

# Scientific Background

European Nursing care Pathways – version 2.10



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Last edited: May 2017

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# Scientific Background

## Introduction

The nursing classification ENP (European Nursing care Pathways) has been developed to illustrate the nursing care process within the context of the nursing documentation in standardized language. As an instrument ENP supports the major targets of a standardized nursing language: Improving the communication among healthcare professionals, supporting process flows such (e.g. the transfer from one institution to another), and the performance transparency of nursing. The structure of ENP supports nurses in their decision-making within the framework of the nursing care process by presenting up-to-date nursing knowledge. Furthermore, data will be generated through the use of standardized formulations for nursing documentation which can be used for hypothesis formation/examination within the context of nursing research and control procedures of nursing management as well as risk management. ENP is available as print version as well as database or implemented in software products. Due to the availability of the taxonomy in different languages (English, German, French, and Italian) within one database ENP can also be used in a multilingual team.

ENP can be divided into three parts:

- A) ENP... as a nursing classification system for a total of seven concept groups (see chapter 1.1)
- B) ENP... as pre-combination of the elements of this nursing classification system (see chapter 1.2)
- C) ENP ... as the practice guidelines developed from the pre-combination and the nursing classification (see chapter 1.3) which offer nurses professional support to illustrate the nursing care process by using standardized formulations, such as nursing diagnoses, characteristics, etiologies, resources, nursing outcomes, and interventions.

Please cite as:

Wietek, Kraus, Mosebach & Berger (2017). Scientific Background ENP (European Nursing care Pathways), version 2.10. RECOM GmbH Available online at: <https://www.recom.eu/klassifikationen/enp-entwicklung/einleitung.html>

## 1. Structure of ENP

The three different parts of ENP are described and its structures illustrated in charts in the following chapters. **Part A** in the figure shows the **nursing classification system** ENP. **Part B** illustrates how **pre-combinations** of elements of the nursing classification system lead, for example, to nursing diagnoses and intervention concepts. **Part C** in the figure illustrates how a nursing diagnosis develops to a nursing practice guideline through linkages with characteristics, etiologies, resources, nursing outcomes, and nursing intervention concepts. Currently, there are 557 (version 2.10) nursing practice guidelines defined. In the following, the categorization of ENP as a nursing classification and practice guideline will be explained. In the overall figure (Figure 1), the connection between the three parts is shown.

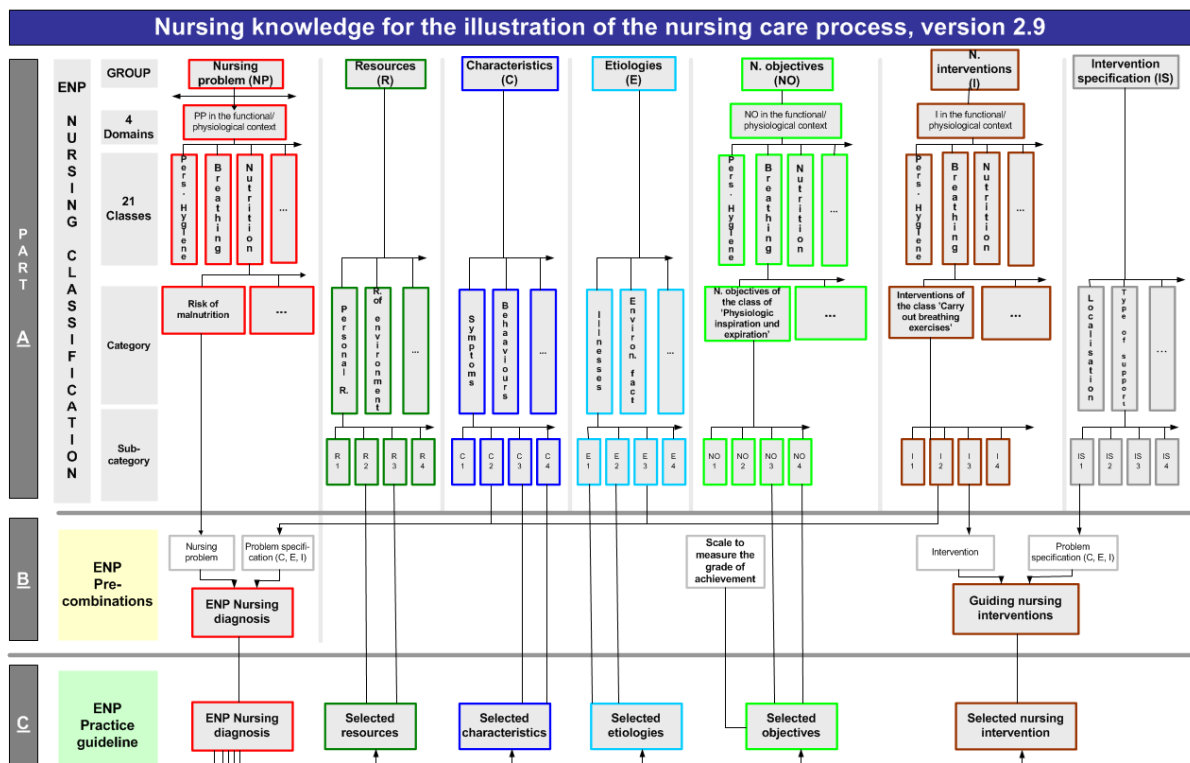


Figure 1: Hierarchical structure of the ENP classification system with parts A, B, and C

### 1.1 The nursing classification ENP – part A

For better understanding, the principles of organization theory are briefly explained. Generally, a classification is an organization system which is based on the principle of class formation. A classification is a list of terms which normally shows a hierarchical structure. The term superordinate to all other terms in the classification is usually called top term and represents the all-comprehensive term. In ENP, the top term is called **"Nursing knowledge/terms for the illustration of the nursing care process"**. The hierarchical term relations illustrate the relations between the super- and subordinate terms. Within the individual classes the classification system is hierarchically organized, as well. It spans the elements: Group → domain → class → category → subcategory.

The **group of nursing problems**, for example, subdivides into **four domains** (nursing problems in the functional/physiological context, nursing problems in the emotional/psychosocial context, nursing problems with multi-dimensional risks, and environment-related nursing problems). The domain nursing problems in the functional/physiological context, for example, is divided into **11 classes**, which are attributed to **68 categories**. In the following table, the domains, classes, and categories of ENP nursing problems are listed. The subdivision of domains and classes is identical in the three groups of nursing diagnoses, outcomes, and interventions.

Domain	Class	Category
<p><b>Functional/physiological context</b></p> <p><i>The domain includes all ENP practice guidelines which lead to restrictions and/or loss of self-care skills to meet the basic physical needs and/or health risks because of changes of body functions and structures.</i></p>	<p><b>Personal hygiene/clothing</b> Ability to wash body as well as choose and dress appropriate clothes.</p>	Self-care deficit washing <sup>1</sup>
		Self-care deficit oral hygiene
		Self-care deficit care of the nails, ears, eyes and the nose
		Self-care deficit hair care
		Self-care deficit dressing
	<p><b>Breathing</b> Includes the respiratory functions of ventilation (inspiration and expiration, function of respiratory muscles), gas exchange between air and blood as well as the self-cleansing functions of the respiratory tract.</p>	Ineffective self-cleansing function of the respiratory tract
		Insufficient respiration
		Risk of respiratory insufficiency
		Risk of suffocation
		Risk of aspiration
		Risk of atelectasis/pneumonia
		Risk of impaired respiration postoperatively
	<p><b>Nutrition</b> Includes the activities, abilities, requirements and functions of human beings to take food with the purpose of growth, preservation, regeneration of tissue, and energy production.</p>	Reduced food intake
		Impaired swallowing
		Malnutrition
		Risk of malnutrition
		Impaired eating habits
		Fluid volume deficit/electrolyte imbalance
		Risk of impaired fluid and electrolyte balance
		Risk of impaired breast feeding
		Impaired breast feeding
		Risk of nutritional complications

<sup>1</sup> Self-care deficit washing is defined as follows: Restricted or lacking ability to wash whole body or body parts at the washbasin or other washing facilities (ICF [d510] washing oneself, ICNP [10020935] washing). Each category is defined and is part of the attributed ENP nursing diagnosis.

<p><b>Elimination</b> Includes the activities, abilities, functions which relate to the elimination of urine (by filtration, collection, and excretion of urine) and defecation (elimination of waste and undigested foods from the bowels including the function of the abdominal press.</p>	Self care deficit micturition/defecation
	Impaired urinary elimination
	Urinary incontinence
	Impaired stool elimination
	Self care deficit stoma care
	Risk of stoma complications
	Impaired stoma care
	Risk of paralytic ileus
	Risk of anuria/renal failure
	Risk of infection of the organs of elimination
<p><b>Circulation</b> Includes activities, functions which ensure the blood supply of the body with adequate and necessary volume and pressure. This includes the pumping functions of the heart, the blood vessel functions for the transport of blood through the body as well as functions for the preservation of arterial blood pressure.</p>	Impaired cardiovascular function
	Risk of impaired cardiovascular function
	Risk of thrombosis
	Risk of lung embolism
	Risk of bleeding
	Risk of allergic reaction/anaphylactic shock
<p><b>Exercise/mobility</b> Includes all activities and abilities of movement to change body positions or transfer from one place to another, locomotion in various forms such as walking, running, etc. also belongs to this class.</p>	Impaired movement
	Impaired walking
	Impaired sequence of movement/movement pattern
	Risk of falling
	Risk of contracture
	Risk of spasticity
	Risk of paralysis
	Risk of impaired mobility
<p><b>Relaxing/Sleeping/Resting</b> Includes all activities and mental functions which are expressed in a periodical, reversible and selective physical and mental detachment</p>	Risk of sleep deficit
	Impaired sleep
	Impaired relaxation

	from the immediate environment, in which a body enters a state of rest and bodily functions are reduced.	
	<b>Tissue Integrity</b> Includes all activities, behaviors and functions, which influence or may influence the integrity of the body and/or the organs.	Risk of pressure points
		Risk of skin damage
		Risk of mucous membrane/skin damage
		Altered oral mucosa
		Risk of corneal damage
		Risk of impaired wound healing
		Impaired wound healing
		Risk of dislocation/luxation
		Risk for trauma
		Risk of swelling/edema formation
		Risk of tissue damage
		Risk of infection/germ spreading
Risk of ketoacidosis		
Metabolic disorder		
	<b>Reproduction</b> Includes all functions and activities which relate to fertility, pregnancy, birth, and lactation.	Risk of impairment of health for mother and child
		Risk of unwanted pregnancy
		Impaired sex life
	<b>Body temperature</b> Includes all functions and activities related to the regulation of body temperature.	Risk of hyper/hypothermia
		Pain

<p><b>Emotional/psychosocial context</b>  <i>The domain includes all ENP practice guidelines which impair the personal development, participation and/or emotional and social health due to limitations (e.g. physical, environment-related), behaviors or other circumstances.</i></p>	<p><b>Feelings</b>  Includes all neurophysiological and neuropsychological processes, which are caused as a precursor of perception through stimulus response. Feelings may relate to pain or emotions such as boredom, fatigue, etc.</p>	Fear
		Impaired feeling
		Impaired well-being
		Feeling of boredom
		Personal suffering
		Exhaustion
		Risk of exhaustion
		Shame
	<p><b>Perceptions</b>  Includes all processes and functions related to the specific mental functions of recognition and interpretation of sensory stimuli (auditive, visual, gustatory, olfactory, tactile).</p>	Restricted orientation
		Impaired body image
		Impaired self-concept/image
		Risk of disorder of consciousness
		Impaired perception
		Impaired consciousness
	<p><b>Interaction</b>  Includes any interrelated, mutual action of two or more persons, for which usually any kind of communication is used.</p>	Risk of adequate/ineffective communication
		Impaired communication
		Risk of impaired interaction
		Impaired interaction
		Impaired relationship
		Risk of unfulfilled needs
	<p><b>Action/behavior</b>  Includes all activities and physical reactions of a human being which can be observed and/or measured  All immediately observed actions are behaviors, which are externally observable expressions of a human being to his/her environment.</p>	Impaired adjustment
		Impaired behavior
		Impaired problem coping strategy
		Harmful behavior
		Risk of self-injury/endangering others
		Behavior endangers self/others



		Behavior is self-injurious
		Risk of ineffective therapy
		Risk of unachieved health-related goals
		Risk for suicide
		Risk of escape
	<b>Activity/daily routine/participation</b> Includes all actions/activities of a person's involvement in a life situation which focuses on carrying out tasks of a structured daily routine, such as organize leisure time, carry out household activities, etc. and/or relate to the social integration/participation and the associated perspectives.	Risk of self-care deficit
		Impaired self-care
		Impaired organization of daily life/life
		Impaired performance of activities
		Impaired recreational activities
		Self-care deficit housekeeping
		Dependent care
		Risk of dependent care
	<b>Personal development</b> Includes all activities, requirements and functions to get a realistic picture of the world and oneself to act and make decisions in one's own interest.	Impaired cognitive capacity
		Impaired ability to make decisions
		Impaired development
		Risk of impaired development
		Impaired future perspectives
		Disturbed habits
		Impaired quality of life
		Impaired dying phase
		Impaired self-esteem
	<b>Knowledge</b> Includes all abilities and activities to gain and use information and knowledge and to apply these for the promotion of health as well as maintenance and restoration.	Lack of information/abilities
		Impaired ability to process information
		Risk of social exclusion

	<p><b>Group</b> Includes activities, actions and ideas which relate to social norms such as religion, roles, beliefs, value systems and influence the own choices and decisions.</p>	<p>Risk of social isolation</p> <p>Risk of financial/social ruin</p> <p>Risk of occupational exclusion</p> <p>Norm conflict</p> <p>Role conflict</p> <p>Impaired religious practice/beliefs</p> <p>Self-care deficit</p>
<p><b>Multidimensional risks</b> <i>The domain includes all ENP practice guidelines which lead to risks due to therapy/procedures, limitations (e.g. physical, environment-related) and/or other circumstances which affect the functional/physiological as well as the emotional/psychosocial area and cannot be clearly assigned to a class.</i></p>	<p><b>Health risks non-specific</b> Includes all activities, treatments, therapies and (physical) changes which relate to a potential risk for own health.</p>	<p>Risk for sudden infant death syndrome</p> <p>Risk of complications: treatment/therapy</p> <p>Risk of complications: primary disease/injury</p> <p>Risk of complications: postoperative</p> <p>Risk of complications: pathologic changes</p> <p>Risk of complications: altered awareness</p> <p>Risk of complications: dehydration</p> <p>Risk of complications: heat regulation</p> <p>Health risks</p>
<p><b>Environment-related nursing problems</b> <i>The domain includes all ENP practice guidelines which do not relate to the care receiver, but to risks for his/her social environment.</i></p>	<p><b>Risk of damage to health for the environment</b> Includes all physical changes which are a potential threat of the person affected for his/her environment.</p>	<p>Risk of infection</p>
N = 4	N = 21	N = 137

Table 1: Group of nursing problems divided into domains, classes, and categories

In 2006 (version 2.3), the pre-combined terms/concepts of the ENP nursing diagnoses were separated into the elements nursing problem and specification and a **monohierarchic structure** was created through clustering. This reorganization enables data evaluation on different aggregation levels. The clustering of the nursing problems were realized in several steps by analysis of the inherent nursing concepts. The entire hierarchization processes were conceptually driven and follow previously set rules based on the fundamental definition work of the domains, classes, etc.

Between 2007-2008 the segmentation and cluster formation of ENP nursing outcomes and interventions was carried out. This, as well, refers to monohierarchic structures. The nursing outcomes and interventions are hierarchically structured on the level of domains and classes as well as thematically structured

according to the same structure as the nursing problems. On the level of categories there are abstract formulations of nursing outcomes and nursing intervention concepts. The structure of domains and classes in the three groups of nursing diagnoses, outcomes, and interventions has been harmonized. Example: category of nursing problems: "*self-care deficit personal hygiene*", attributed category of nursing outcomes is "*existing self-care ability personal hygiene*", on the level of nursing interventions the category is "*interventions of personal hygiene*". Characteristics and etiologies have their own hierarchical structure. The terms/concepts are structured **monohierarchically** in ENP. The hierarchization of ENP started in 2006 (version 2.3) with nursing problems. Since then ENP has been termed as nursing classification. An example from the current ENP version 2.10:

**Nursing diagnoses (n=557)**

Domain: **Functional/physiological context**  
 Class: Personal hygiene/clothing  
 Category: Self-care deficit washing  
**Diagnosis**  
 Category: Self-care deficit oral hygiene  
 Nursing diagnosis ...

**Nursing outcomes (n=1865)**

Domain: **Functional/physiological context**  
 Class: Personal hygiene/clothing  
 Category: Existing self-care ability personal hygiene  
 Nursing outcomes  
 Category: Existing self-care ability oral hygiene  
 Nursing outcomes

**Nursing interventions (n=2632)**

Domain: **Functional/physiological context**  
 Class: Personal hygiene/clothing  
 Category: Nursing interventions for personal hygiene  
 Nursing interventions  
 Category: Nursing interventions for oral hygiene  
 Nursing interventions

**Characteristics (n=4243)**

Domain: **Functional/physiological context**  
 Class: Personal hygiene/clothing  
 Category: Characteristics related to dental care  
 Characteristics

**Etiologies (n=3802)**

Domain: **Functional/physiological context**  
 Class: Personal hygiene/clothing  
 Category: Hygiene behavior  
 Etiologies

**Resources (n=653)**

Domain: **Functional/physiological context**  
 Category: Physical abilities  
 Resource

The hierarchies developed are relevant for further development of ENP and for data evaluation and are invisible to the end user as well as in the ENP book publications because the benefit of ENP for nursing practice can be seen in the horizontal structure (figure 1 part C).

The following table 2 shows the current number of items from each group of ENP. Each item exists only once in the system, but can be linked several times with the exception of the nursing diagnoses. Within the domains, classes and categories each element of a group has only one linkage to the next level. Each item has a definite ID number which doesn't change with a new version. In ENP, items are not deleted, but deactivated. This ensures that older nursing care plans with now invalid terms can still be displayed and read.

Terms/concepts of the group	Number 2.5	Number 2.6	Number 2.7	Number 2.9	Current 2.10
Nursing diagnoses	521	542	548	552	557
Characteristics	2,230	2,719	2,905	3,984	4,243
Etiologies	1,799	2,282	2,426	3,526	3,802
Resources	379	457	473	648	653
Nursing outcomes	1,435	1,683	1,724	1,852	1,865
Nursing interventions	2,494	2,511	2,558	2,615	2,632
Intervention specifications	3,652	4,285	4,461	4,797	5,011

Table 2: Number of items of the ENP groups in the version history

Domain	Class				Category				Pre-combined ENP nursing diagnoses			
	2.6	2.7	2.9	2.10	2.6	2.7	2.9	2.10	2.6	2.7	2.9	2.10
Nursing problems in the functional/physiological context	11	11	11	11	67	67	67	68	275	279	278	280
Nursing problems in the emotional/psychosocial context	8	8	8	8	58	59	59	59	210	212	221	224
Nursing problems with multi-dimensional risks	1	1	1	1	8	9	9	9	54	54	50	50
Environment-related nursing problems	1	1	1	1	1	1	1	1	3	3	3	3
<b>Total: 4</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>134</b>	<b>136</b>	<b>136</b>	<b>137</b>	<b>542</b>	<b>547</b>	<b>552</b>	<b>557</b>

Table 3: Number of elements from the group of ENP nursing problems, version 2.6 (May 2011) to version 2.7 (May 2012), version 2.9 (May 2014) and version 2.10 (May 2017)

## 1.2 Pre-combinations of terms from the ENP nursing classification – part B

In ENP, elements of the nursing classification are pre-combined, i.e. the combination of individual terms and elements is considered in their whole form as a descriptor. For example, the great majority (approx. 4/5) of all nursing diagnoses consist of a nursing problem (term from category level of the group nursing problems) and a specification (terms from the group of characteristics, etiologies, or nursing interventions). Besides the nursing diagnoses, the nursing interventions are pre-combined in ENP, as well. The following chapters illustrate the procedure and structure of the pre-combination by means of examples.

### 1.2.1 Pre-combined ENP nursing diagnoses

An ENP nursing diagnosis is created by the combination of a nursing problem from the monohierarchic structure of part A and a specification of the nursing problem by means of an etiology or characteristic.

#### Example 1 – group nursing problem:

Domain: Nursing problems in the functional/physiological context Class: personal hygiene/clothing

Category: Self-care deficit dressing

Nursing problem: **impaired dressing/undressing**

For example, the precombined ENP nursing diagnosis "The patient is restricted in dressing and undressing due to a disturbed planning of action/movement and performance" is composed of the nursing problem "impaired dressing/undressing" and the etiology "disturbed planning of action/movement". The exemplary nursing diagnosis is assigned to self-care deficit dressing.

Another example is "The patient is at risk of atelectasis/pneumonia due to reduced lung ventilation (dystelectasis)", as displayed in figure 2:

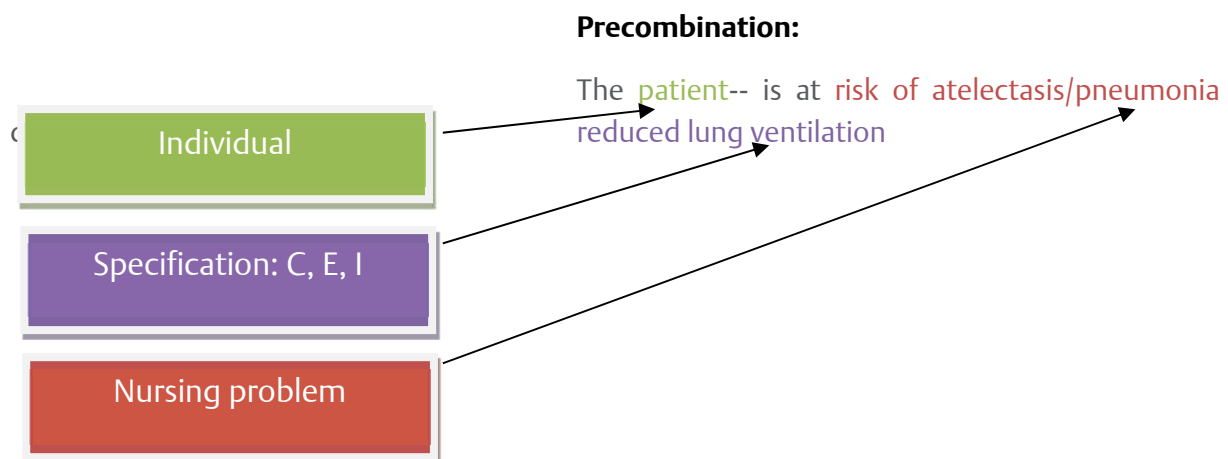


Figure 2: Precombination of an ENP nursing diagnosis

These examples show how the ENP nursing diagnosis is composed out of the terms of the classification by precombination.

Each updated ENP nursing diagnosis of version 2.9 and 2.10 also received a definition for an unambiguous application. This has been developed both for educational purposes as well as for nurses who do not know the nursing diagnostic concepts and to support and promote a common understanding. In general, the definitions are not required in daily use by trained nurses due to the granulation of the ENP nursing diagnoses, i.e. the level of detail, accuracy, and expressiveness, and the clear formulations which offer little room for interpretation. The example below shows the structure of an ENP nursing diagnosis definition.

00022 The resident-- is unable to organize **personal hygiene independently** due to being **disorientated**

**Definition:**

Restricted or lacking ability to wash whole body or body parts at the washbasin or other washing facilities due to impaired mental function of self-perception (which is required to be able to orient to time, place, situation and/or person) (ICF [d510] washing oneself, ICNP [10020935] washing, ICF b114 Orientation functions, ICNP Orientation [10013810] und Disorientation [10001235]).

It becomes clear that in the definition the two concepts "unable to organize personal hygiene independently" and "disoriented" are addressed. It is attempted to describe and/or to explain the key elements of an ENP nursing diagnosis by the precise definition of terms used. During the development of definitions reference is made to already existing classification systems and other key nursing-relevant sources such as concept analyses. The literature used for creating the diagnosis can be found in the literature references for each ENP practice guideline.

If there is already a specification in the nursing diagnosis in the form of an etiology or a characteristic, the offered etiologies or related factors as well as the characteristics refer to the two components of the nursing diagnosis. Example:

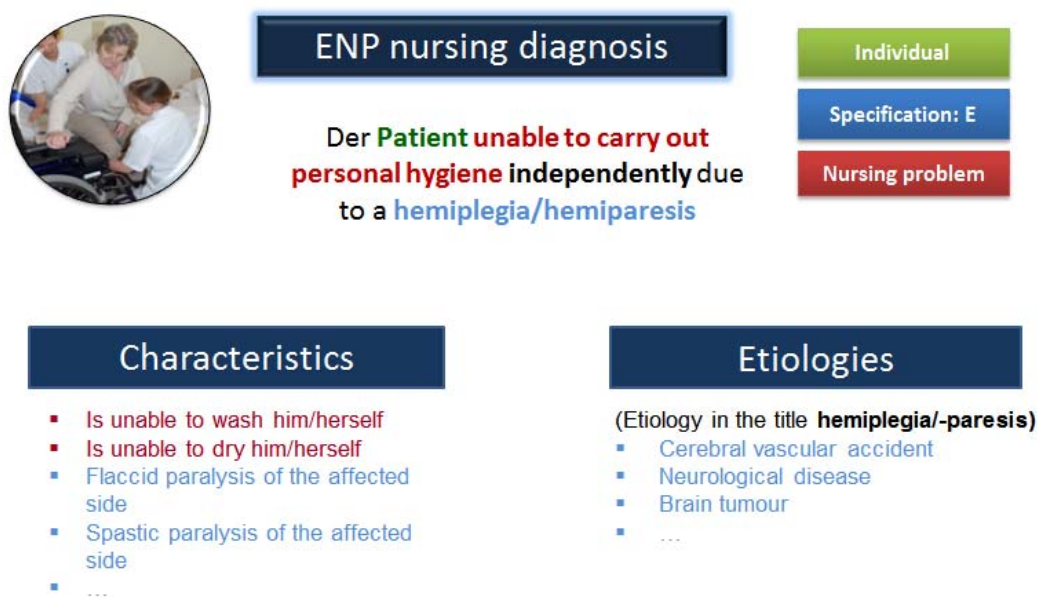


Figure 3: Reference points of the characteristics and etiologies of ENP

Nursing diagnoses for which it is helpful to state the impairment grade on the level of characteristics will be added with a Likert scale for impairment and dependency grades. Example:

The resident-- is **impaired in transfer skills**

Characteristics:

- Impaired transfer ability from bed to the (wheel-/arm-) chair
- Impaired transfer ability from (wheel-/arm-) chair to the bed
- Impaired transfer ability from wheelchair to the toilet
- ...

### **Impairment level of the transfer**

- Level 1: Independent transfer using aids
- Level 2: Low impairment of transfer
- Level 3: Significant impairment of transfer
- Level 4: Severe impairment of transfer
- Level 5: Loss of transfer ability

By adding scaled severity grades for ENP nursing diagnoses regarding self-care deficits, it will be possible in the future to export the newly developed system for the classification of nursing care dependency from the nursing process documentation (Wingenfeld, Büscher, & Gansweid, 2008).

### **1.2.2 Pre-combined ENP nursing interventions**

For the group of nursing interventions pre-combinations are created, as well. In contrast to the ENP nursing diagnoses the pre-combination consists here of different elements from the group of nursing interventions and the group of intervention specifications. The nursing interventions are attributed to intervention specifications. These can contain further information, for example, regarding frequency, grade of care of the person concerned during performance of the nursing intervention, number of required nurses, required aids or products, localization/location referring to the intervention, and time data, etc.

The levels of pre-combined nursing diagnoses and nursing interventions are created from the nursing classification system. These pre-combined nursing diagnoses and nursing intervention formulations are those which are used by nurses for the documentation of the nursing care process. The separation of ENP nursing classification elements from pre-combined elements is indicated by the horizontal gray line in figure 1, and the connections are illustrated by linking lines. In the following, it will be shown how the nursing intervention concepts are assigned to guiding intervention specifications:

An example from the group of nursing interventions:

**Domain:** Nursing diagnoses in the functional/physiological context

**Class:** Personal hygiene/clothing

**Category:** Carry out personal hygiene

**Subcategory:** Wash whole body individually

**Wash body parts individually**

Give individual support during shower

Give individual support during bath

Carry out basal stimulating body wash according to Bobath

...

The intervention formulation "Wash body parts individually" is not concrete enough for an instruction in the context of the nursing care process planning. Details on issues such as the location, where personal hygiene is carried out and which level of support is needed, remain unanswered. Therefore, the ENP nursing interventions are specified further. Thus, a specific instruction for the individual adequate and sufficient performance of nursing care is established. The nursing intervention "Wash body parts individually", for example, is attributed to the following intervention specifications:

- Body part to wash
  - Face/hands
  - Arms
  - Chest
  - Back
  - Legs

- Genital area
- Buttocks
- Indicate level of support:
  - Supervise
  - Help by supporting
  - Partially take over
  - Take over completely
  - Activate/guide
- Location of partial body wash
  - In bed
  - Sitting at edge of the bed
  - At the washbasin
- Indicate nursing product used
- Frequency/time

Basically, the following intervention specifications can be assigned to the nursing intervention formulations:

- Specifying aspects of the underlying intervention concept
- Type of support
- Number of nursing personnel
- Care products used
- Localization, where the body wash is to be carried out
- Interval information
- Time data
- Localization of body region
- Aids required
- Professions involved in the treatment process

### 1.3 Practice Guidelines in ENP – part C

In part C of the ENP structure (see figure 4), it will be explained how the practice guidelines from the different items of the groups are combined. Each practice guideline consists of elements from the group of nursing problems (extended to nursing diagnoses through the intermediate step of pre-combination), etiologies, characteristics, resources, outcomes, and interventions (extended to guiding interventions through the intermediate step of pre-combination).

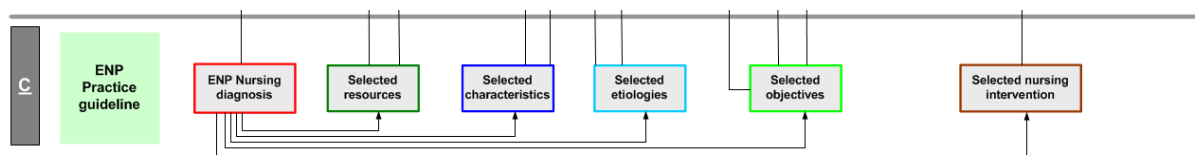


Figure 4: Horizontal structure of an ENP practice guideline

The etiologies and characteristics for a nursing diagnosis of an ENP practice guideline refer to the specification. This is a particularity of the structure of the ENP nursing diagnoses. There are also ENP nursing diagnoses which do not have any pre-combination of specification and nursing problem, but consist of the individual and the nursing problem only. By coding of etiologies and characteristics the nursing problems become nursing diagnoses and are generally rest categories for nursing phenomena which could not have been developed as nursing diagnoses by pre-combination. Pre-combinations are only developed when there are special intervention concepts for a particular nursing diagnosis. This way it is possible to provide "best practice" or "evidence-based nursing" in the sense of a practice guideline.



By linking the class-spanning items which belong together from a research-based perspective, the horizontal structure of nursing practice guidelines are created. The relations between nursing diagnoses, characteristics, resources, outcomes, interventions, and intervention specifications are illustrated in figure 1 with horizontal lines. On the emerging micro level the ENP development team speaks of an **ENP practice guideline**. It is a professionally sound and possibly evidence-based attribution of possible nursing outcomes and intervention concepts for remedy/relief of a nursing problem or a nursing diagnosis. The ENP developer also used the terms "modified practice theory" (Wieteck, 2003) or "nursing diagnosis-related pathway" (Wieteck, 2007a). Both descriptions are reflected in the term practice guideline.

An ENP practice guideline is defined in accordance with the definitions of the general term "practice guideline" (Bölicke, 2001; Field & Lohr, 1992; Ollenschläger et al., 1999; Wieteck):

*An ENP practice guideline describes the systematically developed decision support for an adequate, sufficient approach based on current nursing knowledge for concrete nursing diagnostic problems. The ENP practice guidelines show the action and decision corridor in which nursing activity is being meaningfully carried out after making an ENP nursing diagnosis.*

The result of the meaningful combination of items to a practice guideline is the part of ENP which is used in nursing practice, is visible in a software application, and is individualized as a nursing pathway for each patient in the nursing care plan. According to the ENP developers, these nursing practice guidelines represent the up-to-date nursing knowledge.

## 1.4 (Further) development of ENP

The historical origination and further development of ENP is published in numerous book publications (e.g. Wieteck, 2003, 2004b, 2013, 2014). The specific revision documentation from one version to another can be read in the regularly published Scientific Background to ENP. Below, the key development steps and the current strategies for further development are briefly outlined.

ENP is registered as standardized nursing classification by means of object identifier (OID)<sup>2</sup> in "German healthcare" ("Deutsches Gesundheitswesen"). This allows data exchange between the different electronic patient/resident records. The information on ENP can be viewed at the homepage of the German Institute for Medical Documentation and Information (Deutsches Institut für Medizinische Dokumentation und Information, DIMDI)<sup>3</sup>.

### 1.4.1 Historical Background

The development of ENP began in 1989 at a German nursing school with the key objective to harmonize the nursing process documentation and to develop appropriate educational guidelines. A group of nursing teachers from various nursing schools were involved during the development. Coinciding with the first publication of the ENP practice guidelines in 1994, the implementation of ENP as software began in a relational database.

### Phase 1 (1989–1998) – inductive development

Starting point of the inductive approach was the objective to harmonize the educational contents and the actual organization of the nursing process planning. In the context of practice guidelines for the apprenticeship for nurse practitioners, specific nursing situations (n > 2138) with patients/residents/clients

<sup>2</sup> See <http://www.dimdi.de/dynamic/de/klassi/oid/verzeichnis.html> (Accessed 10.05.2017).

<sup>3</sup> The term taxonomy (also called classification scheme) describes a unified model or theoretical construct according to which single elements/objects are classified and divided into categories by certain criteria.

were used to create a nursing care plan. The nursing care plan was consented with the trainee and the nursing team and afterwards reflected in the teaching team. Formulations found and consented by the experts to illustrate the nursing situation in the form of nursing problems/diagnoses, outcomes, and interventions were additionally supported by literature and then cataloged (Wieteck, 2004c). The inductive development phase was characterized by four key research questions (Wieteck, 2004b).

- Which nursing diagnoses are made in nursing practice and are thus required to illustrate the individual nursing process as standardized formulations?
- Which characteristics, etiologies, and resource formulations occur in which nursing diagnosis and should be offered as a standardized formulation?
- Which aims are agreed upon (with the patient/resident) in the nursing process and are documented in the nursing care plan?
- Which nursing interventions are chosen and can be illustrated with what standardized text blocks as guiding information? Which nursing interventions are discussed in the current nursing literature and can be offered as standardized text blocks?

From a methodological point of view the response to these questions was marked by three phases:

- **Qualitative, participating observation** of specific care situations were carried out in the context of practice guidelines with a trainee and a nursing teacher. During this nursing diagnostic process, the different nursing diagnoses were identified, nursing interventions determined and formulated in a nursing care plan for the patient/resident. If possible, the description of the nursing care plans are based on the already known and described nursing concepts. If this was impossible, own concept analyses were carried out according to Walker/Avant (Opel, 2004).
- Reflection of the nursing care plan with nursing practitioners and then in the teaching team in terms of a **consensus** of the diagnostic process as well as formulations for its illustration.
- Comparison of the identified nursing diagnoses, outcomes and interventions with the literature and cataloging of the new found results (Wieteck, 2004b). The ENP development team calls this a modified practice theory - in other words, it represents a nursing diagnosis-related pathway. Today, the term "ENP practice guideline" is used.

These nursing practice guidelines (situation specific or practice theories), today also called ENP practice guidelines, represent the up-to-date nursing knowledge according to the demands from the ENP developers. The development of nursing diagnosis-related pathways is based, as already mentioned, on the one hand on inductive methods, and on the other hand on literature work/analyses (Wieteck, 2004b) as well as review through validation works.

The nursing care process as well as the process of the development of a nursing diagnosis-related pathway has been understood as a hypothesis-generating process in the ENP development (Gordon & Bartholomeyczik, 2001; Schrems, 2003). The suggestions of Dickoff, James, and Wiedenbach (1968, S. 420-422) and their definition of the "situation-producing theory" or "practice theory" (Walker & Avant, 1998), which already contain key components of the nursing process, such as the objective of nursing performances and the resulting intervention instructions, have been expanded during the development of ENP by the dimensions of nursing diagnoses with characteristics, etiologies, and resources with regard to the nursing process model. While Dickoff, James, and Wiedenbach place the practice theory as the last of the four-step theory formation process, the ENP development team puts the modified "practice theory" as the second step of this process (see figure 5) (Dickoff et al., 1968). This is justified by the assumption that

the nursing pathways/ENP practice guidelines, which are created by linking the nursing diagnoses with characteristics, etiologies and resources, nursing outcomes and interventions, are hypotheses but do not yet constitute a theory. Crucial to this assumption is that the developed hypotheses are considered as preliminary findings in the field of nursing. The formulated hypotheses can be approved, rejected or modified through new findings. This process is reflected in a continual updating process of ENP.

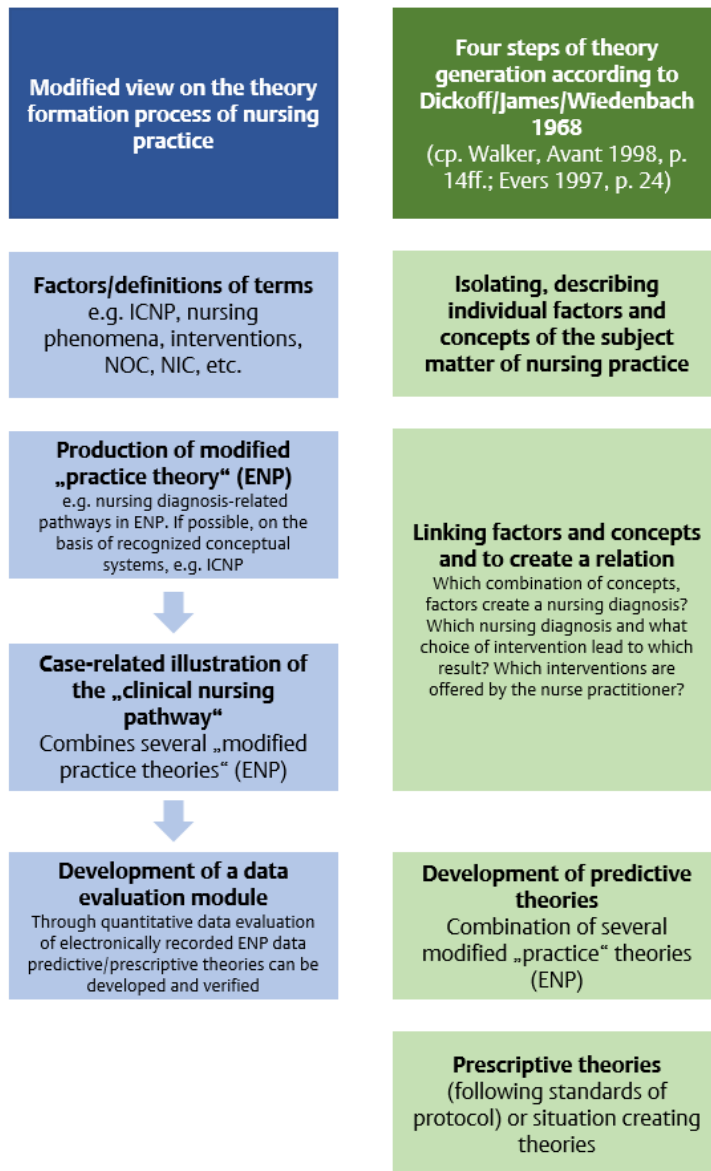


Figure 5: Integration of the modified "practice theory" in the theory formation process

The terms/concepts used in ENP are characterized by high complexity and granularity. In order to support clarity of the developed language, linguistic structures and definitions for the individual ENP formulations have been determined by the ENP development team over the course of the development process.

## Phase 2 (1998 until today) – user feedback and validation for the further development of ENP

Since 1994 ENP is updated in a database and can be implemented by different software products in an electronic patient/resident record for nursing process documentation. From the first application of ENP in an electronic nursing process documentation in 1996 (Deppmeyer, 1999; Wietek, 2001) onwards, the user feedback will be evaluated as an important aspect of the further development of ENP until today (Wietek, 2013). The implementation of ENP in a database ensured that each term in ENP has a notation

(i.e. unambiguous number or ID number) which, however, will not be printed in book publications for reasons of readability and lacking relevance for end users.

Since 2001 validation works are carried out on ENP. The studies on content and/or criteria validity are another important part of the further development of ENP. A rough overview of existing validation works is provided in chapter 1.4.3.

### **Phase 3 (2005–2009) – The classification structure**

In the book publication of 2004, ENP has no separate taxonomy structure yet. Previously, the ENP practice guidelines were assigned to the activities of daily living (ADL). The hierarchization was transferred step by step to the present classification structure. First, a taxonomy<sup>4</sup> was developed for the ENP nursing diagnoses. The classification structure of the ENP nursing diagnoses was first mentioned in a specialist article, there ENP was also referred to as nursing classification system for the first time (Wieteck, 2006a). In 2006, ENP had seven classes, now called groups (nursing diagnoses, etiologies, characteristics, resources, nursing outcomes, nursing interventions and action-guiding instructions). The group of nursing diagnosis had at that time already a monohierarchic structure with 3 domains, 22 classes, and 128 categories. The other classes/groups such as etiologies, characteristics, etc. did not have a hierarchic structure yet, but terms/concepts were managed next to each other in the database. The concepts/terms of the classes had relations, i.e. linkages to the relevant nursing diagnoses. During 2007 and 2009 the individual groups were systematically and monohierarchically structured by clustering and converted into the present classification structure.

The realization of ENP in the form of a database can be best described with terms of informatics and knowledge representation: with regard to its database presentation ENP can be termed as ontology.<sup>5</sup> In ENP, up-to-date nursing knowledge is presented through linkages (relations). The basis are the nursing diagnoses, characteristics, etiologies, resources, nursing outcomes and nursing intervention concepts which are managed in a database. Without linkages to each other this would have little benefit for the user in terms of knowledge representation. For this reason, the elements mentioned above are structured in a database and linked to each other based on nursing knowledge. Finally, a complete set of information in terms of nursing knowledge and in the form of nursing practice guidelines is achieved from the fragmented pieces of information on the horizontal level. A semantic net is created through linkages which can be helpful for decision-making within the context of the nursing care process. In an electronic patient or resident record the formulations are used to realize the nursing process documentation. Additionally, ENP is linked with several other terminology systems and classifications (see chapter 1.6).

### **Phase 4 (since around 2008) – The translation of ENP as a continuous process**

ENP is available as a database in German, English, Italian, and French. Book publications in English, French, and Italian are still pending, however in the dissertation of Serge Haag the validity of ENP in French is described (Haag, 2009). The Italian translation of ENP has begun with a thesis in the Master's program for specialist translations at the University of Bologna. Since then, Elisabetta De Vecchis leads the ENP translation into Italian as well as the validation works of the translation as a member of the ENP development team.

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<sup>4</sup> Ontologies are descriptions of conceptualizations of a knowledge domain, in case of ENP it is the nursing knowledge for representation and control of the nursing care process. An ontology is a controlled vocabulary which formally relates objects and its descriptions and makes a statement on a special domain. Often, the term semantic net is used for ontology.

### 1.4.2 Further development today

Today, ENP is a nursing language with a monohierarchic structure providing nursing knowledge by means of practice guidelines. Figure 6 shows the systematic process of further development of ENP which has been established in this form since 2013 and is being continuously improved. A new database version will be provided annually. Book publications are generally published every two years.

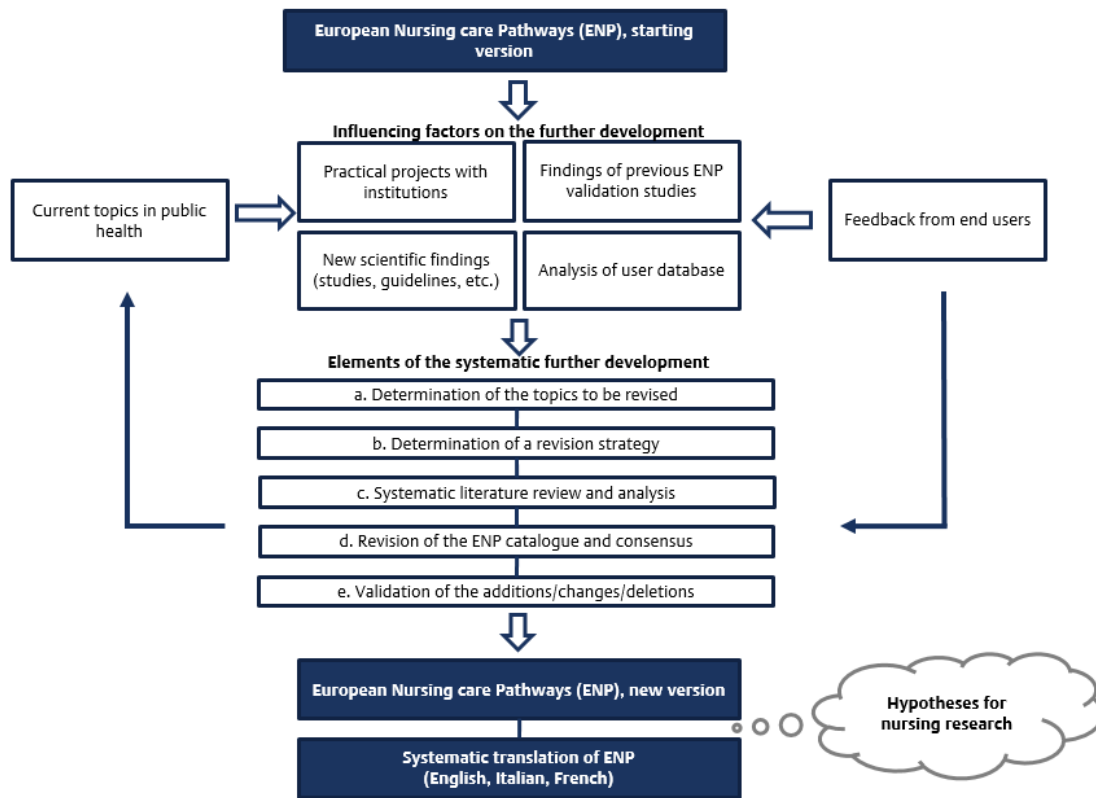


Figure 6: Process of the systematic further development of ENP today

With regard to the influence of health policy decisions, user feedback and new scientific findings in nursing and related disciplines of healthcare it is decided annually which ENP practice guidelines are subject to a systematic review and if necessary a revision. A systematic literature review is initiated as a central methodological step for update and review, which is carried out based on the following scheme:

Revision step	Example from the further development work on the topic of dysphagia
1. Specifying the revision strategy with the formulated question of the targeted literature search	Conducting selective database search added by snowballing and a free hand search in selected journals by using the Boolean operators (AND, OR, NOT), truncations and phrase searches.  Questions including: "Which evidence-based nursing intervention possibilities are described in literature for the prevention, care, treatment and compensation of dysphagia in the oral transport stage (...)?"
2. Definition of the preferred publication type and evidence level	Preference for articles from peer-reviewed journals. The underlying type of study should preferably be a (systematic) overview or an intervention study.

<p>3. Determination of inclusion and exclusion criteria and the databases to be used (eg. Medline, CINAHL, The Cochrane Library).</p>	<p>Publications in German or English published from the year 2000, exclusion of individual care reports. Search in databases which are accessible and recognized in nursing science: PubMed, The Cochrane Database of Systematic Reviews, GeroLit and CINAHL as well as in the guideline register of the AWMF and in the catalogue of the Bavarian State Library. Depending on the number of hits, limiting the searches to hits in the title and/or abstract of the databases.</p>
<p>4. Development of search terms and determination of specific search phrases</p>	<ul style="list-style-type: none"> <li>• <b>Phenomenon:</b> dysphagia, impaired swallowing, swallowing disorder*, swallowing dysfunction*, swallowing abnormalit*, impaired deglutition, deglutition disorder*</li> <li>• <b>Characteristics:</b> symptom*, characteristic*, attribute*, indicator*</li> <li>• <b>Nursing interventions:</b> Nurs* concept*, nurs* intervention*, care, nurs* procedure*</li> </ul>
<p>5. Conducting database searches</p>	<p>Useful combination of search terms, operators, inclusion/exclusion criteria as well as filter criteria for complete search phrases.<sup>6</sup></p>
<p>6. Viewing and obtaining relevant literature in full text and evaluating of publications and studies in terms of quality (critical appraisal)</p>	<p>The databases retrieved between 15 and 687 hits with the final search phrase which were evaluated for relevance by means of title and abstract screening. In the end, a total of 119 hits appeared relevant for revision. These publications were obtained in full text and after examination of their methodological quality consistently compared to existing dysphagia-relevant elements in the ENP catalogue. In accordance with snowballing, further potentially relevant publications were also considered, e.g. from the references section of the obtained primary literature. Finally, 91 new publications were analyzed and considered so that the dysphagia-relevant nursing diagnoses are supported by a total of 159 publications.</p>
<p>7. Revision of the ENP catalogue according to the findings and facts from the literature</p>	<p>See table 5</p>
<p>8. Consensus of the results in the ENP development team, also with consulted external experts in their fields as needed</p>	
<p>9. Validation of the revision through expert rating, a study or a clinical trial in nursing practice</p>	<p>See chapter 1.4.3</p>

Table 4: Process of the systematic literature search for evidence-based ENP further development

<sup>6</sup>An example for a complete search phrase used for the topic of dysphagia is: ((("Deglutition Disorders"[Mesh] AND "Nursing"[Mesh] AND ("1990/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND (English[lang] OR German[lang]))) OR (((dysphagia[title] OR impaired swallowing[title] OR swallowing disorder\*[title] OR swallowing dysfunction\*[title] OR swallowing abnormalit\*[title] OR impaired deglutition[title] OR deglutition disorder\*[title]) AND (cause\*[title] OR source\*[title]) AND ("1990/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND (English[lang] OR German[lang]))) OR ((dysphagia[title] OR impaired swallowing[title] OR swallowing disorder\*[title] OR swallowing dysfunction\*[title] OR swallowing abnormalit\*[title] OR impaired deglutition[title] OR deglutition disorder\*[title]) AND (symptom\*[title] OR characteristic\*[title] OR attribute\*[title] OR indicator\*[title]) AND ("1990/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND (English[lang] OR German[lang]))) OR ((dysphagia[title] OR impaired swallowing[title] OR swallowing disorder\*[title] OR swallowing dysfunction\*[title] OR swallowing abnormalit\*[title] OR impaired deglutition[title] OR deglutition disorder\*[title]) AND (nurs\*[title] OR care[title] OR procedure\*[title] OR caring[title] OR intervention\*[title]) AND ("1990/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND (English[lang] OR German[lang]))) AND ("1990/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND (English[lang] OR German[lang])) AND ("2000/01/01"[PDat] : "3000/12/31"[PDat]) AND Humans[Mesh] AND (English[lang] OR German[lang])) Filters: Review; Meta-Analysis; Systematic Reviews; Publication date from 2000/01/01; Humans; English; German

The following table 5 shows a detail from a processing table for an ENP nursing diagnoses of the topic of breathing which was updated from mid-2016 to 2017. By way of example, the revision of the etiologies<sup>7</sup> of the nursing diagnosis is shown. The columns represent the unique ID number of an etiology, the linguistic formulation of the etiology itself, the short reference to the literature from which the items have been developed or derived, the explanatory texts, as appropriate (e.g. for Latin technical terms), as well as the mark “X” which indicates the linkage of the etiology to the nursing diagnosis. Not shown in this detail are the linkage information of the ENP practice guideline to other instruments and concepts (see chapter 1.6) as well as the integrated normative time values of the ENP interventions (see chapter 4.7). The black text represents unchanged adopted items and elements in comparison to the original ENP version, red and/or red-crossed text indicates a change made to the new version. The following revisions could be:

- Addition of new items
- The linguistic modification of existing items (e.g. up to the technical expression)
- Deactivating the linkage of items to a nursing diagnosis (e.g. due to a better fit to another ENP nursing diagnosis)
- The complete deactivation of items (e.g. due to new scientific findings)

With this approach it is possible to examine the differentiations of nursing diagnoses among each other and to support individual items with literature and evidence-based knowledge e.g. from studies and systematic overviews – or to remove them according to the current state of knowledge. The red highlighted fields indicate which content has been newly added compared to the previous ENP version, a red cross indicates that the diagnosis listed above has been newly linked with the etiology.

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<sup>7</sup> Of course, the same type of documentation is maintained for characteristics, resources, nursing outcomes and interventions, as well.

				223 - Der Patient hat aufgrund von fest sitzendem Bronchialsekret das Risiko einer Atelektase/Pneumonie
ID-Nr.	Ursache	Literatur-Kurzverweise	b.B.: Erläuterung der Ursache	
3143	Operativer Eingriff im Bauchraum			
20813	Operativer Eingriff am offenen Herzen			
2951	Zähes Bronchialsekret mit hoher Viskosität		Viskosität beschreibt die Zähigkeit einer Flüssigkeit. Umso größer die Viskosität, desto zähflüssiger und weniger fließfähig ist die Flüssigkeit.	X
2952	Glasig-zähes Bronchialsekret mit glasig-hoher Viskosität		Viskosität beschreibt die Zähigkeit einer Flüssigkeit. Umso größer die Viskosität, desto zähflüssiger und weniger fließfähig ist die Flüssigkeit.	X
2952	Unproduktiver Husten	10;13;32;		X
2909	Erschöpfung			X
15656	Funktionsbeeinträchtigung der Bronchialschleimhaut durch Staub/Allergene/Noxen	39		X
20824	Akute Atemwegserkrankung	32		X
17430	Mukoviszidose	24;27;28;32;33		X
20706	Bronchiektase	7;15;17;24;29;30;31;37;35		X
20826	Chronische Bronchitis	32		X
	Neuromuskuläre Erkrankung zu der Pflegediagnose: Beeinträchtigte Selbstreinigungsfunktion	3;9;10;13;11; 9 (ALS);22;27;32;34; 38		
	Akute oder chronische Verletzung/Beeinträchtigung des Spinalkanals	39		X
	Rezidivierende Atemwegserkrankungen	32	Beschreibt das Wiederauftreten einer Atemwegserkrankung nach einer klinisch vermuteten, zeitweiligen Heilung bzw. zeitweiligen Besserung.	X
	Asthma bronchiale	20;21;32;33		X
20608	Chronisch obstruktive Lungenerkrankung (COPD)	6;32;33		X

Table 5: Detail of a revision table of the ENP development team (German)



### 1.4.3 Options for validation of ENP practice guidelines

After the systematic further development, validation of the created contents and results follows whenever possible and especially in far-reaching changes. The aim is to have another quality assessment process for the consented and systematically developed ENP practice guidelines (Creason, 2004). Depending on the validation method applied, this is to ensure correctness, completeness, an adequate level of granularity and selectivity of the individual practice guidelines as well as practicability.

With the beginning of the development of nursing classification systems in the 1980s various methods for validation testing have been developed and proposed. The following table 6 gives a short overview without the intention to be exhaustive:

Model	Measured construct	Short description	Literature
<b>Validation methods according to Gordon &amp; Sweeney</b>			
<b>Retrospective Identification Model</b>	Consensual validity, face validity, nursing diagnosis label	Use of the aggregated experience of nurses who retrospectively describe and evaluate nursing phenomena/nursing diagnoses (similar to focus groups)	(e.g. Creason, 2004; Gordon & Sweeney, 1979)
<b>Clinical Model</b>	Nursing diagnosis title	The direct observation of patients and their behavior by nurses as well as the documentation serve as source and basis of evaluation for the nursing diagnosis labels	
<b>Nurse Validation Model</b>	Content validity, face validity	The characteristics determining a nursing diagnosis are examined by two or more experienced nurses as to whether they occur in bundled, relevant form and corresponding frequency in practice	
<b>Validation methods according to Fehring</b>			
<b>Diagnostic Content Validation Model (DCV)</b>	Content validity, face validity	Evaluation of the characteristics of a nursing diagnosis by technically experienced (nursing) experts based on a five-level Likert scale, calculation of a weighted index for each characteristic	(e.g. Caldeira et al., 2012; Richard J. Fehring, 1987; Richard J. Fehring, 1994)
<b>Clinical Diagnostic Validation Model (CDV)</b>	Content validity, face validity, interrater reliability	Examination of the validity of a nursing diagnosis in a clinical situation by two experts either by patient observation or by patient survey. Calculation of a weighed interrater reliability index.	
<b>Etiologic Correlational Ratings Validation Model (ECR)</b>	Predictive validity	Creating a direct cause-effect relationship between a nursing diagnosis and its etiologies. Calculation of a correlation coefficient (etiological correlation rating) for the determination of the strength of an etiology or a risk factor for the prediction of a nursing diagnosis	
<b>Differential Diagnostic Validation Model (DDV)</b>	Discriminant validity (two nursing diagnoses), content validity, face validity	The characteristics of two similar nursing diagnoses are bundled in a survey instrument and blindly evaluated by a "significant number" of (nursing) experts and/or patients for each nursing diagnosis, possibly also in a clinical setting. Calculation of weighted index for both nursing diagnoses and comparison of them.	
<b>Delphi technique</b>	Content validity, face validity	Systematic, multi-level and written survey method of an expert panel while preserving the anonymity of the individual participants. Characteristics and defining elements of a nursing diagnosis are edited in the first rounds until a consensus is reached regarding usefulness, completeness and clarity.	(e.g. Grant & Kinney, 1992)
<b>Concept analyses</b>	Central attributes and characteristic features of concepts	Multi-level method for conceptual analysis as well unambiguous assignment of information(s) that are transported by a concept. Ambiguities should be excluded. Often also used as a precursor to other forms of validation.	(e.g. Walker & Avant, 2010; Whitley, 1997)

<b>Multivariate validation methods</b>			
<b>Factor analysis</b>	Construct validity	Method for reducing a large number of variables/observations to a few key influential factors. In the context of the validation of a nursing diagnosis, the analysis reveals whether the characteristics occur as one factor (ideal case) or as multiple factors.	(e.g. Chang, 1995; Hoskins, 1997; Kerr et al., 1993)
<b>Cluster analysis</b>	Construct validity	Method to identify similar or homogenous groups (cluster) of examination objects from a large, heterogenous data set. Suitability for generating a classification structure as well as for validation (objects from one cluster should have higher correlation than with objects from other clusters).	(e.g. Chang, 1994; Kerr et al., 1993)
<b>Magnitude Estimation Scaling</b>	Content validity, face validity	Method in which defined characteristics of certain nursing diagnoses are evaluated in relation to the extent of individual subjective experience of one group of experts regarding different concept dimensions (e.g. relevance, frequency of occurrence). By this evaluable ratio scales are generated.	(Grant, Kinney, & Guzzetta, 1990a, 1990b)
<b>Crossmapping</b>	Content validity, criteria validity	Method in which similar or interrelated terms or concepts of different (nursing) classification systems are identified, linked and examined for inconsistencies.	(Hyun & Park, 2002; Wieteck, 2008a)

Table 6: Selection of the most common methods for validation of nursing diagnoses/nursing classification systems (source: own illustration)

However, due to methodological aspects on the one side as well as the special structure of ENP (see chapters 1.1 to 1.3) on the other side, the tabulated methods are only of limited use for the validation of the European Nursing care Pathways. Usually, they merely focus on the label and/or certain characteristics or etiologies of a nursing diagnosis and would therefore cover only a small range of ENP, but not the assigned etiologies or interventions as well as the ENP practice guideline in its entirety which completely covers the nursing care process. Furthermore, the well-known models only give an indication of whether a specific criterion is a reliable indicator for a nursing diagnosis, but not, for which reasons a criterion may be rejected. Last but not least, given the large number of known methods, including Fehring's still today, frequently used validation methods (1987; 1994), there is a large discrepancy between the continuous further development of the nursing classification systems and the often long-lasting periods of inactivity regarding the methodological progress of validity concepts, which increasingly raises questions about the reliability and power of the validation results. Finally, from the point of view of research practice many of these methods have major requirements for practicability, which are sometimes hard to meet (e.g. time requirements, costs, availability of cooperation partners or cooperating institutions, etc.).

Against this background the validation works of the ENP development team focus on the following methodological pillars:

- The examining of the validity of revised ENP practice guidelines in the clinical context or setting before the final inclusion in a new ENP version (so called "pretest"). For this purpose, nurses or other clinically active persons of the interdisciplinary care team with relevant experience in the respective area evaluate the revisions of the ENP development team regarding different aspects (professional correctness, completeness for accurate illustration of individual patient/resident/client situations, formulations, usability, etc.) from a direct user perspective in the environment of a hospital or an institution of geriatric care.
- The systematic scientific research in the form of a study as the highest quality type of validity. Conceivable are numerous study designs and realization possibilities. This highly resource-intensive form of validation with high expenditures has often been used in academic theses or in projects with developers of other concepts and instruments in the context of mapping works so far. Given the increasing dissemination of ENP, for example in institutions (e.g. university hospitals) or institutional networks with high numbers of beds or the almost nationwide use of

ENP in some countries and certain nursing settings, the relevance and number of high quality systematic studies on the nursing classification system ENP, or by use of it, will clearly increase.

- Expert ratings in which selected experts assess, evaluate and possibly submit further suggestions for improvement of the revised ENP practice guideline(s) with regard to various dimensions according to defined criteria. Here, various forms of implementation are conceivable, either in the context of multi-level specialist conferences or standardized surveys.

The expert rating using standardized surveys are the currently most often used validation method of revised ENP practice guidelines. This is why in 2014 and 2015 the new development of a standardized survey instrument was considered which was first piloted on the revised ENP practice guidelines on the topic of dysphagia. Key concerns were the complete collection of all constituting elements as well as summative assessments on the various requirements ENP is trying to meet:

- Suitability of the structure of ENP for nursing practice
- Visibility of an interprofessional approach
- Adequate level of granularity
- Adequate level of clarity and selectivity
- Completeness of elements
- Technical correctness
- Suitability of ENP to support decision-making and process documentation
- Benefit and necessity of the consistent use of technical terms in the further development and revision of ENP (example: “cephalgia” instead of headaches).

In order to ensure at least some comparability with common instruments for validation of nursing diagnoses and existing study results, the IT supported expert rating was chosen as basic methodological approach in accordance with the frequently used DCV model by Fehring (1987; 1994). The basic idea is, that established experts evaluate all characteristics, etiologies, objectives, interventions as well as the thematically relevant ENP nursing diagnoses according a defined category system themselves using a standardized questionnaire. This part represents the essential part of the survey instrument.

After numerous draft concepts, the result was an interactive questionnaire based on Microsoft Excel, which guides the experts with native functions (e.g. macros, command buttons) through the revision. Beforehand, on the first pages the respondents received a short introduction on the purpose of the study, the structure of ENP as well as the handling of the electronic questionnaire. In the actual survey part, the participants were asked to evaluate the currently (non-) linkages of the individual nursing diagnoses available in ENP one after the other in three sections regarding the respective etiologies, characteristics and nursing interventions. For each of the elements a dropdown list was created, which default setting indicated that the existing linkage “as it is” is technically correct without any changes. Vice versa, the default setting for non-linked elements indicated that such would not be meaningful. If a need for change was identified by the experts, the dropdown menu offers the possibility to specify the nature of it. Alternatives are offered for the various dimensions of the respective item: completeness, accuracy, technical correctness and relevance. Figure 7 illustrates a section of the questionnaire concept.


KENNZEICHEN VON SCHLUCKSTÖRUNGEN		Pflegediagnosen (insg. 10!)			
		1. Der Bewohner ist aufgrund einer/s beeinträchtigten Bolusformung/-kontrolle/-transports beim Schlucken in der oralen Vorbereitungs-/transportphase beeinträchtigt	2. Der Bewohner ist aufgrund eines Zungenstosses / von Zungenpressen beim Schlucken in der oralen Vorbereitungs-/transportphase beeinträchtigt	3. Der Bewohner ist aufgrund einer hypotonen Wangen-/ Lippen-/ Mundmuskulatur beim Schlucken in der oralen Vorbereitungs-/transportphase beeinträchtigt	4. Der Bewohner verschluckt sich häufig bei der Nahrungsaufnahme, das Schlucken ist in der oralen Transport-/ pharyngealen Phase beeinträchtigt
Zurück	Weiter zu Ursachen von Schluckstörungen				
KENNZEICHEN					
Berichtet über Schluckstörungen bei fester Nahrung		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Auftreten der Schluckstörung überwiegend bei fester Nahrung		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Hustern/Räuspern bei/nach dem Schlucken		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Hustern/Räuspern bei/nach dem Schlucken von Flüssigkeiten		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Erstickungsanfälle nach dem Schlucken		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Erstickungsanfälle nach dem Schlucken von Flüssigkeit		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Atemnot, ggf. mit Zyanose bei/nach dem Schlucken		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Atemnot, ggf. mit Zyanose bei/nach dem Schlucken von Flüssigkeit		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Beobachtbare Schwierigkeiten beim Anschlucken		✓ Sinnvoll, unverändert	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Verbleibende Nahrungsreste auf der Zunge (nach dem Schlucken)		✓ Sinnvoll, unverändert	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Verbleibende Nahrungsreste am Gaumen (nach dem Schlucken)		✓ Sinnvoll, unverändert	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Äußerungen über/Beobachtung von Schluckstörungen		Sinnvoll, unverändert Sinnvoll, inhaltlich jedoch zu spezifisch Sinnvoll, inhaltlich jedoch zu allgemein Auflösen, inhaltlich zu spezifisch Auflösen, inhaltlich zu allgemein Auflösen, fachlich falsch Auflösen, fachlich unvollständig Auflösen, nicht dokumentationsrelev.	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Feuchte/gurgelige Stimmqualität nach dem Schlucken		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Auffälliges positives Ergebnis bei der Phonationsprobe nach dem Schlucken		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	✓ Sinnvoll, unverändert
Auffälliges positives Ergebnis bei der Phonationsprobe nach dem Schlucken von Flüssigkeit		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Auffälliges positives Ergebnis beim 50 ml Wasserschlucktest		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Veränderte Schluckphasen (Schluckkontrollgriff)		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen
Fehlender Schluckreflex (Schluckkontrollgriff)		Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen	Nicht sinnvoll, unverknüpft belassen

Figure 7: Example section from the revision mask of the survey instrument

Due to the often considerable scope of the aspects to be evaluated by the experts, the guiding interventions<sup>8</sup> which are subordinate to the intervention concepts are omitted in the questionnaire for reasons of appropriateness. The resulting likelihood of participants rating the intervention concepts as too abstract due to a lacking knowledge of the specifications was therefore tolerated and taken into account in the evaluation. Following the principle outlined above on the next page of the questionnaire the experts have the opportunity to check their evaluation regarding linkages existing in previous ENP versions but which are deactivated now and to add etiologies, characteristics and nursing interventions necessary for nursing care from their point of view but currently missing in ENP and link those to respective nursing diagnoses. At the end of the questionnaire is a page with summary questions on the aspects outlined above (Likert scale, four point). The structure of the survey instrument has also been created for online survey projects by using the SoSciSurvey platform (<https://www.soscisurvey.de/>), so that in addition to a local editing with Microsoft Excel (offline) a browser-based expert rating (online) is also possible.

Of great importance for the validation work as well as the expressiveness of the results is the question of which persons can be considered experts in the research field for the evaluation of nursing diagnoses and associated elements. The discussed opinions on this are quite ambiguous, additionally numerous definition approaches have different criteria to distinguishing the expert from the amateur. Examples are the professional knowledge or excellence in the respective domain (Bromme, Jucks, & Rambow, 2004). An additional view holds that besides the specific knowledge and/or peak performances also practicability is a decisive attribute of an expert. Given the intention of a nursing classification system, supporting nursing practice in decision-making and performing, the last aspect is of very high relevance for the ENP development team. Consequently, the underlying understanding of an expert in this work follows the definition from the sociology of knowledge: “Experts can be understood as persons who – based on a specific practical and experiential knowledge referring to a clearly defined problem – have created the

<sup>8</sup> See chapter 2.1.

possibility to structure the concrete field of action as meaningful and guiding for others with their interpretations” (Bogner, Littig, & Menz, 2014: 13). The chosen definition thus deliberately deviates from the explanatory approaches commonly used in nursing, for example the nursing expert concept of Benner or the concretization approach of Jasper (Jasper, 1994), which focus more on problem-solving skills. Basically it has to be considered that the expert status in the nursing scientific context always depends on the particular research interest and thus the role is partly awarded by the researcher (Meuser & Nagel, 2002).

With specific reference to nursing diagnostics, Fehring (1994) proposes to select suitable experts on the basis of measurable parameters as part of his validation models. Based on the points given for meeting specific criteria, those persons who achieved a certain minimum number were therefore be accepted as experts in the validation works. Corresponding features are:

- A master’s degree or higher in a nursing-related course (highest weighting).
- An academic qualification work (master in a degree course or higher) on a topic of the nursing diagnose(s) to be validated.
- A period of at least one year since when professional expertise has been gained in the research field.
- Training certificates with reference to the contents of nursing diagnose(s) to be validated.
- Publications and/or published research results with regard to the contents of the nursing diagnose(s) to be validated.

The list shows that the attempt to consequently apply the rating criteria proposed by Fehring in the German speaking countries would (still) lead to a significant problem: a severe lack of suitable experts for participation in a validation study. Nursing science is a comparatively young discipline in Germany whose establishment has made great progress, but is far from finished. This is especially true with regard to other countries such as the US or the UK (Palm & Dichter, 2013). There has also been the possibility of a domestic German training on an academic, secondary qualifying level since the 1980s, although the number of offered courses has grown rapidly since then (Schaeffer & Wingenfeld, 2014). Primary qualifying courses which integrate or replace the “classic” vocational training have only been offered for about ten years, often still in model form. It is well-known that the degree courses based on vocational training such as nursing management, nursing education or nursing science in most cases are oriented for positions away from the point of care. However, it is reported that many graduates from the more recent, directly qualifying courses only have low affinity to working in direct care (Bollinger, Gerlach, & Grewe, 2006). Academic degrees that consistently focus on clinical work in direct care, such as clinical nurse specialist or advanced nursing practitioner, are increasingly required (see e.g. Deutscher Berufsverband für Pflegeberufe e.V., 2013), but are still largely at the beginning in Germany. As a result, there is currently in Germany a very unbalanced distribution of nurses with an academic degree. Obtaining a sufficient number of clinically active and experienced nurses with at least a master’s degree as expert (the main criterion of Fehring) for a nursing diagnostic validation study has currently little chances for success in the German speaking countries and especially in Germany. Furthermore, a professional specialization of these persons on the topic of the nursing diagnosis or practice guideline to be examined, here dysphagia, would be required, which would further limit the selection options.

The expert definition used in validation works on ENP the internationally often used criteria by Fehring couldn’t be used for the reasons outlined. Particularly important is to move away from the premise that the experts participating in the review need to have an academic degree in nursing. According to the previous experience the necessity was also clear that a basic nursing vocational training is not a

prerequisite for the participation in the study. The reason for this lies in the fact that although nurses are involved in the care of specific patient/resident/client groups, a clinical specialization in the corresponding direction virtually doesn't exist in this country as well abroad. An example for this is the topic of dysphagia which is highly relevant for the profession of nursing: Only a few publications with direct nursing reference could be found as part of the systematic literature review for the revision of the ENP practice guidelines. If there is specific nursing literature available, it usually is from an author from neighboring professions and treats the role of nursing in the interdisciplinary treatment of dysphagia patients (e.g. Brady, 2008; Tanner, 2010). High quality publications on the subject from the profession itself are only occasionally found (Hines et al., 2011). In summary, from technical and quality-related considerations the following aspects were regarded to be a prerequisite and decisive for the selection and contact of appropriate experts, whereas a deliberate adaptation of these criteria is conceivable depending on the ENP practice guideline to be validated:

- Appropriate mastering of the German (technical) language in the context of the validation of a German-language classification system.
- Professional qualification with direct related to the subject of dysphagia, ideally at an academic level (e.g. speech therapy, linguistics, language therapy, etc.).
- At least two years of work experience in a clinical area with corresponding qualification for the treatment and care of persons with dysphagia.
- At least one pertinent methodologically high quality publication on the subject (e.g. standard works, basic literature, systematic review).
- Active membership in a dysphagia-relevant (professional) association, commission or, alternatively, the active teaching and/or lecturing on the subject.

The data analysis is carried out using software like Microsoft Office and/or statistics programs (e.g. SPSS, Statistical Package for the Social Sciences). The information from the electronically filled out questionnaires was transferred for this reason in corresponding evaluation masks. To exclude transmission errors as much as possible, all data was checked again for correctness after entry. For the data analysis mainly descriptive approaches were used, including frequency calculations (absolute and relative), positional parameters (e.g. the arithmetic mean), scattering parameters (e.g. span) as well as graphical representations. Of major importance is also the quantification of all evaluations made by the experts regarding the (non-) linkage of each characteristic, etiology and intervention to each of the ten ENP nursing diagnoses. Based on this, a pre-defined limit value (cut-off value) can be used to determine which individual elements and (non-) linkages ...

- ... should be subject to a detailed technical review.
- ... have to be examined for clarity and granularity.
- ... have to be deactivated, supplemented or newly added.

In addition to the search for a suitable impulse limit for the technical revision, it is important to consider noticeable incongruencies in the rating of the experts during data evaluation and to get an idea of the extent and reliability of the level of agreement in the assessments. Depending on the underlying data, different models for the calculation of the interrater reliability and interrater agreement are used.

## 1.5 Application of ENP

Corresponding to the classification of terminologies into interface terminologies, reference terminologies, and administrative terminologies, ENP can be counted as interface terminology. Interface terminologies

are intended for front-end use and should therefore be applied by the end users (nurses) in the direct care (Bakken et al., 2000) to realize the standardized nursing process and performance documentation.

The use of ENP is primarily intended for electronic patient records. For teaching, nursing schooling, or for training of staff in nursing institutions which intensively deal with the steps of the nursing care process, ENP can be a valuable support as the user is presented the up-to-date nursing knowledge through linkages. Implemented in a software patient data can be retrieved quickly and efficiently and are additionally available for evaluation purposes. The actual implementation and visualization of ENP can be very different from software product to software product<sup>9</sup>.

## 1.6 Linkages of ENP with other instruments

ENP is managed in a database for the implementation in software products such as electronic patient/resident/client records. The notations (unambiguous numbering of items) are automatically allocated within a group according to the database management. Each item in the ENP system has an unambiguous code within its group which remains stable and is updated in further versions. Such notations enable the linkage of the nursing classification system ENP to other instruments and classification systems, also called “mapping”. The currently or previously linked instruments are/were:

- **ICD-10** (International Statistical Classification of Diseases and Related Health Problems) and **OPS** (German Procedure Classification) codes for optimized coding of nursing-relevant secondary diagnoses in hospitals as well as for support of DRG coding.
- **LEP Nursing 3** (performance classification in nursing), a classification system for the documentation of (nursing) performance in healthcare. The performances and activities underlying the method LEP are provided with normative time values (see e.g. Baumberger & Raeburn, 2015) and were linked with the interventions of the ENP catalogue. By this way it is provided to use the LEP time values in addition to the ENP’s own time values (cp. chapter 4.7) e.g. for the documentation of nursing expenditure or meaningful key figures. The mapping of ENP to LEP Nursing has not been maintained since 2014.
- **PPR** (“German Regulation on standards and principles for the staffing requirements in inpatient nursing”, abbr. Nursing staff regulation). The PPR as an element of the healthcare structure law from 1992 served as a daily determination of the nursing expenditure in inpatient nursing and thus as a performance-oriented calculation basis for the demand of nursing staff resources. Due to various reasons, i.a. the comparatively abstract nursing categories and subsequently low realistic nursing minute values, but especially the enormous personnel requirements in German hospitals on the basis of the PPR data (21,000 full time jobs between 1993 and 1995), the PPR was discontinued in 1996 and completely abolished in the following year. Although the PPR is of no mandatory character, it is used by many hospitals as internal controlling instrument still today (Thomas et al., 2014; Wieteck & Kraus, 2016).
- **IDEA (Interdisciplinary Databased Electronic Assessment)**, an interdisciplinary and electronic anamnesis catalogue by which structured anamnesis information are collected as well as subsequently the probable need for action is assessed. IDEA is based on the use of standardized knowledge and on the literature collection of anamnesis-relevant information. From nursing perspective, potentially relevant nursing diagnoses can be derived automatically by the linkages of IDEA to ENP, by collecting anamnesis information in the background by the software. For example, from the information collected in IDEA of a body mass index >30 (automatically calculated from the body height and weight) as well as information on the nutritional condition and nutritional preferences the suggested nursing diagnosis “the patient/resident/client has an inadequate eating behavior” can be derived. However, the nurse decides on the suggested ENP-

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<sup>9</sup> An exemplary impression of the software implementation of ENP provides the homepage of the company RECOM under <https://www.recom.eu/en/software/overview.html>

nursing diagnosis given the individual care situation and actual relevance, who receives support in decision-making through the mapping of IDEA and ENP.

- **Search terms**, in the form of a search system for quick finding of ENP nursing diagnoses in electronic use. Not only the directly contained terms are linked with the nursing diagnoses, but also synonyms and terms corresponding in scope of meaning.
- **Criteria of the MDK** (the German Medical Review Board of the Statutory Health Insurance Funds), for the classification of the need for care (level of care assignment through time values and grades of dependence). Against the background of the Second Act on Nursing (Pflegerstärkungsgesetz, PSG II), which came into effect in January 2017, in which the previous three levels of care were replaced by five so called care degrees (see e.g. Kimmel & Breuninger, 2016), the mapping of the criteria of the MDK with ENP will no longer be maintained, since the changes of the PSG II the practical relevance is no longer given. In contrast to levels of care (or the MDK criteria), the new nursing degrees valid from January 2017 are not directly linked to ENP, however through a mapping to the anamnesis IDEA (see above) und the nursing basic assessment (BAss) (cp. Pelchen et al., 2016), there is an indirect connection to ENP.
- **Standardized assessment instruments** on various clinical care aspects such as fall risk, pressure sore risk, nutrition or respiration, which generate suggestions for potentially relevant ENP nursing diagnoses when implemented in an electronic patient/resident/client record and results-oriented algorithms depending on the present score value. If, for example, the assessment of the pressure sore risk using the Braden scale results in a score of 14 and thus a medium pressure sore risk, the ENP nursing diagnoses “The patient/resident/client has a pressure sore risk” is subsequently suggested. Here, as well, the decision on the actual correctness of the suggested nursing diagnosis in the individual care situation is up to the nurse.
- **PKMS (nursing complex measures score)** as well as other complex codes for automatic support of documentation demands and code generation. The PKMS is an instrument for the illustration of highly complex patient cases in hospitals which was originally established by the German nursing council (DPR) and serves as the basis for service accounting within the G-DRG system (exception: calendar days can not be coded on intensive care units). Services in the field of “general care” as well as “specialized care” are collected. In order to apply the PKMS for acute inpatient patients, one of the reasons for highly complex care must be listed in the relevant service area of the PKMS catalogue and a corresponding intervention profile must be present. If one or more service characteristics are present, points for the corresponding calendar day are summed over the length of stay. The total number of points lead to an OPS procedure “9-20 ... Highly complex care”, if the number of points specified in the PKMS catalogue is achieved (Wieteck et al., 2017). With appropriate implementation in software products, the mapping of ENP to PKMS enables a largely automated coding of the PKMS from the daily documentation with ENP, without additional forms, entry masks or collection efforts.
- **NANDA-I nursing diagnoses.** For about 40 years, the NANDA International (NANDA-I) organization has been engaged in the formulation, development and validation of nursing diagnoses (with corresponding defining characteristics and related factors) to represent the clinical, nursing diagnostic judgement of nurses in the form of a standardized taxonomy. As an internationally recognized and widespread nursing language, NANDA-I focuses exclusively on the first step of the nursing care process, more precisely the collection and clustering of information and its transformation into a nursing judgement regarding relevant problem areas for the patient/resident/client - the nursing diagnostic process. In order to be able to illustrate and document the nursing care process in its entirety using standardized and classified language modules (determination of nursing outcomes based on the nursing diagnostics, planning of adequate nursing interventions, performance of nursing care as well as evaluation of nursing outcome), further classification systems are required which are mapped with the NANDA-I nursing diagnoses and serve the further steps of the nursing care process. For this purpose, various approaches exist. Explicitly against the background of the electronic use in computer systems as



well as with the aim to fill the gap in the nursing care process, all ENP practice guidelines were mapped with the nursing diagnoses of NANDA-I as part of a research work on the validation of ENP. All ENP practice guidelines which could be assigned to a NANDA-I nursing diagnosis as part of the mapping work, were analyzed and the corresponding ENP nursing outcomes and ENP nursing interventions were linked to the NANDA-I nursing diagnoses in a new database after the removal of duplications. The resulting database thus provides users the complete scope of the NANDA-I nursing diagnoses, added by the meaningfully linked nursing outcomes and interventions from the ENP catalogue.

Various studies and field tests have already reviewed many of the linkages to the described instruments (cp. e.g. Baltzer, Baumberger, & Wieteck, 2006; Gärtner, 2006, 2008; Schmid, 2007; Schütze, 2006).

### 1.7 Dissemination of ENP

ENP is currently (as of August 2017) used in numerous outpatient and inpatient healthcare facilities (hospitals, nursing homes, etc.) in Germany, Austria, Luxembourg, and Italy in electronic patient/resident records for the complete nursing process documentation. ENP is not only used in the electronic record GRIPS of the company RECOM but is also increasingly implemented as database in many software products of other vendors. In addition, besides the electronic format ENP is also used in print format by many institutions as well as for education and training, for example as a formulation aid for handwritten nursing planning. This wide range of usage forms and distributions makes it difficult to accurately quantify the national and international use of ENP. Nonetheless, the following list tries to give a more accurate picture of the use of ENP in German-speaking countries:

#### **Germany:**

About 12 hospitals and more than 300 institutions of inpatient and residential elderly care use ENP in different software products. Exact figures are not available due to the implementation of ENP as database in third-party software, as already mentioned, but reliable estimates suggest that at least 35,000 nurses work with ENP in Germany. Until now four educational institutions have integrated ENP as an integral part in their curriculum. In addition, since 2016, ENP has been delivered to more than 3,000 nurses in training and education in the form of a free learning software (the so-called ENP Trainer<sup>10</sup>).

#### **Austria:**

In Austria, 17 hospitals, more than 100 outpatient nursing services as well as about 60 residential elderly homes use ENP in three different software products. The outpatient nursing services in Austria can not be compared to those in Germany in terms of size. The more than 100 outpatient nursing services working with ENP have more than 8,000 nursing employees who realize the nursing documentation with ENP daily.

#### **Luxembourg:**

Three acute-care hospitals, one rehabilitation clinic, two residential elderly homes as well the two biggest providers of outpatient care, who altogether care for 90 % of all patients in Luxembourg, use ENP in two different software products. Also in Luxembourg the outpatient nursing services are different in terms of size than in Germany. The two outpatient nursing services employ more than 4,000 people of nursing working with ENP. Here, also the accounting positions were mapped with ENP to support accounting of

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<sup>10</sup> See <https://www.recom.eu/get-enp.html>

services from the daily documentation. It is foreseeable that the dissemination of ENP in Luxembourg will continue to increase especially in inpatient treatment areas. Several institutions currently intensively discuss the nursing classification system.

## 2. Changes of the versions

In the following, the changes of the ENP versions will be described. In addition to the new and deactivated nursing diagnoses listed below, also those diagnoses will be shown which were modified in meaning as a result of literature work and expert questioning. In addition to these diagnoses, numerous measures for standardization were carried out and suggestions from end users were continuously incorporated after expert verification. Also, there are ongoing further developments in the structure and architecture of ENP.

### 2.1 ENP versions 2.0 (Wieteck, 2004b) to 2.4

Not every version will be published in a book. In-between the book publications there will be additional interim versions in the ENP database. The practical test of ENP, for example, was carried out in several hospitals in 2005 using ENP version 2.3. After and during the practical test in Canton St Gallen major changes were carried out in ENP, which will be shown in the following.

#### ENP version 2.3 to 2.4

- Hierarchization on the level of nursing diagnoses, development of the ENP taxonomy to establish a monohierarchic structure used for data evaluation.
- Hierarchization works on the level of nursing outcomes, development of an outcome taxonomy.
- Hierarchization works on the level of nursing interventions.
- Examination of nursing diagnoses regarding fluctuating abstraction levels and overlapping. In this course 41 nursing diagnoses were integrated into others from version 2.3 (n = 557 nursing diagnoses) to version 2.4 (n = 516 nursing diagnoses).
- Support of ENP through further literature work. The sources used to support the practice guidelines from version 2.0 (n = 279) consisting of nursing literature, reference books and studies, to version 2.5 were increased to a total number of 520. International literature was increasingly used.
- Work on gaps regarding completeness and level of detail found in practice tests, see for example (see e.g. Kossaibati & Berthou, 2006).

### 2.2 ENP version 2.4 to 2.5 (2008/2009)

New ENP practice guidelines (n=14)	
848	The resident/patient/client-- has <b>malnutrition</b> due to an <b>eating disorder</b>
849	The resident/patient/client has <b>malnutrition</b> due to a <b>cognitive impairment</b>
851	The resident/patient/client is at risk of <b>malnutrition</b> due to <b>cognitive impairment</b>
850	The resident/patient/client is at <b>risk of malnutrition</b>
855	The resident/patient/client's <b>well-being is affected</b> due to <b>tube feeding</b>
852	The resident/patient/client is <b>unable to keep/can only with effort keep attention</b> to the contra-lesional (=neglected) <b>space or side of the body</b> (=neglect)

853	The resident/patient/client is <b>impaired in the ability to take up and process information</b>
856	The resident/patient/client is <b>impaired in the ability to acquire self-care competencies</b> , risk of ineffective therapy
857	The resident/patient/client has <b>pressure sore</b> , there is <b>difficult wound healing</b>
858	The resident/patient/client has <b>arterial ulcer</b> , there is <b>difficult wound healing</b>
859	The resident/patient/client has <b>venous ulcer</b> , there is <b>difficult wound healing</b>
861	The resident/patient/client's <b>well-being is affected</b> due to <b>chronic wound</b>
858	The resident/patient/client has <b>diabetic foot syndrome</b> , there is <b>difficult wound healing</b>
887	The resident/patient/client is at <b>risk of ineffective treatment</b> due to <b>lack of information/skills</b> associated with <b>diabetes/hypo/hyperglycemia</b>

Table 7: New ENP practice guidelines version 2.5

Extensively revised practice guidelines (n=31)	
555	The resident/patient/client has <b>malnutrition</b>
558	The resident/patient/client <b>refuses food intake</b> (food refusal), there is a <b>risk of malnutrition</b>
554	The resident/patient/client demonstrates <b>neglect of food intake</b> , there is a <b>risk of malnutrition</b>
134	The resident/patient/client has <b>involuntary urine loss</b> due to an <b>increased abdominal pressure</b> (stress incontinence)
135	The resident/patient/client has <b>involuntary urine loss</b> due to <b>heavy imperative urgency</b> (urge incontinence)
137	The resident/patient/client has <b>involuntary urine loss</b> at <b>regular times due to a full bladder</b> (spontaneous reflex emptying)
138	The resident/patient/client has urinary dribbling/ <b>involuntary urine loss</b> due to an <b>chronic urinary retention</b>
574	The resident/patient/client has an intact urogenital tract and is <b>unable to avoid involuntary urine loss</b> (functional urinary incontinence)
130	The resident/patient/client has <b>urinary incontinence</b> (multiple incontinence uncategorized incontinence type)
845	The resident/patient/client has a <b>continuous loss of urine</b> due to <b>extraurethral incontinence</b>
012	The resident/patient/client is <b>unable to wash independently</b> due to <b>restricted mobility</b>
018	The resident/patient/client is <b>unable to carry out personal hygiene</b> independently due to <b>hemiplegia/hemiparesis</b>
007	The resident/patient/client is <b>unable to carry out personal hygiene independently</b> due to <b>physical restrictions</b>
027	The resident/patient/client is not allowed to exert himself whilst carrying out personal hygiene due to a <b>reduced cardiac output</b> , there is a <b>self-care deficit personal hygiene</b>
029	The resident/patient/client is <b>unable to hold bathing articles</b> due to <b>restricted mobility</b> , there is a self-care deficit personal hygiene
022	The resident/patient/client is <b>unable to organize personal hygiene independently</b> due to being <b>disorientated</b>
011	The resident/patient/client should avoid movement between the pelvis and torso due to an <b>injury of the spinal column</b> , there is a <b>personal hygiene self-care deficit</b>

013	The resident/patient/client is <b>completely dependent on personal hygiene</b> being carried out due to a <b>measurable altered consciousness</b>
033	The resident/patient/client does <b>not perform personal hygiene adequately</b> , a <b>personal hygiene self-care deficit</b> exists
016	The resident/patient/client is <b>unable to carry out perineal hygiene as accustomed</b> due to a <b>wound in the genital area</b>
001	The resident/patient/client's <b>personal hygiene is impaired</b> due to other reasons (rest category)
676	The resident/patient/client has a <b>chronic wound</b> , there is <b>difficult wound healing</b>
339	The resident/patient/client's <b>wound is healing by second intention</b> , there is a <b>disturbance of wound healing</b>
331	The resident/patient/client's <b>wound is healing by first intention</b> , there is a <b>risk of impaired wound healing</b>
278	The resident/patient/client is at <b>risk of complications</b> due to a <b>blunt injury to the extremities</b>
092	The resident/patient/client is <b>restricted when eating</b> due to a <b>disturbance in sensation</b> and <b>reduced muscle innervation</b> of one side of the face
094	The resident/patient/client is <b>restricted when eating</b> due to a <b>reduced ability to close the mouth</b> , partly digested foodstuffs fall out of the mouth
078	The resident/patient/client is <b>restricted in independent nail care</b>
827	The resident/patient/client is <b>restricted in independent foot care</b>
069	The resident/patient/client is restricted in independent <b>hair care</b>

Table 8: Extensively revised practice guidelines version 2.5

Deactivated practice guidelines: (n=8)	
	The resident has a purulent, coated wound, risk of germ spreading
	The resident/patient/client has an <b>elevated risk of skin damage</b> caused by the application of detergent substances
	The resident/patient/client has an <b>elevated risk of inflammation of the eyes</b> due to germ spreading caused by body care performances
	The resident/patient/client is <b>unable to wash hair independently</b>
	The resident/patient/client has <b>long toe nails</b> and is unable to cut them independently
	The resident/patient/client has <b>thick horny skin</b> at the feet and is unable to remove it independently
	The resident/patient/client <b>has dirt under his finger nails</b> and is unable to remove it independently
	The resident/patient/client is <b>restricted when drinking</b> due to a <b>reduced ability to close the mouth</b> , fluid flows out of the mouth
	The resident/patient/client is restricted when eating and drinking, <b>food particles collect in cheek pouch</b> of the affected side

Table 9: Deactivated practice guidelines version 2.5

Literature used N=1018

## 2.3 ENP version 2.5 to 2.6 (2009 to May 2011)

New ENP practice guidelines (n=25)	
867	The resident/patient/client has ineffective <b>self-cleansing function of the lung</b> (rest category)
868	The resident/patient/client is <b>restricted</b> in independent <b>eye care</b> (rest category)
869	The resident/patient/client is at <b>risk of atelectasis/pneumonia</b> due to other reasons (rest category)
870	The resident/patient/client is <b>restricted in swallowing</b> (rest category)
872	The resident/patient/client is at <b>risk of a fluid/electrolyte deficit</b> (rest category)
873	The resident/patient/client is at <b>risk of inadequate breast feeding</b> (rest category)
877	The resident/patient/client is <b>handicapped during breast feeding</b> (rest category)
878	The resident/patient/client's <b>eating behavior is inadequate</b> (rest category)
879	The resident/patient/client is <b>restricted in urination</b> (rest category)
880	The resident/patient/client has <b>ineffective bowel elimination</b> (rest category)
881	The resident/patient/client is <b>otherwise impaired during stoma care</b>
886	The resident/patient/client is at <b>risk of sudden infant death syndrome</b>
892	The child aged older than 4 years <b>defaecates</b> without organic reasons (encopresis)
882	The relative/important person is <b>unable to carry out self-care activities</b> independently
883	The relative/important person is at risk of being unable to carry out self-care activities of person concerned independently
894	The resident/patient/client has colonization/infection of <b>multi-resistant organisms</b> , there is the <b>risk of germ spreading</b>
889	The resident/patient/client has <b>hypertensive crisis</b> due to an <b>autonomic dysreflexia</b>
893	The resident/patient/client is at <b>risk of autonomic dysreflexia</b> due to <b>paraplegia</b>
896	The resident/patient/client's <b>daily organization/life organization is affected</b> due to <b>dementia</b>
887	The resident/patient/client is at <b>risk of ineffective treatment</b> due to <b>lack of information/skills</b> associated with <b>diabetes/hypo/hyperglycemia</b>
891	The resident/patient/client is at <b>risk of delayed development</b>
897	The resident/patient/client's <b>communication is restricted</b> due to a <b>language disorder</b>
898	The resident/patient/client has <b>dermatitis associated with elimination/incontinence, impaired wound healing</b>
895	The resident/patient/client's <b>activity level is low, risk of serious health problems</b>

Table 10: New ENP practice guidelines version 2.6

The added rest categories were established in collaboration with project hospitals. These are required because, in addition to the specific pre-combined nursing diagnoses, there are nursing problem areas of another kind.

### Extensively revised practice guidelines (n=30):

519	The resident/patient/client has a <b>sexually transmitted disease</b> , there is a <b>risk of infection</b> for the sex partner
354	The resident/patient/client is at risk of <b>hyperglycemia or hypoglycemia</b>
383	The resident/patient/client has an <b>infectious disease</b> , there is a risk of <b>spreading infection to the surrounding environment</b>
263	The resident/patient/client has an unstable <b>cardiovascular situation</b> due to <b>reduced cardiac output</b>
610	The resident/patient/client is at <b>risk of cardiovascular complications</b> due to <b>reduced cardiac output</b>
261	The resident/patient/client is at <b>risk of cardiovascular complications</b> due to <b>hypertonic circulatory changes</b>
260	The resident/patient/client is at <b>risk of cardiovascular complications</b> due to <b>hypotonic circulatory changes</b>
696	The child aged older than 5 <b>wets</b> her/himself without organic reasons (enuresis)
160	The resident/patient/client is at <b>risk of pressure sore</b> (adaption to the current expert standard)
103	The resident/patient/client <b>receives parenteral feeding via infusion</b> , there is a <b>risk of nutritional related complications</b>
097	The resident/patient/client <b>receives enteral tube feeding</b> , there is a <b>reduction in food intake</b>
326	The resident/patient/client is at <b>risk of being under or over infused</b> due to <b>intravenous infusion therapy</b>
651	The resident/patient/client is at <b>risk of complications</b> due to <b>central venous catheter/infusion therapy</b>
451	The resident/patient/client's independent <b>daily organization/organization of life is restricted</b> due to <b>age-related reduction processes</b>
535	The resident/patient/client's <b>daily organization/life organization is affected</b> due to a <b>thought disorder</b>
450	The resident/patient/client is impaired in the <b>independent daily organization/organization of life</b> due to <b>disorientation</b>
634	The resident/patient/client's <b>daily organization/organization of life is affected</b> due to <b>memory/thought disorders</b>
793	The resident/patient/client is at <b>risk of complications</b> due to <b>arterial access</b>
627	The resident/patient/client's <b>quality of drive is lowered</b> , there is a <b>risk of self-care deficit</b>
428	The resident/patient/client's <b>reference to reality is affected</b> due to a <b>psychotic experience</b> , there is a <b>risk of self-care deficit</b>
429	The resident/patient/client is impaired in <b>structuring of the daily routine</b> , there is a <b>risk of self-care deficit</b>
426	The resident/patient/client is <b>restricted in the organization of life</b> , there is a <b>risk of self-care deficit</b>
313	The resident//patient/client is <b>restricted in organizing daily life/daily routine independently</b> due to <b>disturbance of the self</b>
621	The resident//patient/client is <b>impaired in the daily organization/organization of life</b> due to <b>continual recurring thoughts which cannot be suppressed by logic/reason</b> (compulsive thoughts)
425	The resident/patient/client is restricted in the independent <b>daily organization/organization of life</b> due to a <b>handicap</b>
152	The resident/patient/client is <b>restricted in the organization</b> of life due to an <b>ostomy</b> (artificial opening for the bowels)
467	The resident/patient/client is <b>restricted in organizing recreational activities</b> independently
500	The resident/patient/client demonstrates repeatedly <b>self-injury behavior</b> , there is an <b>impaired problem solving strategy/coping strategy</b>

684	The resident/patient/client displays <b>avoidance behavior</b> due to a <b>lack of confidence in his/her own physical strength</b>
131	The resident/patient/client is at <b>risk of dermatitis associated with elimination/incontinence</b>

Table 11: Extensively revised practice guidelines version 2.6

Deactivated practice guidelines (n=9):	
188	The resident/patient/client is at <b>risk of circulatory collapse</b> during <b>mobilization procedures</b> (merged into diagnosis "hypotension", ID 260)
325	The resident/patient/client has a <b>CVC</b> (central venous catheter) there is a <b>risk of inflammation of the vein</b> (merged into diagnosis ID 651)
324	The resident/patient/client has an <b>intravenous cannula in situ</b> , there is a <b>risk of an inflammation of the vein</b> (merged into diagnosis ID 651)
326	The resident/patient/client is at <b>risk of being under or over infused</b> due to <b>intravenous infusion therapy</b> (merged into diagnosis 651)
887	The resident/patient/client is at <b>risk of ineffective treatment</b> due to <b>lack of information/skills</b> associated with <b>diabetes/hypo/hyperglycemia</b>
082	The resident/patient/client has a <b>fixation of the nasogastric tube, risk of skin irritation</b> (merged into diagnosis ID 097)
098	The resident/patient/client has <b>gastrointestinal pain</b> due to tube feeding (merged into diagnosis ID 097)
106	The resident/patient/client has blood sugar fluctuations due to <b>diabetes</b> , there is a <b>risk of hyperglycemia or hypoglycemia</b> (merged into diagnosis ID 354)
107	The resident/patient/client is at <b>risk of not achieving health related aims</b> due to a <b>lack of information/skills</b> associated with <b>diabetes</b>

Table 12: Deactivated practice guidelines version 2.6

## Literature used N=1018

### 2.4 ENP version 2.6 to 2.7 (May 2011 to August 2012)

The main driving force for the development work between versions 2.6 and 2.7 were two major projects with hospitals. On the one hand the incorporation of "therapeutic care" and on the other the peculiarities of children's hospitals. Also, validation works on ENP lead to the revision of some pathways.

New ENP practice guidelines (n=11)	
898	The resident/patient/client has <b>dermatitis associated with elimination/incontinence</b> , there is difficult wound healing
900	The resident/patient/client is unable to wash him/herself independently due to a <b>sensory integration disorder</b>
902	The resident/patient/client displays <b>motor and/or behavioral abnormalities</b> when there are adjustment responses to the environment, <b>impaired perception/sensory integration</b> disorder

903	The resident/patient/client shows <b>no reaction to stimuli</b> , impaired <b>consciousness</b>
901	The resident/patient/client is at risk of <b>irritations of the mucous membrane/dents</b> due to a <b>denture plate</b>
905	The newborn baby is at risk of neonatal hyperbilirubinemia
904	The resident/patient/client has <b>renal impairment/kidney failure</b> , there is a <b>metabolic disorder</b>
1017	The resident/patient/client is <b>developmentally delayed</b>
1034	Relatives/important persons' education does not promote development, there is a risk of delayed development
1032	The resident/patient/client is <b>restricted in swallowing</b> due to an <b>impaired bolus formation/control/transport</b>
1033	The resident/patient/client is at <b>risk of aspiration</b> due to a <b>lack of/insufficient protective reflexes</b>

Table 13: New ENP practice guidelines version 2.7

Extensively revised practice guidelines (n=20)	
522	The resident/patient/client's <b>production of mother milk is impaired</b> , <b>risk of under feeding</b> the baby
184	The resident/patient/client' ability to <b>sit independently</b> is <b>impaired</b>
712	The resident/patient/client's ability to <b>change position in bed</b> is <b>impaired</b>
160	The resident/patient/client is at risk of <b>pressure sores</b>
084	The resident/patient/client has <b>limited independence</b> when <b>eating/drinking</b>
842	The resident/patient/client is unable to perform self-care in <b>nutrition independently</b> due to the <b>stage of development</b>
849	The resident/patient/client has malnutrition due to a cognitive impairment
555	The resident/patient/client has <b>malnutrition</b>
851	The resident/patient/client is at <b>risk of malnutrition</b> due to <b>cognitive impairment</b>
608	The resident/patient/client's <b>transfer skills are impaired</b>
015	The resident/patient/client is at risk of complications due to a <b>reduced body awareness</b>
309	The resident/patient/client is at risk of complications due to a <b>quantitative impaired consciousness</b>
411	The resident/patient/client is <b>unable to perceive/process environmental stimuli adequately</b> , there is a risk of misinterpretation
840	The resident/patient/client has <b>not developed skills and abilities for his age</b> due to an impaired development of perception
537	The resident/patient/client is restricted in dressing and undressing due to a <b>hemiplegia</b>
529	The resident/patient/client is <b>restricted in dressing and undressing</b> due to other reasons
154	The resident/patient/client is at <b>risk of kidney failure</b>
234	The resident/patient/client is at risk of atelectasis/pneumonia due to <b>reduced lung ventilation</b>
828	The resident/patient/client is at <b>risk of reduced lung ventilation</b>



359	The resident/patient/client is at <b>risk of complications</b> due to a <b>raised bilirubin</b>
814	The resident/patient/client is at <b>risk of social exclusion</b> due to <b>behaviors</b> that breach the principles and valid standards of the community
815	The resident/patient/client has an altered social behavior due to an <b>altered parent-child relationship</b> that breaches the principles of set standards, there is a <b>risk of social exclusion</b>
748	The resident/patient/client is at <b>risk of delayed development</b> due to <b>separation from the parents/important person</b>
838	The resident/patient/client is at <b>risk of delayed development</b> due to <b>being premature</b>
891	The resident/patient/client is at risk of delayed development
92	The resident/patient/client is restricted when eating due to hypotonic cheek/lip/mouth muscles
681	The resident/patient/client is restricted when eating due to chewing difficulties
87	The resident/patient/client often chokes when eating, swallowing is impaired
90	The resident/patient/client often chokes when drinking, swallowing is impaired
95	The resident/patient/client's swallowing is impaired due to pressing of the tongue
96	The resident/patient/client is restricted when swallowing due to reduced/altered pharyngeal/esophageal peristaltic movement
870	The resident/patient/client has other/multiple reasons for dysphagia

Table 14: Extensively revised practice guidelines version 2.7

Deactivated practice guidelines (n=5):	
811	The resident/patient/client is at risk of <b>social exclusion</b> due to an <b>altered social behavior</b> that breaches the principles of valid social norms
52	The resident/patient/client has an impaired swallow reflex, there is a risk of aspiration during oral hygiene
88	The resident/patient/client has no swallow reflex, there is a risk of aspiration
89	The resident/patient/client has no cough, pharyngeal reflex, there is a risk of saliva aspiration
94	The resident/patient/client is restricted when eating due to a reduced ability to close the mouth, partly digested foodstuffs fall out of the mouth

Table 15: Deactivated practice guidelines version 2.7

## Literature used N=1214

The practice guidelines were supported at the current version (2012) on the basis of 1,214 national and international literature sources, e.g. German rules and standards as well as recommendations such as expert standards, guidelines of the MDS (Medical Service of the Central Association of Health Insurance Funds), legal peculiarities like activities according to §87b SGB XI etc.

## 2.5 ENP version 2.7 to 2.9 (August 2012 to August 2014)

In addition to a comprehensive literature-based and systematic revision of about one fifth of the nursing diagnostic part of all practice guidelines (nursing diagnosis label, characteristics, etiologies), this revision phase brought four new and with regard to the criteria transparency, clarity and comprehensibility major structural extensions for the nursing classification system ENP:

- Development of a definition for each ENP nursing diagnosis (see also chapter 1.2)
- Indication of the evidence level (LOE) for each nursing diagnosis as well as the complete ENP practice guidelines based on the criteria of NANDA International (see chapter 3)
- The documentation of the revision history for each practice guideline shows the number and time of revisions for each nursing diagnosis as well as each practice guideline.
- Establishment of explanatory texts (when required) for items on the level of characteristics, etiologies, and resources. These are used, for example, for Latin technical terms, ambiguous or rarely used terms and should bridge lack of clarity or potential knowledge gaps of the ENP users.

The following section (figure 8 and table 16) from the original German revision documentation of the ENP development team serves as an example of the class personal hygiene/clothing to illustrate the changes:

Type of text		ID no.	ENP texts for the nursing diagnosis
	Revision history: 1994*, 2004, 2008; 2014		
		ENP practice guideline	ENP nursing diagnosis
	Level of Evidence:	LOE 3.1	LOE 3.1
<b>Class</b>		10.051	<b>Personal hygiene/clothing</b>
<b>Category</b>		10.468	<b>Self-care deficit personal hygiene</b>
<b>Nursing diagnosis</b>		11	The resident-- should avoid movement between the pelvis and torso due to an <b>injury of the spinal column</b> , there is a <b>personal hygiene self-care deficit</b>
<b>Definition</b>			Is unable/not allowed to wash whole body or body parts at the washbasin or other washing facilities independently due to a spinal injury (e.g. through trauma, tumors) associated with the risk of paraplegia and/or neurologic impairment by rotational movements in the pelvis and trunk area (ICF [d510] washing oneself, ICNP [10020935] washing).

Figure 8: Detail of a revision documentation of the ENP development team: Definition of the nursing diagnosis, evidence level and revision history were added 2014 as new elements

ID	Characteristics	Explanation
22,080	Strongly pronounced agrammatism	Denotes a disorder of language production characterized by the lack of grammatical structures, e.g. some words are strung together without any grammatical link.
22,036	Strongly halting speech flow	
7,140	Pronounced word finding difficulties	
22,060	Uses commonplace phrases	
22,052	Uses meaningless phrases and/or stereotypes	

22,049	Phonematic neologisms	New word creations in which the used word differs in more than one sound from the target sound. In the standard language the “new” word doesn’t exist and thus has no meaning (e.g. “flower” becomes “fluler”).
22,058	Phonematic paraphrasia	Describes the phonetic change of a word through replacing, adding, omitting or shifting of individual sounds (e.g. “Pospital” instead of “hospital”)
22,081	Verbal semantic paraphrasia	Describes the wrong use of the word which is similar to the meaning of the target word or is contextually inappropriate. Example: “I married my sister 20 years ago.”
22,082	Conduite d’approche	Denotes the gradual semantic or phonematic approach to the searched word, e.g. in naming.
22,043	Increased language effort	Difficulties in motor activity of speech due to an impairment of articulation, phonation and/or speech rhythm

Table 16: Examples for explanations of ENP items on the level of characteristics

The following table presents those ENP practice guidelines which have been newly created, extensively revised or deactivated during the development from ENP version 2.7 to 2.9.

#### New ENP practice guidelines (n=17)

LOE of the guideline	LOE of the diagnosis	Year of development	ID	ENP nursing diagnosis label 2.9
LOE 2.1	LOE 2.1	2014*	1080	The resident-- is at <b>risk of impaired mobility</b>
LOE 2.1	LOE 2.1	2014*	1072	The resident-- is <b>impaired in well-being</b> [nursing problem without specification]
LOE 2.1	LOE 2.1	2013*	1071	The resident-- is <b>impaired in carrying out the activities of daily living</b>
LOE 2.1	LOE 2.1	2013*	1070	The newborn baby has <b>neonatal hyperbilirubinemia</b>
LOE 2.1	LOE 2.1	2013*	1068	The resident-- is at <b>risk of impaired wound healing</b> due to <b>intertrigo</b>
LOE 2.1	LOE 2.1	2013*	1067	The resident-- has <b>electrolyte imbalance</b>
LOE 2.1	LOE 2.1	2013*	1066	The resident-- has an <b>allergic reaction</b> , there is the <b>risk of anaphylactic shock</b>
LOE 2.1	LOE 2.1	2013*	1064	The resident-- has <b>fluid volume deficit</b>
LOE 2.1	LOE 2.1	2013*	1063	The resident-- is at risk of <b>pulmonary complications</b> due to <b>surgery</b>
LOE 2.1	LOE 2.1	2013*	1062	The resident-- has <b>insufficient respiration</b>
LOE 2.1	LOE 2.1	2012*	1041	The resident-- is at <b>risk of complications</b> due to <b>tick bite</b>
LOE 2.1	LOE 2.1	2012*	1040	The resident-- is at <b>risk of delayed development</b> due to <b>physical/medical neglect</b>

LOE 2.1	LOE 2.1	2012*	1039	The resident-- is at <b>risk of delayed development</b> due to <b>psychological abuse/emotional neglect</b>
LOE 2.1	LOE 2.1	2012*	1035	The resident-- is at <b>risk of delayed development</b> due to <b>physical abuse</b>
LOE 2.1	LOE 2.1	2012*	1038	The resident-- is at risk of <b>delayed development</b> due to a <b>suspected sexual abuse/rape</b>
LOE 2.1	LOE 2.1	2012*	1037	The resident-- is at <b>risk of delayed development</b> due to <b>sexual abuse/rape</b>
LOE 2.1	LOE 2.1	2012*	1037	The resident-- is at <b>risk of physical abuse</b>

Table 17: New ENP practice guidelines version 2.9

### Extensively revised practice guidelines (n=112)

LOE of the guideline	LOE of the diagnosis	Systematic update	ID	ENP nursing diagnosis label 2.9
LOE 3.2	LOE 3.2	1989*, 1994, 2007, 2014	407	The resident-- is <b>impaired in communication</b> due to <b>hypacusis (hardness of hearing)</b>
LOE 3.2	LOE 3.2	1991*, 2004, 2007, 2014	416	The resident-- is <b>impaired in verbal communication</b> due to a <b>global aphasia</b>
LOE 3.2	LOE 3.2	1991*, 2004, 2007, 2014	419	The resident-- is <b>impaired in verbal communication</b> due to <b>motor aphasia</b> (Broca's aphasia)
LOE 3.2	LOE 3.2	1991*, 2004, 2007, 2014	417	The resident-- is impaired in verbal communication due to a <b>sensory aphasia</b> (Wernicke's aphasia)
LOE 2.1	LOE 2.3	1992*, 1994, 2003, 2008, 2014	412	The resident-- is <b>impaired in verbal communication</b> due to <b>physical weakness</b>
LOE 3.2	LOE 3.2	2006*, 2014	387	The resident-- has <b>difficulty in expressing his/her own wishes/needs</b> , there is a <b>risk that these cannot be adequately fulfilled</b>
LOE 2.1	LOE 2.3	2000*, 2006, 2014	424	The resident-- is <b>impaired in verbal communication</b> due to a <b>speech disorder</b> (impairment of motor-articulatory skills)
LOE 2.1	LOE 2.1	2010*; 2014	897	The resident-- is restricted in communication due to a <b>language disorder</b>
LOE 3.2	LOE 3.2	1990*, 2006, 2014	414	The resident-- is unable to <b>make contact in the accustomed way</b> , an impaired interaction exists
LOE 2.1	LOE 2.3	2005*, 2011, 2014	411	The resident-- is <b>unable to perceive/process environmental stimuli adequately</b> , there is a <b>risk of misinterpretation</b>
LOE 3.2	LOE 3.2	2000*, 2004, 2006, 2014	746	The resident-- is <b>restricted in establishing and maintaining relationships with other people</b> , social interaction is affected
LOE 2.1	LOE 2.3	1993*, 2004, 2007; 2014	186	The resident-- is <b>impaired in the ability to walk</b>

LOE 2.1	LOE 2.3	1992*, 1994, 2004, 2008, 2014	193	The resident-- is <b>restricted when walking</b> due to <b>uncertainty in the use of walking aids</b>
LOE 3.2	LOE 3.2	1992*, 2001, 2011, 2014	608	The resident-- is <b>impaired in transfer skills</b>
LOE 3.2	LOE 3.2	1990*, 2004, 2007, 2011, 2014	181	The resident-- is <b>impaired</b> in the ability <b>to change position in bed</b> independently
LOE 2.1	LOE 2.1	1989*, 1994, 2004, 2008, 2014	592	The resident-- is unable to <b>move about in the wheelchair independently</b> in the living space
LOE 3.2	LOE 3.2	2001*, 2004, 2008, 2014	648	The resident-- has <b>restricted mobility</b> due to <b>reduced stamina/physical strength</b>
LOE 2.1	LOE 2.3	1992*, 1994, 2004, 2007, 2014	179	The resident-- has <b>limited mobility</b> due to an amputation of a lower extremity
LOE 2.1	LOE 2.3	1990*, 1994, 2002, 2006, 2007, 2014	171	The resident-- is at <b>risk of contracture</b>
LOE 3.2	LOE 3.2	1991*, 1994, 2007, 2014	178	The resident-- has limited mobility due to a <b>contracture</b>
LOE 3.2	LOE 3.2	1991*, 1994, 2004, 2008, 2014	165	The resident-- is at <b>risk of thrombosis</b> due to <b>immobility/restricted mobility</b>
LOE 3.2	LOE 3.2	1992*, 1994, 2004, 2009, 2014	261	The resident-- is at <b>risk of cardiovascular complications</b> due to <b>hypertonic circulatory changes</b>
LOE 2.1	LOE 2.3	1993*, 1994, 2005, 2009; 2014	610	The resident-- is at risk of <b>cardiovascular failure</b> due to <b>cardiac insufficiency</b>
LOE 2.1	LOE 2.3	1989*, 1994, 2004, 2011, 2014	234	The resident-- is at <b>risk of atelectasis/pneumonia</b> due to <b>reduced lung ventilation</b>
LOE 3.2	LOE 3.2	2005*, 2007, 2014	347	The resident-- is restricted in <b>taking medication independently</b> , there is a <b>risk of ineffective therapy</b>
LOE 3.2	LOE 3.2	1992*, 2004, 2008, 2011, 2014	688	The resident-- is at <b>risk of aspiration</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2008, 2014	12	The resident-- is unable to wash independently due to <b>restricted mobility</b>
LOE 3.2	LOE 3.2	1991*, 1994, 2004, 2008; 2014	22	The resident-- is unable to organize <b>personal hygiene independently</b> due to being <b>disorientated</b>
LOE 3.1	LOE 3.1	1991*, 1994, 2004, 2008, 2014	33	The resident-- does not perform <b>personal hygiene</b> adequately due to <b>self-neglect</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2008, 2014	7	The resident-- is unable to carry out personal hygiene independently due to <b>physical restrictions in coping with stress</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2003, 2007, 2014	18	The resident-- is <b>unable to carry out personal hygiene independently</b> due to <b>hemiplegia/hemiparesis</b>

LOE 3.1	LOE 3.1	1991*, 2000, 2004, 2008, 2014	13	The resident-- is <b>completely dependent in personal hygiene</b> due to a <b>measurable altered consciousness</b>
LOE 3.1	LOE 3.1	2001*, 2004, 2008, 2014	536	The resident-- is <b>unable to shower/bathe independently</b>
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2007, 2009, 2014	37	The resident-- is <b>restricted in carrying out oral hygiene</b> independently
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2009, 2014	46	The resident-- wears <b>dentures</b> and is unable to <b>carry out mouth/denture care</b> independently
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2008, 2014	69	The resident-- is <b>restricted in carrying out hair care independently</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2007, 2014	72	The resident-- is <b>restricted in carrying out shaving/beard grooming</b> independently
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2009, 2014	78	The resident-- is <b>restricted in carrying out nail care</b> independently
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2009*, 2014	827	The resident-- is <b>restricted</b> in independent <b>foot care</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2003, 2007; 2014	63	The resident-- is at <b>risk of skin damage</b> due to <b>dry skin</b>
LOE 3.2	LOE 3.2	1991*, 1994, 2004, 2008, 2014	66	The resident-- is at <b>risk of skin damage</b> due to <b>tendency to intertrigo</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2011, 2014	84	The resident-- is <b>restricted when eating/drinking</b> due to <b>limited independence</b>
LOE 3.2	LOE 3.2	2002*, 2004, 2008, 2014	554	The resident-- demonstrates <b>neglect of food intake</b> (self-neglect), there is a <b>risk of malnutrition</b>
LOE 2.1	LOE 2.3	2003*, 2008; 2014	559	The resident-- is at <b>risk of developing obesity</b> due to <b>deficient dietary behavior</b>
LOE 3.2	LOE 3.2	2002*, 2008, 2014	562	The resident-- is at <b>risk of fluid deficit</b> due to <b>oligodipsia/adipsia</b> (reduced/nonexistent thirst)
LOE 2.1	LOE 2.3	2009*, 2014	872	The resident-- is at <b>risk of fluid/electrolyte deficit</b>
LOE 2.1	LOE 2.3	2008*, 2014	850	The resident-- is at <b>risk of malnutrition</b>
LOE 2.1	LOE 2.3	2008*; 2014	851	The resident-- is at <b>risk of malnutrition</b> due to <b>cognitive impairment</b>
LOE 3.2	LOE 3.2	2004*, 2007, 2008, 2014	558	The resident-- <b>refuses food intake</b> (food refusal), there is a <b>risk of malnutrition</b>
LOE 3.1	LOE 3.1	2004*; 2008, 2014	555	The resident-- has <b>malnutrition</b>
LOE 3.2	LOE 3.2	1990*, 2003, 2009; 2014	97	The resident-- is receiving <b>enteral tube feeding</b> , there is an impaired <b>food intake</b>

LOE 3.1	LOE 3.1	1989*, 2003, 2009, 2011; 2014	87	The resident-- <b>often chokes when eating</b> , swallowing is impaired in the <b>oral transport/pharyngeal stage</b>
LOE 3.1	LOE 3.1	1989*, 2003, 2009, 2011; 2014	90	The resident-- <b>only chokes when drinking</b> , swallowing is <b>impaired in the oral transport/pharyngeal stage</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2008, 2014	127	The resident-- is impaired in independent <b>urinary/stool elimination</b>
LOE 3.2	LOE 3.2	2003*, 2006, 2014	132	The resident-- does not reach the toilet in time due to <b>impaired mobility</b> , there is a <b>risk of wetting</b>
LOE 3.2	LOE 3.2	2003*, 2006, 2008; 2012, 2014	130	The resident-- has <b>involuntary urine loss</b> (mixed incontinence) due to <b>detrusor overactivity</b> and an <b>insufficient sphincter apparatus</b>
LOE 3.2	LOE 3.2	2006*, 2008, 2012, 2014	574	The resident-- is <b>unable to avoid urine loss</b> with an <b>intact urogenital tract</b> (functional urinary incontinence)
LOE 3.2	LOE 3.2	1990*, 2003, 2006, 2008, 2012, 2014	134	The resident-- has <b>involuntary urine loss</b> (stress incontinence) due to an <b>insufficient sphincter apparatus</b> with increased abdominal pressure (stress incontinence)
LOE 3.2	LOE 3.2	2003*, 2006, 2008, 2012, 2014	137	The resident-- has <b>involuntary urine loss</b> (reflex incontinence) due to <b>involuntary, uninhibited detrusor contractions</b>
LOE 3.2	LOE 3.2	2003*, 2006, 2008, 2012, 2014	135	The resident-- suffers from <b>involuntary urine loss</b> due to <b>heavy imperative urgency</b> (urge incontinence)
LOE 3.2	LOE 3.2	1990*, 2003, 2006, 2012, 2014	143	The resident-- is at <b>risk of a reduced frequency of defecation</b> (risk of constipation)
LOE 3.2	LOE 3.2	2003*, 2006, 2012, 2014	576	The resident-- suffers from a <b>reduced frequency of defecation</b> associated with hard/dry bowel movements (constipation)
LOE 3.2	LOE 3.2	1989*, 2003, 2006, 2012, 2014	145	The resident-- suffers from <b>involuntary bowel movements</b> (fecal incontinence)
LOE 3.2	LOE 3.2	1991*, 1994, 2003, 2006, 2012, 2014	321	The resident-- is at <b>risk of an ascending urinary tract infection</b> due to an <b>indwelling transurethral catheter</b>
LOE 3.2	LOE 3.2	1991*, 2003, 2006, 2012, 2014	322	The resident-- is at <b>risk of an infection</b> of the organs of elimination due to a <b>suprapubic catheter</b>
LOE 3.2	LOE 3.2	1992*, 1994, 2004, 2007, 2011, 2014	529	The resident-- is <b>restricted in dressing and undressing</b> independently
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2008, 2014	170	The resident-- is <b>unable to put on/take off the compression stockings independently</b> , a <b>self-care-deficit when dressing</b> exists
LOE 2.1	LOE 2.3	2001*, 2004, 2007, 2014	530	The resident-- shows <b>no interest in clean/neat clothing</b> , there is a <b>risk of self-neglect of clothing/outer appearance</b>

LOE 2.1	LOE 2.3	1991*, 1994, 2004, 2008, 2014	537	The resident-- is <b>restricted in dressing and undressing</b> due to hemiplegia
LOE 3.2	LOE 3.2	1990*, 1995, 2004, 2014	299	The resident-- is <b>unable to sleep throughout the night</b> , there is a <b>risk of sleep deficit</b>
LOE 3.2	LOE 3.2	1990*, 1995, 2004, 2007, 2014	282	The resident-- is <b>hampered when falling asleep</b> , there is a <b>risk of sleep deficit</b>
LOE 2.1	LOE 2.3	1991*, 1995, 2003, 2007, 2014	479	The resident-- is <b>unable to relax</b>
LOE 2.1	LOE 2.3	1992*, 1994, 2003, 2007, 2009, 2014	467	The resident-- is <b>restricted in organizing recreational activities</b> independently
LOE 2.1	LOE 2.1	2006*, 2009, 2014	451	The resident-- is <b>restricted in the independent daily organization/organization of life</b> due to <b>age-related reduction processes</b> (frailty syndrome)
LOE 2.1	LOE 2.3	2006*, 2010, 2014	450	The resident-- is impaired in the <b>independent daily organization/organization of life</b> due to <b>disorientation</b>
LOE 2.1	LOE 2.1	2006*, 2009, 2014	634	The resident-- is <b>impaired in the daily organization/organization of life</b> due to <b>memory disorders</b>
LOE 2.1	LOE 2.3	2006*, 2009, 2014	535	The resident-- is <b>impaired in the daily organization/organization of life</b> due to a <b>thought disorder</b>
LOE 2.1	LOE 2.1	2006*, 2009, 2014	896	The resident-- is <b>impaired in the independent daily organization/organization of life</b> due to <b>dementia</b>
LOE 2.1	LOE 2.1	1993* 2003, 2009, 2014	452	The resident-- is <b>restricted in the independent daily organization/organization of life</b> due to a <b>handicap</b>
LOE 2.1	LOE 2.1	2003*, 2007, 2014	547	The resident-- is <b>restricted in styling the outward appearance</b> and is thereby <b>affected in his/her well-being</b>
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2008, 2014	187	The resident-- is at <b>risk of falls</b>
LOE 2.1	LOE 2.1	2005*, 2007, 2014	203	The resident-- has an <b>impaired postural control/balance</b> , is at <b>risk for falls</b> due to <b>Parkinson's disease</b>
LOE 2.1	LOE 2.3	1993*, 2004, 2007, 2014	216	The resident-- is at <b>risk for falls</b> due to an <b>impaired balance</b> when walking/standing/sitting
LOE 3.2	LOE 3.2	1989*, 1995, 2003, 2007, 2010, 2012, 2014	160	The resident-- is at <b>risk of pressure sores</b>
LOE 2.1	LOE 2.3	1991*, 1995, 2004, 2007, 2014	431	The resident-- <b>withdraws from social events</b> , there is a <b>risk of social isolation</b>
LOE 2.1	LOE 2.1	2001*, 2008, 2014	429	The resident-- is <b>impaired in structuring of the daily routine</b> , there is a <b>risk of self-care deficit</b>



LOE 2.1	LOE 2.3	2002*, 2008, 2014	626	The resident-- demonstrates a <b>tendency to run away</b> , there is a <b>risk of self-harm</b>
LOE 2.1	LOE 2.1	2003*, 2007, 2014	217	The resident-- is <b>impaired in the spatial orientation</b> due to <b>balance disorder</b>
LOE 3.2	LOE 3.2	2002*, 2005, 2008, 2014	317	The resident-- is at <b>risk of self-injury/ endangering others</b> due to <b>disorientation</b>
LOE 2.1	LOE 2.3	2005*, 2008, 2014	743	The resident-- shows acute <b>behavior which endangers self/others</b>
LOE 3.2	LOE 3.2	1990* 2003, 2007 2014	489	The resident-- has acute pain
LOE 3.2	LOE 3.2	2003*, 2007, 2014	645	The resident-- has <b>chronic pain</b>
LOE 2.1	LOE 2.3	1991*, 2004, 2007, 2014	493	The resident-- has <b>pain of the musculoskeletal system</b>
LOE 2.1	LOE 2.3	1991*, 2004, 2007, 2014	491	The resident-- has <b>joint pain</b> with <b>functional/mobility restrictions</b>
LOE 2.1	LOE 2.3	1990*, 1994, 2004, 2009, 2014	354	The resident-- is at risk of <b>hyperglycemia or hypoglycemia</b>
LOE 2.1	LOE 2.3	2003*, 2006, 2009, 2014	676	The resident-- has a <b>chronic wound</b> , there is <b>poor wound healing</b>
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2014	497	The resident-- is <b>anxious</b> , senses a real/fictitious threat
LOE 3.2	LOE 3.2	1990*, 1994, 2004, 2014	190	The resident-- is <b>afraid of falling</b>
LOE 2.1	LOE 2.3	1990*, 1994, 2004, 2014	498	The resident-- is <b>afraid of falling out of the bed</b>
LOE 2.1	LOE 2.3	2004*, 2008, 2014	703	The resident-- suffers from a <b>state of agitation</b>
LOE 2.1	LOE 2.3	1991*, 2004, 2007, 2014	464	The resident-- <b>feels bored</b> due to a <b>lack of meaningful tasks</b>
LOE 2.1	LOE 2.3	2004*, 2008, 2014	503	The resident-- suffers from <b>homesickness</b>
LOE 2.1	LOE 2.1	1989*, 1994, 2004, 2008, 2014	68	The resident-- is <b>impaired in well-being</b> due to <b>pruritus</b>
LOE 3.2	LOE 3.2	1989*, 1994, 2004, 2008, 2014	39	The resident-- has a <b>reduced/lacking chewing activity/flow of saliva</b> , there is a <b>risk of thrush and parotitis</b>
LOE 2.1	LOE 2.1	1991*, 1994, 2004, 2008, 2014	131	The resident-- is at <b>risk of dermatitis associated with elimination/incontinence</b>
LOE 3.2	LOE 3.2	2005*, 2006, 2008, 2011, 2014	857	The resident-- has <b>pressure sore</b> , there is <b>difficult wound healing</b>

LOE 3.2	LOE 3.2	2003*, 2008, 2014	622	The resident-- is at <b>risk of an increased (extracellular/intravascular) fluid volume</b>
LOE 2.1	LOE 2.1	2003*, 2008, 2011, 2014	887	The resident-- is at risk of ineffective treatment due to <b>lack of information/skills</b> associated with <b>diabetes/hypo/hyperglycemia</b>
LOE 2.1	LOE 2.3	2006*, 2011, 2014	569	The resident-- has the <b>risk of skin damage</b> due to <b>sensitive/thin skin</b>
LOE 2.1	LOE 2.3	2006*, 2009, 2014	383	The resident-- has an <b>infectious disease</b> , there is a risk of spreading infection to the surrounding environment
LOE 2.1	LOE 2.1	2009*, 2014	894	The resident-- has colonization/infection of multi-resistant organisms, there is a risk of germ spreading
LOE 3.2	LOE 3.2	1989*, 2003, 2006, 2009, 2014	339	The resident-- has a secondary wound healing, there is a disturbance of wound healing

Table 18: Extensively revised practice guidelines version 2.9

### Deactivated practice guidelines (n=13)

As part of the revision the nursing diagnoses listed below have been merged or transferred to a new diagnosis.

ID	ENP nursing diagnosis label
52	The resident-- has an impaired swallow reflex, there is a risk of aspiration during oral hygiene
88	The resident-- has no swallow reflex, there is a risk of aspiration
89	The resident-- has no cough, pharyngeal reflex, there is a risk of saliva aspiration
94	The resident-- is restricted when eating due to a reduced ability to close the mouth, partly digested foodstuffs fall out of the mouth
561	The resident-- is at risk of fluid deficit
654	The resident-- must eat a low protein diet due to a protein intolerance, there is a risk of dietary related complications
828	The resident-- is at risk of reduced lung ventilation
235	The resident-- has shallow breathing and is unable to perform active breathing exercises, there is a risk of atelectasis/pneumonia
249	The resident-- is unable to cough up due to a glottis closure defect, there is a risk of atelectasis/pneumonia
198	The resident-- has restricted freedom of movement due to external factors
206	The resident-- has impaired mobility due to pain on weight bearing
647	The resident-- has postoperative restricted mobility
490	The resident-- has joint pain including pain on initiation of movement

Table 19: Deactivated practice guidelines version 2.9

Literature used N=3,545

The practice guidelines of version 2.9 (2014) are supported by 3,545 national and international literature sources. These include German regulations, guidelines and recommendations such as the national expert standards, etc., as well as numerous international guidelines.

## 2.6 ENP version 2.9 to 2.10 (September 2014 to May 2017)

In addition to technical and content-related revisions of the ENP catalogue, huge efforts were made in the revision period between the ENP version 2.9 and 2.10 for the methodological further development of the ENP development procedures as well as the creation of a new methodological and research-practically adequate validation option for the created or revised ENP content (see chapter 1.4.2 and 1.4.3) and thus a large amount of resources spent in structural and content-related work of ENP.

Those ENP practice guidelines which have undergone changes in content, have been terminologically refined or added in version 2.10 are listed in the following table<sup>11</sup>. Most of the changes or new developments are based on suggestions from users who use ENP in their daily nursing practice. For detailed information on the changes on item level there is a separate revision documentation available on request for each revised practice guideline. During the further development from ENP version 2.9 to 2.10 no practice guideline was deactivated.

### New ENP practice guidelines (n = 5)

LOE of the guideline	LOE of the diagnosis	ID	ENP nursing diagnosis label
LOE 2.1	LOE 2.1	1081	The resident-- is <b>impaired in interaction</b> due to <b>inadequate emotional/affective reaction patterns</b>
LOE 2.1	LOE 2.1	1082	The resident-- is <b>impaired</b> in communication due to a <b>formal thought disorder</b>
LOE 2.1	LOE 2.1	1084	The resident-- has a <b>bladder emptying dysfunction/urinary incontinence</b> , there is an <b>impaired help-seeking behavior</b>
LOE 2.1	LOE 2.1	1120	The resident-- has a <b>urostomy</b> (surgical urinary diversion), there is a <b>self-care deficit stoma care/management</b>
LOE 2.1	LOE 2.1	1121	The resident-- is at <b>risk</b> of developing a <b>stoma complication</b>

Table 20: New ENP practice guidelines version 2.10

<sup>11</sup>Not listed in the table are terminologically or content-related revisions of individual items with no relevance for the context/topic of one or many assigned practice guidelines.

### Extensively revised practice guidelines (n = 13)

LOE of the guideline	LOE of the diagnosis	ID	ENP nursing diagnosis label
LOE 3.2	LOE 3.2	149	The resident-- has an <b>ostomy</b> (artificial opening for the bowels), there is a <b>self-care deficit stoma care/management</b> (previously: The resident-- has a <b>self-care deficit in stoma care</b> )
LOE 2.1	LOE 2.1	148	The resident-- has a <b>stoma</b> , there is a <b>need of information</b> (previously: The resident-- has an <b>ostomy</b> (artificial opening for the bowels), there is a <b>need of information</b> )
LOE 2.1	LOE 2.1	153	The resident-- has a <b>colostomy</b> (artificial opening for the bowels), <b>information/skills are lacking</b> in order to carry out irrigation independently (previously: The resident-- has a <b>ostomy</b> (artificial opening for the bowels), <b>information/skills are lacking</b> in order to carry out irrigation independently)
LOE 3.2	LOE 3.2	268	The resident-- has <b>fever</b> (pyrexia), there is a <b>risk of complications</b> (previously: The resident-- has <b>hypothermia</b> , there is a <b>risk of complications</b> )
LOE 2.1	LOE 2.1	580	The resident-- has <b>skin changes</b> in the area around the stoma, there is <b>impaired stoma care</b> (previously: The resident-- has <b>skin changes</b> in the area around the ostomy, there is <b>impaired stoma care</b> )
LOE 2.1	LOE 2.1	581	The resident-- has <b>stoma necrosis</b> , there is an <b>impaired stoma care</b>
LOE 2.1	LOE 2.1	582	The resident-- has <b>stoma retraction</b> , there is an <b>impaired stoma care</b>
LOE 2.1	LOE 2.1	583	The resident-- has <b>stoma prolapse</b> , there is an <b>impaired stoma care</b>
LOE 2.1	LOE 2.1	584	The resident-- has <b>parastomal hernia</b> , there is an <b>impaired stoma care</b>
LOE 2.1	LOE 2.1	674	The resident-- is <b>impaired in the ability to adapt to the altered state of health</b>
LOE 2.1	LOE 2.1	881	The resident-- has any other <b>problem stoma</b> which impairs stoma care (previously: The resident/patient/client is <b>otherwise impaired in stoma care</b> )
LOE 2.1	LOE 2.1	1063	The resident-- is at <b>risk of respiratory complications</b> due to <b>surgery</b>
LOE 3.2	LOE 3.2	134	The resident-- has <b>involuntary urine loss</b> (stress incontinence) due to an <b>insufficient sphincter apparatus</b> with increased abdominal pressure

Table 21: Extensively revised practice guidelines version 2.10

### Terminologically and/or selectively revised practice guidelines (n = 19)

LOE of the guideline	LOE of the diagnosis	ID	ENP nursing diagnosis label
LOE 2.1	LOE 2.1	68	The resident-- is <b>impaired in well-being</b> due to <b>pruritus</b>

LOE 3.2	LOE 3.2	130	The resident-- has <b>involuntary urine loss</b> (mixed incontinence) due to <b>detrusor overactivity</b> and an <b>insufficient sphincter apparatus</b>
LOE 3.2	LOE 3.2	137	The resident-- has <b>involuntary urine loss</b> (reflex incontinence) due to <b>involuntary, uninhibited detrusor contractions</b>
LOE 2.1	LOE 2.1	138	The resident-- has <b>chronic urinary retention</b> and <b>involuntary urine loss (overflow incontinence)</b>
LOE 2.1	LOE 2.1	151	The resident-- has <b>mycosis</b> (fungal infection) of the <b>area around the ostomy</b> , there is an <b>impaired stoma care</b>
LOE 2.1	LOE 2.1	160	The resident-- is at <b>risk of pressure sores</b>
LOE 2.1	LOE 2.1	359	The resident-- has <b>jaundice</b> due to <b>increased bilirubin</b>
LOE 2.1	LOE 2.1	369	The resident-- is at <b>risk of aspirating</b> due to <b>vomiting/tendency to vomit</b> as a result of a <b>surgical intervention</b> (PONV = postoperative nausea and vomiting)
LOE 2.1	LOE 2.1	383	The resident-- has an <b>infectious disease</b> , there is a <b>risk of germ spreading</b>
LOE 3.2	LOE 3.2	574	The resident-- is <b>unable to avoid urine loss</b> with an <b>intact urogenital tract</b> (functional urinary incontinence)
LOE 2.1	LOE 2.1	696	The child aged older than 5 <b>wets</b> her/himself without organic reasons (enuresis)
LOE 2.1	LOE 2.1	706	The resident-- is <b>currently impaired in well-being</b> due to <b>nausea</b>
LOE 2.1	LOE 2.1	905	The newborn-- is at <b>risk of neonatal jaundice</b>
LOE 2.1	LOE 2.1	1070	The newborn-- has <b>neonatal jaundice</b> , there is the risk of complications
LOE 3.2	LOE 3.2	165	The resident-- is at <b>risk of venous thrombosis</b> due to <b>immobility/restricted mobility</b>
LOE 2.1	LOE 2.1	279	The resident-- is at <b>risk of venous thrombosis</b> due to <b>varicosis</b>
LOE 2.1	LOE 2.1	591	The resident-- has other <b>risk factors</b> which favor the <b>risk of thrombosis</b>
LOE 2.1	LOE 2.1	859	The resident-- has <b>venous leg ulcer</b> , there is difficult wound healing
LOE 3.2	LOE 3.2	135	The resident-- has a strong/ <b>imperative urgency</b> associated with <b>involuntary urine loss</b> (urge incontinence)

Table 22: Terminologically and/or selectively revised practice guidelines version 2.10

As of May 2017, **the 557 ENP practice guidelines of version 2.10 are based on the analysis of altogether approx. 3,960 publications.** For the content-related revisions of ENP from version 2.9 to 2.10, a total of 410 systematically researched, national and international publications were used.

## 2.7 Outlook: ENP version 3.0 (expected release: 2019)

In addition to the technical further development based on user feedback, the analysis of user databases, new research findings as well as the further strengthening of the evidence base of older ENP practice guidelines, especially the completion of two structural aspects are planned for the publication of a new major version of ENP in 2019:

- The systematic creation of a definition for all nursing diagnoses of the entire ENP catalogue, wherever this hasn't yet been done since the revisions of 2014. Definitions of ENP nursing diagnoses already formulated in this period will be revised again with regard to currentness and correctness in order to ensure a clear description of the concept terms and their contexts in the nursing diagnoses.
- Evidence level (see chapter 3) for each ENP nursing diagnosis with associated characteristics, etiologies and resources, on the one side, as well as for each entire ENP practice guideline, on the other side (ie additionally considering ENP nursing outcomes and ENP nursing interventions). The aim is to create transparency for the entire ENP catalogue with regard to the developmental status, the level of scientific substantiation as well as validation status of the individual ENP nursing diagnoses or ENP practice guidelines.

From a technical perspective new and further developments and revisions of ENP practice guidelines are currently being planned (as of May 2017) or currently being implemented for the following clinical topics among others:

- Dysphagia
- Respiration
- Dementia
- Chronic fatigue

## 3. Evidence grades of the ENP nursing diagnoses and practice guidelines

Evidence level were developed for the ENP nursing diagnoses and practice guidelines starting with the revisions in 2014. Important development goals from the outset were to create comparability of evidence level with those of other nursing classification systems and to create a maximum of transparency of the development, revision and validation status of the ENP nursing diagnoses and ENP practice guidelines. Against this background, the level of evidence of ENP are based on the classification criteria of NANDA International (vgl. Herdman & Kamitsuru, 2016, p. 496-498), although these criteria can also be critically discussed<sup>12</sup>. This ensures that the explanatory power of individual nursing diagnoses of various classification systems can be compared with each other. The specification of evidence levels will be continued as part of the further development work and refers to the nursing diagnosis (nursing diagnosis and its definition, characteristics, etiologies and resources) as well as the entire practice guideline (plus nursing outcomes and interventions). The following list shows the evidence level of ENP in detail:

### 1. Development of a new practice guideline

ENP practice guidelines are generally developed inductively, which means that the nursing practitioners working with ENP identify a gap in ENP. The development often originates in the identification of a relevant phenomenon in nursing practice and is subsequently implemented. The result is consented with nursing practice. Subsequently, the diagnosis will be included to the ENP catalogue. Less frequently, the new

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<sup>12</sup> The evidence level of NANDA-I can be viewed in book publications and also on the website <http://www.nanda.org/nanda-international-level-of-evidence-criterial.html> (Accessed 10.05.2017)

development of an ENP practice guideline is influenced by literature reviews, health policy developments or other impulses outside of nursing practice. If this is the case, a development proposal is first developed (see LOE 1.1/1.2/1.3) which is then discussed with experts from clinical practice and evaluated by them.

**1.1 Nursing diagnosis label only (development request)**

The topic as well as the essential concept terms of the ENP nursing diagnosis are clear and are supported by literature references. The syntactic and structural requirements are examined. Also, potential overlapping with other ENP practice guidelines are essentially examined and avoided.

**1.2 Nursing diagnosis label and definition, characteristics, etiologies and resources (development request)**

The ENP nursing diagnosis is clearly formulated, the definition is consistent with the title. The definition differs from the core concepts of the diagnosis title in the form of a description. The diagnosis and the definition as well as the characteristics, etiologies and resources developed in this phase, are supported by literature references.

**1.3 Nursing diagnosis and definition, characteristics, etiologies and resources are completed by nursing outcomes and nursing interventions to a practice guideline (development request)**

The ENP practice guideline is at an early stage and is made available to the end users in software applications for evaluation and is improved together with the ENP development team.

In clinical nursing practice it may occur that an ENP practice guideline is made available to end users at an early state of 1.3 in the context of projects. In the official ENP catalogue as well as in book publications, however, only diagnoses will be listed which have at least reached the maturity level of 2.1.

**2. Nursing diagnoses and practice guidelines included in the ENP catalogue and confirmed by international literature references, nursing practice and/or consensus studies**

**2.1 Nursing diagnosis label, definition, characteristics, etiologies and resources (nursing diagnostic statement) or nursing diagnosis label, definition, characteristics, etiologies, resources and nursing outcomes and interventions (entire practice guideline) are supported by literature references**

The nursing diagnosis, its definition as well as characteristics, etiologies and resources in the sense of a nursing diagnostic statement or the entire ENP practice guideline, i.e. these elements as well as the nursing interventions and nursing outcomes are supported by national and international literature references.

**2.2 Concept analysis of the nursing diagnosis**

Additional to the literature support of diagnosis label, definition, characteristics, etiologies, resources, nursing interventions and nursing outcomes, a concept analysis of the key nursing diagnostic terms with detailed literature review is carried out. The concept analysis supports the nursing diagnosis and the definition and includes discussion and support of characteristics.

**2.3 Consensus studies on existing diagnoses by experts**

In addition to the literature support of all elements of the nursing diagnosis and practice guideline, consensus studies are carried out with experts from the respective specialist area. The studies include expert's opinions, Delphi or cross mapping studies with other nursing classification systems as well as similar study designs with diagnostic content.

**3. Clinically supported nursing diagnoses and practice guidelines (validation and testing)**

**3.1 a) Literature synthesis**

The further development of the nursing diagnosis/practice guideline is based on a systematic, international literature analysis and evaluation for the nursing diagnosis and nursing intervention with documented and proven search strategy.

### 3.1 b) Literature synthesis and expert rating

The further development of the nursing diagnosis/practice guideline is based on a systematic literature analysis and evaluation for the nursing diagnosis and nursing intervention with documented and proven search strategy as well subsequent expert rating (e.g. through standardized questionnaires, online surveys etc.).

### 3.2 Clinical studies of nursing diagnoses and practice guidelines which cannot be generalized to the general population

The study refers to the nursing diagnosis as well as all characteristics and etiologies that are related to the diagnosis or the entire practice guideline (including nursing outcomes and nursing interventions). The studies can be of qualitative or quantitative nature. This also includes studies which examine the concurrent validity in the clinical context. The sample size is limited and not random (non-probabilistic).

### 3.3 Well-designed clinical studies with small sample sizes

The study refers to the nursing diagnosis as well as all characteristics and etiologies that are related to the diagnosis or the entire practice guideline. The studies can be of qualitative or quantitative nature. This also includes studies which examine the concurrent validity in the clinical context. A random sample (probabilistic sample) is used, but with a limited sample size.

### 3.4 Well-designed clinical studies with random sample of sufficient size to allow for generalizability to the total population

The study refers to the nursing diagnosis as well as all characteristics and etiologies that are related to the diagnosis or the entire practice guideline. The studies can be of qualitative or quantitative nature. This also includes studies which examine the concurrent validity in the clinical context. A random sample (probabilistic sample) is used, the sample size is sufficient to generalize the results to the total population.

With reference to the current ENP version 2.10, there are currently 157 out of 557 practice guidelines (equivalent to 28 %) with an evidence level. The distribution to the individual evidence grades is as follows:

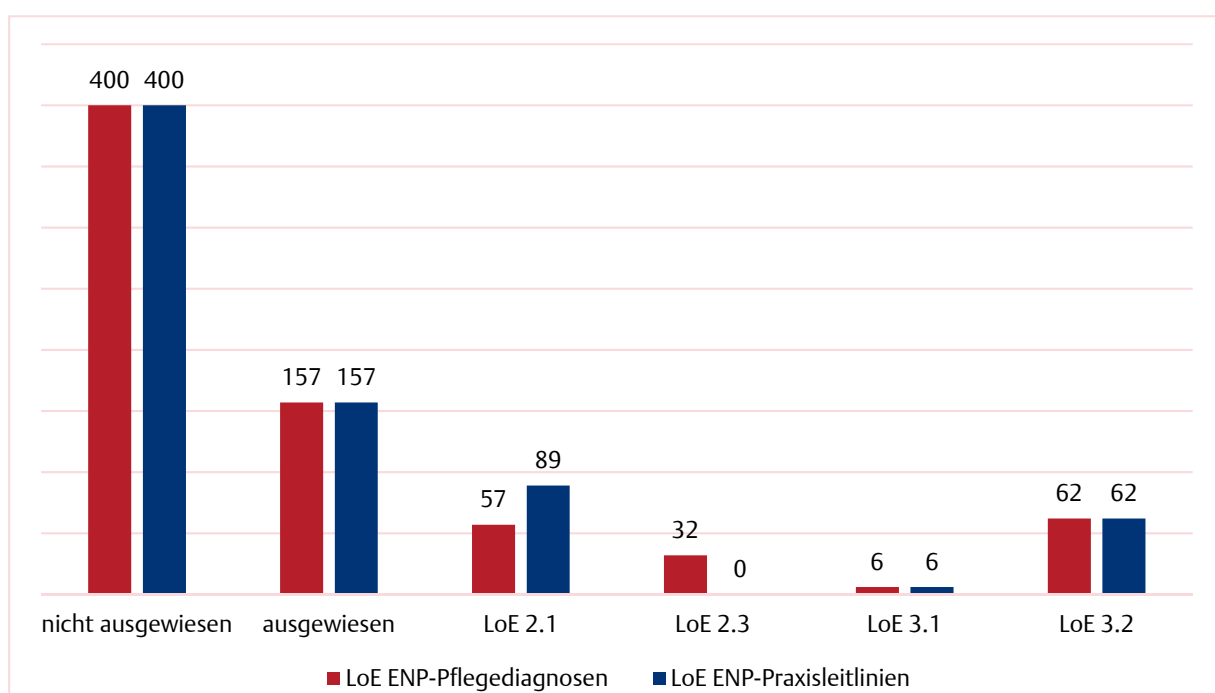


Figure 9: Distribution of evidence levels for ENP nursing diagnoses and ENP practice guidelines



## 4. Definitions of the class terms in ENP

In order to enhance clarity of the European Nursing care Pathways as nursing language and classification system, linguistic structures and definitions for the individual ENP groups have been determined by the ENP development team over the course of the development. These are presented in the chapters below.

### 4.1 Definition of ENP nursing diagnoses

An ENP nursing diagnosis is defined as follows:

*ENP nursing diagnoses generally are a systematic clinical judgement of the patient's responses to actual or potential health problems and/or life processes. Nursing diagnoses are thus part of the nursing process and form the basis for the selection of nursing interventions by means of which the nursing outcomes agreed upon with the patient are achieved. A nursing diagnosis in ENP in particular is the term nurses use, if possible, together with the person affected and/or his/her relatives based on the systematic assessment/evaluation (assessment, nursing anamnesis, physical examination) of the health status and mental, physiological and developmental state, or the response to health problems to make decisions on that basis for nursing outcomes and appropriate nursing interventions.*

An ENP nursing diagnosis describes possible nursing diagnostic findings in a standardized form. The elements of an ENP nursing diagnosis are a nursing problem and a specification. As of May 2017, a small part of the ENP nursing diagnoses of about 17.8 % (n = 99) has no specification and serves as "rest category", if no provided pre-combined nursing problems with specification apply. As part of the diagnostic process, the nurse adds in this case characteristics and etiologies him/herself and transfers the nursing problem into a nursing diagnosis. A pre-combination of specification and nursing problem was conducted, if there are specific intervention concepts for the ENP nursing diagnosis. A nursing problem in ENP is defined as follows:

*Nursing problems are actual impairments of the person affected which are due to his/her person or his/her environment. Or, there are risks associated with the affected person's health status or treatment which he/she cannot cope with or eliminate and which restrict his/her independence and/or those of others. Psychological, environmental and developmental conditions or changes of the physiological health status as well as age-related restrictions can be the starting point of nursing problems. Professional action is required to determine the nursing problem, transfer it into a nursing diagnosis and to positively influence the health status through planned care.*

Gordon und Bartholomeyczik say that a nursing diagnosis consists of three essential elements, "[...] which are also termed as PES scheme". *These three components are: Health problems (P), Etiologic and related factors (E) [and] defining characteristics or cluster of signs and symptoms (S)*" (Gordon & Bartholomeyczik, 2001, S. 38f). On the level of category the group of nursing problems describe nursing problems which represent disjunctive features to which the nursing diagnosis terms are assigned. Due to the composition of an ENP nursing diagnosis from a nursing problem and a specification, this already contains at least two essential elements of a nursing diagnosis as suggested by Gordon & Bartholomeyczik. As part of the diagnostic process the nurse selects adequate characteristics and etiologies from ENP. The characteristics in ENP do not exclusively refer to the nursing problem, but to the combination of the nursing problem and the specification.

In the following table 23, exemplary ENP nursing diagnoses of the category *Personal hygiene/clothing* and the category *Self-care deficit personal hygiene* from the domain *nursing diagnoses from the functional/physiological context* are presented, in order to clarify the difference between nursing problem (= category) and nursing diagnosis in ENP.

Class	Category (= nursing problem)	ENP nursing diagnoses
<b>Personal hygiene/clothing</b>	Self-care deficit washing	The resident/patient/client is <b>unable to wash independently</b> due to <b>restricted mobility</b>
		The resident/patient/client is unable to carry out personal hygiene independently due to <b>hemiplegia/hemiparesis</b>
		The resident/patient/client is <b>unable to carry out personal hygiene independently</b> due to <b>physical restrictions</b>
		The resident/patient/client is not allowed to exert himself whilst carrying out personal hygiene due to a <b>reduced cardiac output</b> , there is a <b>self-care deficit personal hygiene</b>
		The resident/patient/client is <b>unable to hold bathing articles</b> due to <b>restricted mobility</b> , there is a self-care deficit personal hygiene
		The resident/patient/client is <b>unable to organize personal hygiene independently</b> due to being <b>disorientated</b>
		The resident/patient/client should avoid movement between the pelvis and torso due to an <b>injury of the spinal column</b> , there is a <b>personal hygiene self-care deficit</b>
		The resident/patient/client is <b>completely dependent on personal hygiene</b> being carried out due to a <b>measurable altered consciousness</b>
		The resident/patient/client does not perform <b>personal hygiene</b> adequately due to <b>self-neglect</b>
		The resident/patient/client is <b>unable to carry out perineal hygiene as accustomed</b> due to a <b>wound in the genital area</b>
		The resident/patient/client is <b>unable to carry out personal hygiene self-care independently</b> due to <b>stage of development</b>
		The resident/patient/client is unable to wash him/herself independently due to a <b>sensory integration disorder</b>
		The resident-- is impaired in <b>personal hygiene</b> [nursing problem without specification]
...		

Table 23: ENP nursing diagnoses from the category of personal hygiene/clothing to illustrate the difference between nursing problem and ENP nursing diagnose

The operationalization of self-care deficit personal hygiene presented here is determined by the development of the practice guideline. If during the development of the nursing practice guideline it becomes clear that there are e.g. specific intervention concepts for self-care deficit personal hygiene for patients with hemiplegia, the ENP nursing diagnosis would be further developed pre-combined. A literature analysis which was created as part of the ENP development of the nursing diagnoses of the sub-category self-care deficit personal hygiene shows that there are specific intervention concepts for the ENP nursing diagnoses listed in table 23 (Helmbold & Berger, 2010).

To provide the user of ENP with differentiated and purpose-oriented intervention concepts, the already described structure of the ENP nursing diagnoses was chosen.

## 4.2 Definition: ENP characteristics

Any analysis of a concept inevitably leads to the defining characteristics of the term. To determine the scope of a term as well as the nursing diagnostic concept, such as the ENP nursing diagnoses, the determination of characteristics is decisive which can support the nursing diagnosis. In terminology, the characteristics are assigned different meanings. *"The entirety of the defined attributes of a concept at a given time is the sum knowledge about this concept"* (Arntz, Picht, & Mayer, 2004, p. 53f). This knowledge about the concept supports to specify and define the knowledge. Also, characteristics support to structure concepts and classify them into a taxonomy.

In the nursing diagnostic process the characteristics are used as indicators to confirm a nursing diagnosis (Gordon & Bartholomeyczik, 2001, p. 43ff.). As part of the development of ENP nursing diagnoses the characteristics are used to conceptualize these. In the following, the definition of the ENP characteristics are presented.

***ENP characteristics** are indicators, symptoms and expressions of the person affected. These help to identify the nursing diagnosis/problems or to differentiate the nursing diagnosis/problem from each other. These indicators can describe symptoms, further features of the problem, biographical or historical, physiological or psychological indicators, a reported verbal expression of the person affected regarding the problem, reported reactions of a human being or risk factors.*

The characteristics of ENP refer to the existing nursing problem as well as the problem specification.

## 4.3 Definition: ENP etiologies

Etiologies can be defined as a term "for an incident or a set of incidents which causally produce another incident, the effect (causality)". Mittelstraß defines the concept of etiology in the Encyclopedia of philosophy and theory of science) on the basis of four etiology types according to Aristoteles, the modern cause-effect relations according to Humes and other philosophers (Mittelstraß, 1996, S. 442). A similar basic understanding was used for the definition of the etiologies in the ENP development. Etiologies shall further differentiate the nursing diagnosis, if they are responsible or influential in causing and maintaining the health problem/condition (Brobst et al., 1997; Gordon, 2001). In ENP etiologies are defined as follows:

***ENP etiologies** are triggering and/or influencing factors which lead to or maintain the development of a nursing problem/nursing diagnosis. Etiologies/influencing factors may be the behavioral patterns of the affected person, existing or known illnesses as well as describable restrictions both in the psychosocial area or in the area of physical and cognitive restrictions. Also, etiologies/influential factors can be found in the environment, the socialization and the experiences of the person affected.*

As part of the nursing care process it is important to be aware of the etiologies of nursing problems, as they often have to be taken into account for intervention offers in order to solve or cure a nursing problem. For example, there is a difference for the planning and selection of adequate nursing interventions, in whether an individual is unable to wash himself/herself, because the etiology is either the restriction of movement after surgery or apraxia. The understanding of etiologies in ENP is based on the philosophical analysis of the concept of etiologies which gives the following distinction (Hügli & Lübcke, 2001): Etiologies as causal relationship between cause and effect. *Etiologies as chain of causation and causal relation, that means "[...] that network of causes and effect into which an event is interwoven"* (Hügli & Lübcke, 2001, p. 642).

*Contributive etiologies* are etiologies that are related with the effect, but which do not cause the effect alone.

*Major etiology* is a cause that can be proven to be of major importance for the effect.

*Essential etiologies* which is a necessary condition for the effect.

The different perspectives and distinctions of the concept 'etiology' are always formulated in ENP in relation to the nursing diagnosis. Of particular interest are the special relationships between the identified health problems/conditions of an individual, its etiologies and the factors that maintain the problem. Each ENP nursing diagnosis can be assigned several etiologies. This means that different etiologies can influence or cause the diagnosis. The selected etiologies in the diagnostic process form the basis for the selection of adequate interventions.

The etiology formulations can be diseases (e.g. *mania, right-sided heart failure, eating disorder, multiple sclerosis*), motives for behavior (e.g. *need for self-affirmation, aversion to food intake, lack of interest, fear, sense of shame*), conditions (e.g. *confused state, prolonged loss of appetite, deformation at the soft palate, sucking weakness, dyspnea at exertion, lack of self-esteem, limited mobility*) knowledge/ information deficits (e.g. *lacking knowledge on breast feeding, lack of access to information*), socio-cultural influences (e.g. *family dynamic factors, unemployment*), habits/behavior (e.g. *ritualized compulsive behavior, stool smearing, lack of activity, insufficient setting of boundaries*), impaired interaction (e.g. *speaks a different language*), or restricted/impaired abilities (e.g. *restricted cognitive abilities*).

#### 4.4 Definition: Resources

In ENP, the resources (abilities) of the person concerned are formulated with the nursing diagnosis which are important for the selection of the nursing outcomes and nursing interventions. An ENP resource is defined as follows:

ENP resources are descriptions of conditions, physical, mental and psychosocial abilities, behaviors and/or factors of the social environment that help to develop coping strategies and/or to support nursing interventions.

The development of resources is always formulated against the background of the preferably differentiated description and assessment of the health problem/condition from which the care/support need is derived. For example, it is decisive for the selection of nursing outcomes and interventions whether a patient with a self-care deficit in personal hygiene is able to sit or stand and e.g. to handle the facecloth. Resources in contrast to the other groups in ENP make no claim to completeness. Nurses are asked to add individual entries of resource formulations as part of the diagnostic process.

The standardized resource formulations of ENP refer to behaviors, activity-promoting attitudes, support of the social environment or physiological conditions that help to develop and support coping strategies and interventions to address health problems and to cope with (health) crises by drawing on personal and socially mediated resources (resilience).

#### 4.5 Definition: ENP nursing outcomes

The nursing outcome should be achieved by targeted nursing care and the promotion of individual resources. Nursing outcomes should be realistic, achievable, verifiable, positively formulated and based on the nursing problem/diagnosis. A nursing diagnosis can be assigned to several possible outcomes. The nurse selects one or many nursing outcomes depending on the patient's condition. An ENP nursing outcome is defined as follows:

*ENP nursing outcomes determine the nursing results that nurses plan together with the person affected and which are to be achieved within an agreed time frame. The expected results are described in the form of actual conditions to be achieved in the future. The nursing outcomes can refer to physical performances and abilities, physiological parameters, knowledge, behaviors and personality traits, findings, emotional experience and subjective sensation as well as the identification of physical changes.*

It is possible to use the nursing outcomes for outcome measurement. For this purpose, each ENP nursing outcome is linked with a five-point Likert scale for assessing the level of outcome achievement. There are different types of five-point scales. Common to all is that 5 means the outcome was achieved and 1 that the nursing outcome has not yet been achieved. Here are a few examples:

**ENP nursing diagnosis:** The patient withdraws from social events, social interaction is impaired

**Etiology:** Psychological illness

**Characteristic:** Withdraws to his/her room

**Nursing outcome:** Participates in group activities without being asked

The nurse assesses the outcome achievement on a five-point Likert scale. The linked evaluation criteria for assessing the level of outcome achievement are:

- 5 = completely achieved
- 4 = largely achieved
- 3 = moderately achieved
- 2 = slightly achieved
- 1 = not achieved

The coding 1 means that the patient has not achieved the nursing outcome "*Participates in group activities without being asked*" with regard to the nursing diagnosis (0 % outcome achievement). The coding "less" means that weak signs of outcome achievement are observable (up to 25 % outcome achievement), a "moderate" evaluation shows that there is an average outcome achievement (26–50 %), "extensively achieved" is coded if the outcome has been achieved by more than 50 % (51–75 % outcome achievement) and "completely achieved" is coded if the outcome has been achieved above 75 %.

Another type of scaling is realized in ENP by operationalized outcome items. For example, the three nursing outcomes for personal hygiene have been described as in the following table.

Scale sectioned in 5 personal hygiene					
	Value 5	Value 4	Value 3	Value 2	Value 1
Is able to <b>wash and dry body independently</b>	Is able to <b>wash and dry body independently</b>	Is able to wash and dry body independently by <b>using aids</b> and/or <b>extended wash time</b> (> 15 Min.)	Is able to wash and dry body independently with <b>verbal guidance</b> and <b>provision</b> of material	Is able to wash and dry body <b>partly independently</b> , nurse takes over body parts difficult to reach	Is <b>completely dependent</b> on personal hygiene being carried out
Is able to <b>wash and dry upper part of the body</b> independently	Is able to <b>wash and dry upper part of the body</b> independently	Is able to wash and dry body independently with the help of <b>aids</b> and/or <b>extended wash time</b> (> 7 Min.)	Is able to wash and dry body independently with <b>verbal guidance</b> and <b>provision</b> of material	Is able to wash and dry <b>body partly independently</b> , nurse takes over body parts difficult to reach	Is <b>completely dependent</b> in performing washing of upper part of the body
Is able to <b>wash and dry face and hands</b> independently	Is able to <b>wash and dry face and hands</b> independently	Is able to wash and dry face and hands with <b>extended wash time</b> (> 3 Min.)	Is able to wash and dry body independently with <b>verbal guidance</b> and	Is able to wash and dry <b>body partly independently</b> , nurse takes over	Is <b>completely dependent</b> in performing washing of face and hands

			provision of material	body parts difficult to reach	
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Table 24: Scale sectioned in 5 of ENP nursing outcomes of Personal hygiene

A further example is from the class Feeling and the category “Painfree”.

Scale sectioned in 5 of Painfree					
	Value 5	Value 4	Value 3	Value 2	Value 1
Is <b>painfree</b>	Feels <b>(no) pain</b> , which was <b>evaluated</b> between 1-2 on the <b>numeric scale</b>	Feels <b>pain</b> , which was evaluated between 4-3 on the <b>numeric scale</b>	Feels <b>pain</b> , which was evaluated between 5-6 on the <b>numeric scale</b>	Feels <b>pain</b> , which was evaluated between 7-8 on the <b>numeric scale</b>	Feels <b>pain</b> , which was evaluated between 9-10 on the <b>numeric scale</b>

Table 25: Scale sectioned in 5 of the ENP outcomes of the class “Painfree”

The last example is from the class of Feeling, category “Demands adapted to abilities”:

Scale sectioned in 5 Demands adapted to abilities					
	Value 5	Value 4	Value 3	Value 2	Value 1
The <b>physical demands expected</b> for personal hygiene activities are in keeping with the <b>actual physical abilities</b>	The <b>physical demands expected</b> for personal hygiene activities are in keeping with the <b>actual physical abilities</b>	The <b>physical demands expected</b> for personal hygiene activities are <b>partly in keeping with the physical abilities</b> , which is demonstrated by <b>total exhaustion</b> after personal hygiene activities	The <b>physical demands expected</b> for personal hygiene activities are <b>partly in keeping with the physical abilities</b> , which is demonstrated by <b>severely changed vital parameters and/or pain</b> after personal hygiene activities	The <b>physical demands expected</b> for personal hygiene activities are <b>not in keeping with the physical abilities</b> , which is demonstrated by <b>severely changed vital parameters with exceeding of limit values and/or pain</b> , personal hygiene activities had to be <b>interrupted</b> several times	The <b>physical demands expected</b> for personal hygiene activities <b>exceed the physical abilities</b> , which is demonstrated by circulatory collapse, respiratory insufficiency or other crises, <b>personal hygiene activities cannot be continued as planned</b>

Table 26: Scale sectioned in 5 of ENP outcomes of the class “Demands adapted to abilities”

Currently, about 50 differentiated evaluation scales for ENP nursing outcomes have been developed. The conversion of ENP nursing outcome into operationalized items is being continuously carried out. The aim is to develop further result indicators which serve as self-evaluation instruments for patients/residents/clients as well as measurement instrument for nurses. The result indicators developed so far are available in the software application or database.

To enable a standardized evaluation of outcome achievement in the nursing team, it is important to discuss the outcome achievement with the patient and/or the team. Especially outcome formulations such as “Participates in group activities without being asked” are subject to a certain subjectivity.

#### 4.6 Definition: ENP nursing interventions

Nursing interventions in ENP are all performances as part of nursing care carried out directly for and with the patient (e.g. whole body wash) as well as indirectly for patients (e.g. prepare medication) which are carried out by nurses on the basis of the nursing diagnosis process. An ENP nursing intervention is defined as follows:

*An ENP nursing intervention is the linguistic expression for the intervention concept. The intervention concepts are abstract formulations of nursing actions which consist of numerous sub steps. The ENP intervention concepts can refer to direct, indirect or administrative nursing actions, which are initiated and performed by nurses for outcome achievement based on clinical decision-making and nursing knowledge.*

An example for clarification: The nursing intervention “Carry out 30° positioning according to Seiler” consists of numerous individual sub-actions. This partial intervention begins among others with the disinfection of hands, preparation of material, greeting of the patient, information of the patient, the actual positioning performance (which can be described in several single steps, e.g. place head rest in flat position, remove pillow, etc.) and ends with the reassurance that the patient has no further desire after positioning and e.g. is able to reach the bell. The individual practical steps of the nursing interventions in ENP have not been described, but have been conceptualized in the context of education. For nursing process documentation it is also not meaningful to enter the individual practical steps of an intervention concept into a patient record (vgl. hierzu u.a. Göpfert-Divivier, Mybes, & Igl, 2006).

#### Intervention specification

In literature it is demanded that written nursing interventions have to answer the following commonly known questions. These are: “Who does when, what, how, with what?” From these demands for nursing interventions it can be deduced that nursing interventions concepts should have action-guiding character. This requirement is taken into account in ENP by the intervention specifications. ENP intervention specifications are defined as follows:

*ENP intervention specifications are additional detailed information which refer to the nursing intervention. These can include the following dimensions: detailed description of the nursing intervention, the type of support for nurses in the performance of the intervention, frequency and scheduled time of the intervention, time intervals of interventions, used nursing products and aids, order of interrelated interventions, topology, information on location or directions as well as quantities, number of nurses required for the adequate performance of the nursing intervention.*

#### 4.7 Normative time values in ENP

In addition to the other elements in ENP the normative time values are linked to a large number of nursing interventions or intervention specifications and are summed up on a case-by-case basis. For the situation-based illustration of the summed time values, different factors are taken into account such as severity levels, location of performance, etc. The time values are estimates that were negotiated over years in an empirical process with nurses. The integrated normative time values are also weighted by the context of the nursing diagnosis. For example, there are different time values in a demented patient/resident for personal hygiene than in a patient who is unable to carry out personal hygiene independently due to

physical weakness. The process of time values has started in 1996 and was continuously adjusted in focus groups of nurses with the first software application used in practice. By means of own time value measurements as part of research studies, further adjustments of the time values were also made, and, if possible, expenditure-related information from scientific literature was taken into account for the creation of the time values. During the linkage of LEP Nursing 3 and ENP interventions in 2004 it became apparent that the integrated time values correspond to a high degree.

The normative time values in ENP can be integrated at different levels. For one thing on the level of the intervention concept itself, so that a time value generally applies to the ENP nursing intervention regardless of the selected interventions specification. An example for this is the intervention “carry out special oral hygiene”. Regardless of the nursing products, aids or wiping techniques used for the performance of oral hygiene, a nursing time of 5 minutes is calculated in each case. However, the normative time values may be on the level of the intervention specifications, so that this leads to a cumulative time value corresponding to the individual nursing situation, depending on the performance of the nursing interventions or the selected intervention specifications. An example for this is the nursing intervention “whole body wash”. Here, the aggregated time value results in the selection of intervention specifications, precisely: the location of whole body wash, the necessary level of support, peculiarities in whole body wash as well as the number of required staff needed to perform whole body wash (see figure 10).

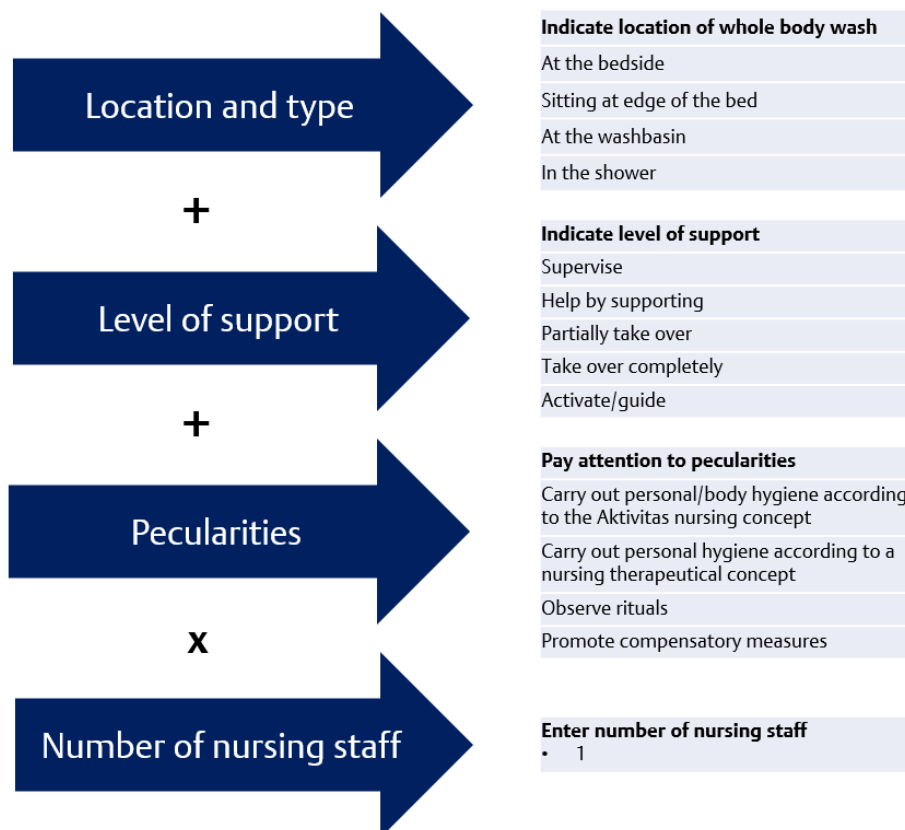


Figure 10: Example for the cumulated calculation of normative ENP time values (detail)

For example, if a nurse (x1) would perform whole body wash at the washbasin (18 minutes) and integrate activating/guiding elements (+5 minutes) and observe an existing ritual of the patient/resident/client (+1 minute), the result would be a normative time value of 24 minutes. If for some reason two nurses were to be involved for whole body wash (x2), the result would be a normative time value of 48 minutes.



Because in ENP there are some interventions, which deliberately und intentionally do not have integrated time values. The main reason for this is that some nursing intervention can hardly or not be normalized. Examples for such areas are e.g. many activities in the context of counselling, guidance and patient education which can vary greatly in the nursing effort depending on the specific content, compliance and competencies of the individual patient/resident/client. In such situations it seems more appropriate for the collection of valid and reliable time expenditures to prompt users to enter a time value manually e.g. by means of a software-triggered request.

## 5. Quality of the ENP practice guidelines

The nursing diagnoses-related pathways in ENP have been developed inductively in Germany (Wieteck, 2004b). Until today users have great influence on the development of ENP. Users report requirements for the illustration of nursing diagnoses and nursing interventions to the ENP development team. These demands from the practice will be defined as development input. For example, in 2010 the following items were submitted as part of the illustration of restricted communication of a resident with dementia: "Unclear speech" and "Meaningless speech". After substantive discussions with nurses on site and a first literature analysis, the following practice guideline was developed: "The resident/patient/client's communication is restricted due to a language disorder". After positive feedback of nurses on site the next steps are a deeper literature analysis and a systematic comparison with possible competing nursing diagnoses.

Literature references of ENP practice guidelines relate to international and national studies. This literature support has been massively increased during the last five years which improved the quality of the practice guidelines significantly. The systematic further development of ENP is also increasingly getting important impulses in the form of bachelor, master and doctoral theses (see e.g. Haller, 2017). Every ENP practice guideline is aligned with current literature, Woodtli calls this already a sign of content validity in the context of the content validity discussion of nursing diagnostic terms in 1988.

There are eight content and criterion validation works (Berger, 2010; Hardenacke, 2007; Helmbold, 2010; Helmbold & Berger, 2010; Schmitt, 2010; Wieteck, 2006b, 2006c, 2008b), further are in the publication phase (as of April 2017) like on the topic of dysphagia (Kraus, 2015) or were carried out as part of academic theses (Nisslein, 2017) and will be published elsewhere in the future. As part of the criterion-related validation of Berger 1,931 narrative nursing process formulations were illustrated using ENP in the hospital setting. The formulations were taken from examination papers, which were graded 1 or 2. Altogether, 73 % of the formulation could be illustrated completely, 14 % partially and 13 % not at all. The criterion validity study by Schmitt in the field of neonatal intensive care comes to similar results (Schmitt, 2010). These works refer to the complete practice guideline (= nursing diagnosis, characteristics, etiologies, nursing interventions). Also the literature analysis of Helmbold (2010) and Helmbold and Berger (2010) refers to a complete practice guideline. Based on the validity limitations in the nursing diagnoses on malnutrition found in the study of Hardenacke (2007), the follow-up and further development of the ENP nursing diagnoses on malnutrition can be comprehended (Helmbold, 2010).

Some studies and projects on the evaluation of ENP were carried out with regard to the practical application of ENP. In a broad implementation project in a hospital, Baltzer and colleagues come to the conclusion: "ENP formulations are practical and understandable" and "With ENP, processes in nursing can be illustrated completely and comprehensibly." (Baltzer et al., 2006, p. 9). The evaluation project of Canton St Gallen, carried out in four different hospitals, aimed at testing the nursing language ENP for a cantonal implementation decision. Against this background, ENP was tested by different institutions and disciplines. See the final report on the *Conception and piloting of the implementation of ENP in hospitals of Canton St Gallen* (Kossaibati & Berthou, 2006). As part of the evaluation project, the nursing experts of the pilot institutions rated the nursing plans documented with ENP with regard to the criteria "verifiability", "guidance", "nursing relevance", "clarity", "comprehensibility" and "completeness". "In at least 80 % of

the analyzed nursing care plans, the documented contents met the analysis criteria.” (Kossaibati & Berthou, 2006, p. 41).

In an intervention study it was examined whether the application of ENP (at that time called “text modules for nursing process documentation”) in a software influences the quality of nursing process documentation in a nursing home. The frequency and valence analytic evaluations show significantly positive effects on the documentation quality (Wieteck, 2001). In another study it was examined to what extent “actually carried out nursing interventions” (collected by observers) correspond with the “documented nursing services using ENP”. In the multicenter descriptive cross-sectional study using the parallel test method, a total of 1,068 nursing intervention codings were evaluated in 34 patient cases. The percentage agreement of the rater results in the institutions was 76 % on average. However, in the study the question remains open as to whether and to what extent the 24 % of incorrect codings are due to failure by nurses or lacking nursing intervention items in ENP (Wieteck, 2007b). ENP data analyses in hospitals, inpatient nursing institutions and outpatient nursing services were published in two further studies. Here, ENP data from the nursing process documentation was used with regard to different questions (Haag, 2009; Konrad, 2009; Wieteck, 2004a). In a research paper, Wieteck (2009) shows that ENP has the granularity, i.e. the clarity, fineness, and selectivity, e.g. to answer audit questions of the expert standard on pressure sore from the daily nursing process documentation. ENP is also discussed in the context of the illustration of nursing services within the DRG system (Bartholomeyczik, Haasenritter, & Wieteck, 2009; Wieteck & Kraus, 2015, 2016). In addition, validation work on the translation of ENP into Italian, English and French was carried out. For this, there is collaboration with the University of L’Aquila as well as many hospitals in Luxembourg.

The strength of ENP is to be seen in the granularity, which is in accordance with the German documentation requirements for nurses. The classification has been developed in the German context which is why cultural adaptations to German-speaking area are not necessary. An international data exchange can be ensured by a mapping (Wieteck, 2007c). Similarly, aspects of adapting and adjusting to the MDS requirements as set out in the policy statements on the nursing care process and documentation can be met with ENP (German Medical Service of the Central Association of Health Insurance Funds) (Medizinischer Dienst der Spitzenverbände der Krankenkassen e.V. (MDS), 2005).

In comparison to other precombined nursing classification systems, ENP classifies nursing diagnoses, outcomes and interventions which are individually combined as practice guidelines in a horizontal structure to support decision-making for nurses. Therefore, comparisons of quality criteria with other classification systems are difficult.

## 6. Critical remarks

ENP is currently not fully complete to describe all necessary nursing phenomena and interventions relevant for process documentation. This is the result of various studies and evaluation projects. Approx. 23 % of NANDA-I nursing diagnoses could not be illustrated with ENP according to a study of 2008 (Wieteck, 2008c). In addition, about 18 % of the formulations in the nursing care plans had to be added individually at this time. This statement refers to the complete nursing process (nursing diagnoses, nursing outcomes, nursing interventions) (Berger, 2008, 2010; Schmitt, 2010; Wieteck, 2004b). In the broad practical test in St Gallen, Kossaibati and Berthou (2006) come to the conclusion that it is noticeable the technical language comes from Germany and recommend a Swiss adaptation to promote acceptance. The results confirm, as well as other studies, that ENP is not yet complete in all specialist areas of nursing. In some areas, elements of some pathways were perceived as inconsistent and not up to date with the scientific findings. This is why the following aspects were formulated to adapt and remove limitations of the hospitals and clinics in the Canton St Gallen experienced in the project.

- Linguistic and conceptual helvetization (Swiss adaptation): including the illustration of the Swiss nursing competencies and nursing understanding and the replacement of non-Swiss terms Swiss equivalents,
- update of ENP contents (in particular consideration of international, or foreign-language literature as well as nursing research),
- standardization of level of detail,
- completion of ENP contents: in the area of oncologic care, transcultural care, addiction, psychosocial aspects etc.

The validity of the ENP practice guideline has not yet been tested on a high scientific level. There are indications that individual ENP nursing diagnoses are not complete and can be improved (Hardenacke, 2007).

### **Summary**

Since the nursing knowledge is constantly expanding and evolving rapidly, the validation process of ENP is also an ongoing requirement for the further development of the system. (see e.g. Kraus, 2015). However, it does not seem wrong to speak of a high maturity of the system. Indications for this are the application in all sectors of nursing for the illustration of the nursing process as well as the positive user feedback. The quality of ENP indicates that there is a high level of agreement between the systems NANDA-I and ICNP and that expressiveness and clarity of ENP nursing diagnoses were rated by experts about 84 % as equal to or higher than NANDA-I nursing diagnoses (Wieteck 2008).

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