pressure ulcers, urinary tract infections, intravenous infections, abuses, and failure to rescue. | [1]Dubois et al. 2013 |
| | *Patient satisfaction or dissatisfaction of using e-learning* | Patient results indicated their degree of satisfaction/dissatisfaction with e-learning interventions, their acceptance, acceptability, and receptiveness of their usage of interventions. Usefulness (or uselessness), perceived and actual benefits/advantages, such as accessibility and flexibility, ease of use, usability, complexity, level of confidence in using e-learning interventions, the confidentiality. | [3]Rouleau et al. 2017 |

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