

Ladies and Gentlemen, I would like to welcome you to my presentation „Nursing Diagnoses Used in Electronic Patient Records“. First, I would like to present my colleagues: Dr. Holger Mosebach and Mr. Simon Berger. Dr. Mosebach is head of our translation team and is responsible for the co-ordination of the translation process for NANDA-I nursing diagnoses. Mr. Berger is the deputy head of the ENP development team. I lead the ENP development team and am responsible for the research and development of ENP. Part of my remit is to assist in nursing matters during translation projects.



Overview

- Nursing diagnoses are an integral part of the electronic patient record and are increasingly gaining in importance
- In addition to the nursing diagnoses other terminologies are used for nursing care documentation
- Advantages of using controlled vocabulary in the context of an Electronic Patient Record
- Presentation of an Electronic Patient Record working with standardised terminology
- Outlook on possible data evaluation
- Demands on terminologies for documentation of nursing care process in an Electronic Patient Record

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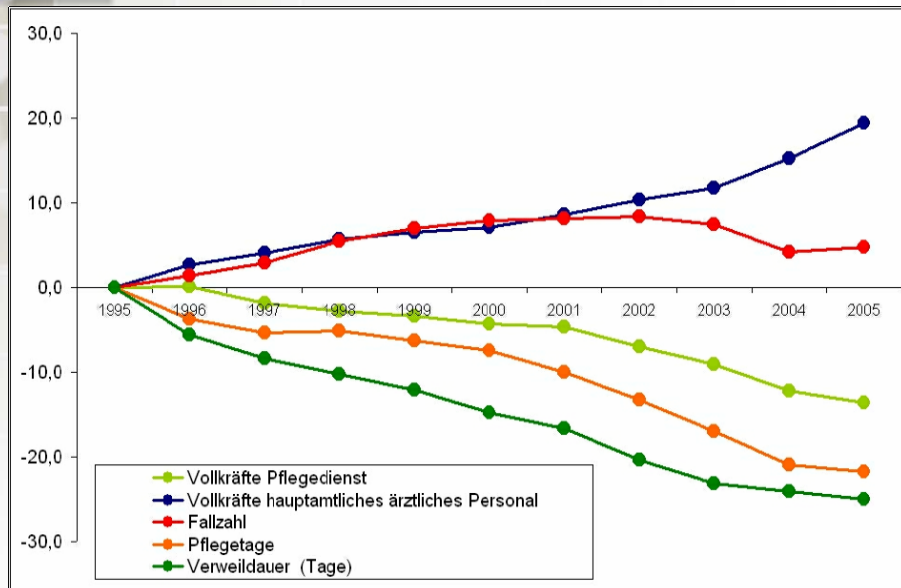
This presentation is structured as follows:

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Problem

→ Development of hospital indicators between 1995-2005



Source: dip Pflege-Thermometer 2007, p. 9

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As in the United States, German hospitals have been increasingly under cost pressure which has led to the continuous cutback in nursing posts. On this slide you can see the development of some hospital indicators between 1995–2005. Over the last 10 years 48,000 full-time nursing positions have been cut. On the other side, there are 1 million more patients each year. This leads to a very high work concentration. At the same time, more physicians have been employed, which means that more and more diagnostics, therapies, and orders have to be carried out. All this has to be done by a decreasing nursing staff.

Problem

→ **lacking nursing data**

- Currently, nursing is unable to show what amount of nursing resources are required to deliver adequate and safe nursing services
- Existing performance figures for nursing in hospitals do not explain the necessity of nursing interventions, nor their effectivity and outcomes
- Data explaining the necessity of nursing interventions or their effectivity exist only on paper and in narrative notes
- The current DRG system is based on the assumption that medical diagnoses can also explain the amount of nursing resources (Hunstein 2003). Studies in the German disprove this assumption. (Schmid 2006, Eberl et al. 2005, Wieteck 2007a, Gerhard 2003) and international context (Halloran 1985a, Halloran & Kiley 1987, O'Brien-Pallas et al. 1997, Ballard et al. 1993, Welton & Halloran 2005)

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Currently, nursing is unable to show what amount of nursing resources is required to deliver adequate and safe nursing services. Due to the current reimbursement system, nursing is regarded from an economic point of view of the individual hospital exclusively as a cost factor, and not as a value adding service. The appeal for hospitals to reduce costs regardless of possible consequences is additionally supported by the fact that nursing staff costs in German hospitals equal approximately 23 % of the pre-tax overall costs.

Meanwhile, in other countries, where reimbursement systems are based on case-based lump sums without adequate regard to nursing services, the consequences of nursing cutbacks in the quality of care are being increasingly indicated through research studies on mortality rates, functional status at discharge, length of stay and treatment costs.

Existing performance figures for nursing in hospitals do not explain the necessity of nursing interventions, nor their effectiveness and outcome.

The data from nursing process documentation can not be used, because they predominantly exist on paper. The situation for nursing is also worsening due to the assumption that the current DRG system, which is based on medical diagnoses, can also illustrate the nursing performance. Some German and international studies show that this assumption is unsustainable and the nursing performance cannot be adequately illustrated. Medical diagnoses based on DRGs can involve very different nursing performances, because nursing phenomena can barely be covered by them. The key question is: which data can nursing use in the future to provide operating figures for questions relating to nursing outcomes and nursing performance?



A solution?

- Several international authors call for using standardised nursing terminologies in an electronic patient record

(Lavin, Avant, Craft-Rosenberg, Herdman und Gebbie, 2004, Wieteck 2008)

A solution for quantifying the required information on nursing in order to assess its value is the use of standardised terminology in an Electronic Patient Record. Using this option nurses can carry out the nursing care documentation without having to code any additional instruments to determine, for example, the nursing expenditure.



What are the reasons for using nursing diagnoses and other standardised terminologies?

Statements from the literature

- **The shared language furthers the clarity of communication among nursing professionals** (vgl. Huneke 2000:38f, Figoski und Downey 2006)
- **Provides the framework for nursing care process and is the foundation for planning nursing and evaluation of nursing services** (vgl. Höhmann 1999:10)
- **Foundation for quantifiable data for nursing research, hypothesis formation and examination** (Beckstrand 1980:76, Käppeli 1999:156, Roberts et. al. 1999:4, Bartholomeyczik 2000:64ff, Mortensen 1996, Bates 2003)
- **Offers possibilities to collect patient outcomes** (Lavin et al. 2004, Wieteck 2004)
- **Represents up-to-date nursing knowledge** (Lunney 2006, Wieteck 2004)
- **Supports the continuity of nursing care** (Figoski und Downey, 2006)

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I would now like to present the aspects of standardised terminologies as discussed in literature. The use of nursing terminologies can support the clarity and quality of communication amongst professionals. The nursing terminologies provide the framework for the nursing care process and are the basis for the evaluation of nursing. The use of terminologies in an electronic patient record enables us to quantify the data obtained from the nursing process. This data can also be used for outcome research. Nursing terminologies can represent the nursing knowledge and support nurses in their decision making. The continuity of care is also supported.



What are the reasons for using nursing diagnoses and other standardised terminologies? Statements from the literature

- **The discussion on nursing diagnoses has been nurtured by the introduction of Diagnosis Related Groups (DRG), which are seen as a possibility for representing nursing adequately** (Gordon 2001:VII, Wellton 2005, Halloran 1987, Wieteck 2005)
- **Transparency is demanded in health economic discussions, as cost-effectiveness means that required services correspond to services delivered** (cp. Fischer 2000:79, Wieteck 2004)
- **By using a standardised nursing language comparisons will be possible; to reflect nursing practice; for cost calculation; and benchmarking** (Huneke, 2000:39, Jerant 2001)
- **To represent and measure nursing activities** (cp. Fischer 2002, S. 145, Wieteck 2004, Wieteck 2003)

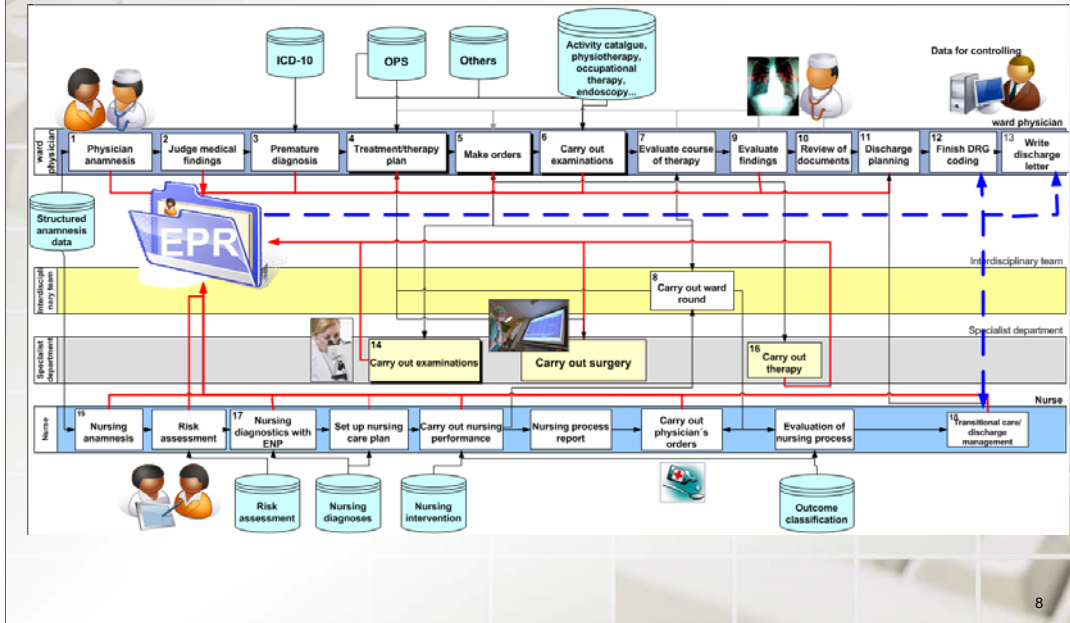
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Other aspects described in the literature refer to possible performance transparency in nursing for staff calculation or case cost calculations.



What should an Electronic Patient Record consist of?

Where is the use of controlled vocabulary meaningful?



This slide illustrates the core process of physicians and nurses in a hospital. The process steps of a nurse are: collect medical history, assess risks, and set nursing diagnoses. With this information the nurse develops a nursing care plan together with the patient. Then, the care planned is carried out and the effect is documented in the nursing progress report. Additionally, several physicians' orders such as medication are carried out. During the course of the nursing care process nursing is evaluated and optionally the nursing care plan is adjusted. Finally the discharge or transfer has to be organised. Similar process steps are to be found in the medical field. Here, the medical history is also collected, which will in part correspond to the collection of nursing information. The bright blue signs for "database" indicate in which fields it would make sense to use standardised terminologies. In nursing the use of standardised terms of the medical history, assessment, nursing diagnoses, objectives, or outcomes and nursing interventions would be meaningful.

Using a case study, I would like to show you an Electronic Patient Record using a standardised nursing terminology. The aim of this presentation is to consider the demands for nursing classifications used in an Electronic Patient Record.



Brief insight into a software representing the nursing care process with ENP



Physician and nurses at ward round with a mobile notebook

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I am now, changing to the software. I have already logged into the program and activated a patient. You are now seeing the documents already created under the patient's name. The first process steps during the admission of a patient are to collect the past medical history.

Medical history:

To document the collected information there are standardised medical history items available in the software. First, I would like to make two general statements. What you are seeing here has been parameterised in the settings for a surgery ward. For each department the medical history will be compiled according to appropriate medical history categories from a pool of possible items. Each item is linked with nursing diagnoses. For demonstration purposes I am showing you the medical history categories from the field of body hygiene and clothing together with the linked items for the description of the skin condition. With this the nurse gets suggestions for nursing diagnoses from the coded nursing history. In the software I am showing the user has the opportunity to add information in a free text entry field. By saving, the nurse quits the history. This information can be reviewed, added or changed any time.

Risk assessment:

There are several assessment instruments available to assess existing risks. As an example I will present to you the risk assessment for pressure sore. The nurse selects the adequate assessment items. Mr. Berger will select these now at random. By saving these coded data the assessment can now be shown in a chart or in a record in which the different items can be viewed.

Nursing care plan

In the next step the nurse sets up a nursing care plan using nursing classifications. I am now using ENP (European Nursing care Pathways). The nurse can now use the nursing diagnoses derived from the history to set up the nursing care plan. The "S" (for scale) and the "A" (for anamnesis) indicate from which source the suggested nursing diagnoses come. The nurse now selects a nursing diagnosis. The ENP nursing pathway opens up. Now the nurse can select characteristics, etiologies (related factors), and resources (strengths). Then the nursing objectives can be selected and in the next step the nursing interventions. Usually, the nursing interventions can be added to e.g. with care product information and details for localisation and frequency. By clicking the appropriate items those are transferred directly into the nursing care plan. I will now do this for another nursing diagnosis. My patient, for example, has a self-care deficit body hygiene. The nursing diagnoses are structured into 4 domains, 21 classes, and 128 categories. The category self-care deficit body hygiene has 13 subordinate nursing diagnoses which are already pre-combined with an etiology a characteristic. For example: The patient is unable to carry out personal hygiene independently due to a hemiplegia/hemiparesis. As a characteristic the nurse can add "Neglects the affected side during personal hygiene". "CVA" is selected as an etiology. The nurse then selects "Is able to wash and dry upper part of body/face independently". This she would like to achieve through a particular washing training. She codes the nursing intervention "Carry out body hygiene according to the learning level of the NDT concept (Neuro-Developmental Training)". Afterwards, she selects intervention guiding information again. This way, a differentiated nursing care plan is created. At the same time, the nurse can look at the literature based on the nursing pathway.

Evaluation

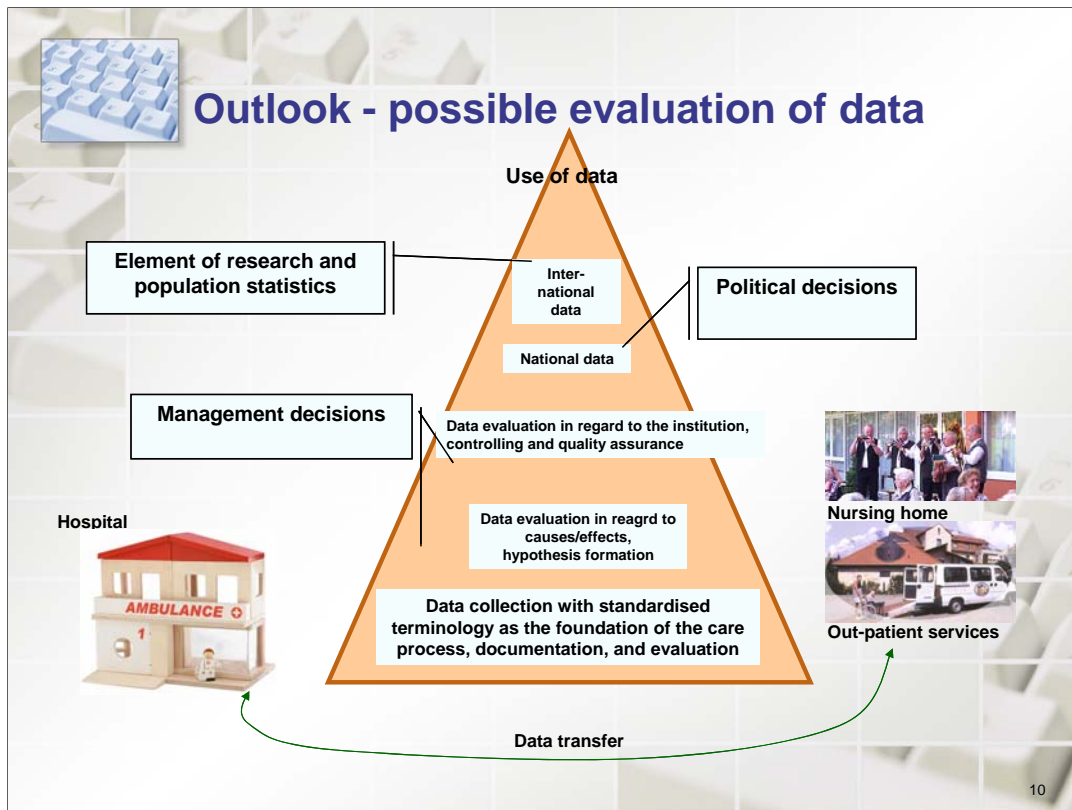
Before the nursing care plan is saved, the nurse can decide whether nursing objectives should be regularly evaluated. If she selects "Is able to wash and dry upper part of body independently" she can add this objective to the objective evaluation record. If a date was stated for when the evaluation should be carried out, this will be indicated with a grey point. Also, there are reminder lists of tasks which are running in the background.

Performance documentation

The saved nursing care plan for the patient has to be opened for performance documentation. In the signature bar, the nursing performance can be signed. The nursing interventions signed represent data for statistical evaluation. For example, it can be immediately evaluated how much nursing time in LEP (a nursing work management system from Switzerland) is required for the patient per day. Or, it can be found out by database query whether an appropriate nursing diagnosis has been planned.

In addition to the core element of the nursing care plan, there is a chart in the software in which the medication, surveillance parameter, elimination etc. can be documented. Additionally, there are positioning plans, wound documentation, medication and fluid balance charts. In these documents, standardised terms should also be used. The only narrative texts in the GriPS software is the physician's reporting and the ordering system which is outside the medication and surveillance orders. If you would like to have a closer look at these functions you can do so at the RECOM stand in the Entrance Hall.

I will now leave the software and go back to the presentation. In the same software it is also possible to use NANDA nursing diagnoses with ENP nursing objectives and interventions for nursing care process documentation.



I promised to give you an outlook on possible data evaluation. First, I would like to make some general statements on the nursing data which have been collected with ENP. The same would be possible with NANDA.

There are different levels on which data is required and evaluated. According to the question, differently aggregated data are needed. The instruments used need to be differentiated and detailed for nursing care process documentation, furthermore they should allow for meaningful aggregations and conclusions for management and political decision-making.

The instruments should also be applicable in different sectors to enable data transfer between different institutions.

I will now present two nursing process data evaluations from two different institutions.



Using nursing care process data

SPSS data transfer I: nursing care process data

Nursing care process data (nursing diagnoses, etiologies, characteristics, resources, planned interventions and links to the classes, assessment values) and

Case data such as age, ward, building ..., time values per case can be transferred to SPSS.

Korr_online_Kirchdorf_alle_Stationen_Datenban_Mai_Sept_2005.sav - SPSS Daten-Editor

	Haus	newStatId	oldStatId	newPatId	oldPatId	alter	D_1_kann_sich_nicht_selbstständig_waschen	D_100_wird_mitSondennahrung_ernährt_Gefahrder_Sond	D_101_hat_eine_perkutane_Sonde_Gefahr_derinfekt	D_102_hat_eine_Sonde_n_durch_die_Hai
1	1	3	1001,00	1,00	60464606	51,0	1	0	1	0
2	1	3	1001,00	5,00	60460160	56,0	1	0	0	0
3	1	3	1001,00	35,00	60464310	71,0	1	0	0	0
4	1	3	1001,00	43,00	60464471	92,0	1	0	0	0
5	1	3	1001,00	55,00	60464654	67,0	0	0	0	0
6	1	3	1001,00	58,00	60464716	66,0	1	0	0	0
7	1	3	1001,00	61,00	60464745	67,0	1	0	0	0
8	1	3	1001,00	74,00	60465014	66,0	1	0	0	0
9	1	3	1001,00	75,00	60465021	88,0	1	0	0	0

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Basically, you can transfer each coded item from the software which has been coded with structured data into a statistics tool such as SPSS. According the question, the items which have been collected during the nursing care process can be transferred e.g. from the patient's history, risk assessment, data from the fever chart or the nursing care plan.



The first evaluation I would like to present to you was carried out in the Specialist Orthopaedic Clinic in Stenum. The aim of the study was to analyse whether ENP nursing diagnoses are suitable for delivering nursing relevant data within the DRG context. The question of the study was: Can ENP nursing diagnoses explain the time spent giving nursing care?



Sample

A total of 344 datasets of patient cases in the hospital were available. The DRGs most often coded were used in a convenience sample. The patient cases were all treated between January and July 2006.

I 48 Z (Revision or replacement of the hip joint without complicating diagnosis ...)

I 42 Z (Multimodal pain therapy for illness and disruption of muscle skeleton or connective tissue)

I 44 A (Implantation of a bicondylar prosthesis or other prosthesis of the knee joint under extremely complicated circumstances)

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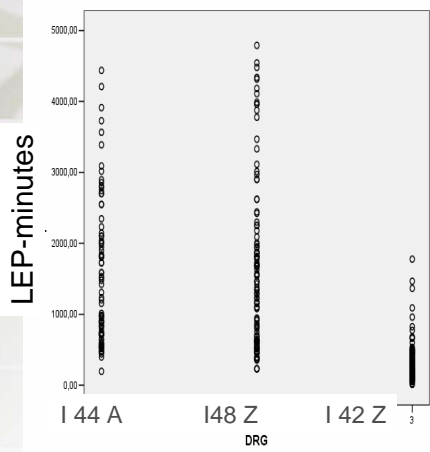
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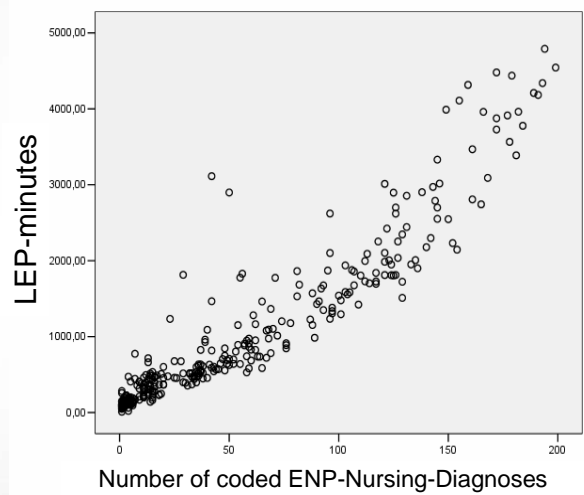
I 44 A (Implantation of a bicondylar prosthesis or other prosthesis of the knee joint under extremely complicated circumstances)



DRGs do not explain the nursing input, but nursing diagnoses do!



N = 311 cases

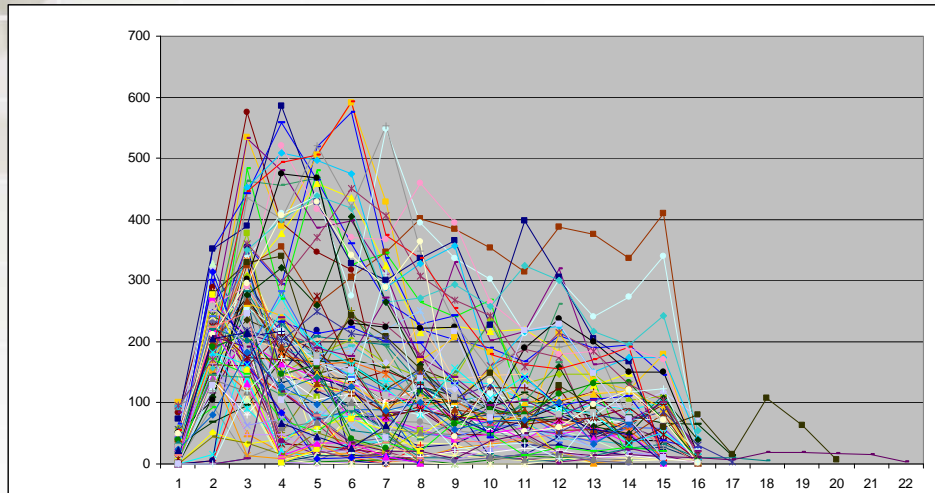


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On this slide you can see two charts. Each point is a patient case. Horizontally, you can see which DRG case group the patient is in. Vertically, you can see how much nursing care time the patient required within a DRG case group. It becomes obvious that the DRG group does not explain the nursing input. In contrast, the second chart shows the connection between the number of coded nursing diagnoses per stay and, on the vertical axis, the nursing input. The coefficient of determination R^2 is 82 %.

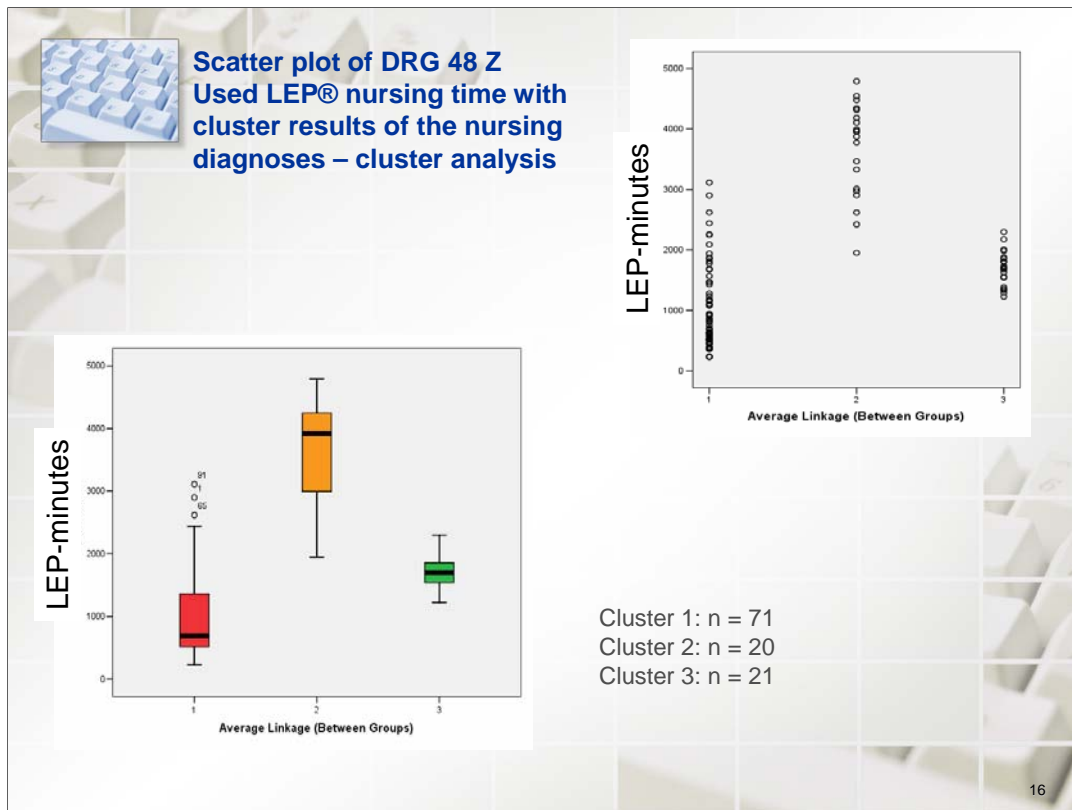


Used LEP® nursing time of the case group I 48 Z (n = 112)



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The analysis of a DRG case group which should actually be homogeneous shows the following results: Here you see the data of patients who have received a total hip replacement, altogether 112 patients. The horizontal axis represents the length of stay. The patient who stayed the longest in the hospital was there for 22 days. On the vertical axis you can see the LEP nursing workload time per minute. The chart shows that the nursing workload time used is very inhomogeneous. The coefficient of variation is 73 %.



In a further analysis of the data the DRG case groups were examined using a cluster analysis of the ENP nursing diagnoses per case. A screeplot was created to prematurely determine the amount of clusters in the case groups examined. This represents in a chart the eigenvalue distribution of a factor analysis. The eigenvalue distribution is the cleared part of the total variance which can be explained by a factor. Afterwards, the results of the cluster analysis were used to create a scatter plot on nursing input used in the case groups per case. Additionally, a box plot on nursing input used in the case groups separated in cluster groups was created. The results will be shown in the following illustrations using the DRG group 42 Z as an example.

To summarise, the results show that the ENP nursing diagnoses of this case group can explain the nursing input used per case quite well.

If these results are supported by further studies, the nursing process data from the nursing documentation could be used in future to consider the resource input for billing. This study supports other studies which also found that nursing diagnoses can explain the nursing input.



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The next data evaluation I would like to present is from the State Hospital in Kirchdorf, Austria, which belongs to a network of 12 hospitals.

The evaluation was presented at a German conference in 2005. The director of nursing demonstrated how he is using nursing care process data to gain data for quality management.



Coding of pressure sore risk of age groups on medical wards

Data evaluation 2005

Data from two medical wards Data period: May-Sept. 2005			D_160 has an increased pressure sore risk		Total
			0	1	
alter_group	1-50 years	Anzahl	224	1	225
		% of age group	99,6%	,4%	100,0%
	51-60 years	Anzahl	174	6	180
		% of age group	96,7%	3,3%	100,0%
	61-70 years	Anzahl	192	13	205
		% of age group	93,7%	6,3%	100,0%
	71-80 years	Anzahl	355	42	397
		% of age group	89,4%	10,6%	100,0%
	81-90 years	Anzahl	248	56	304
		% of age group	81,6%	18,4%	100,0%
	91-100 years	Anzahl	32	16	48
		% of age group	66,7%	33,3%	100,0%
Gesamt		Anzahl	1225	134	1359
		% of age group	90,1%	9,9%	100,0%

age_group * D_160_has_an_increased_pressure_sore_risk contingency table (SPSS 12)

This slide shows an evaluation of pressure sore risk. From January through September 1359 cases were treated in two medical wards and from these 134 patients were coded with the pressure sore diagnosis. In the table it becomes obvious that with increasing patient age the risk for developing pressure sore also increases. The results were compared with other studies and evaluated with regard to the individual wards.

Pressure sore risk in two medical wards

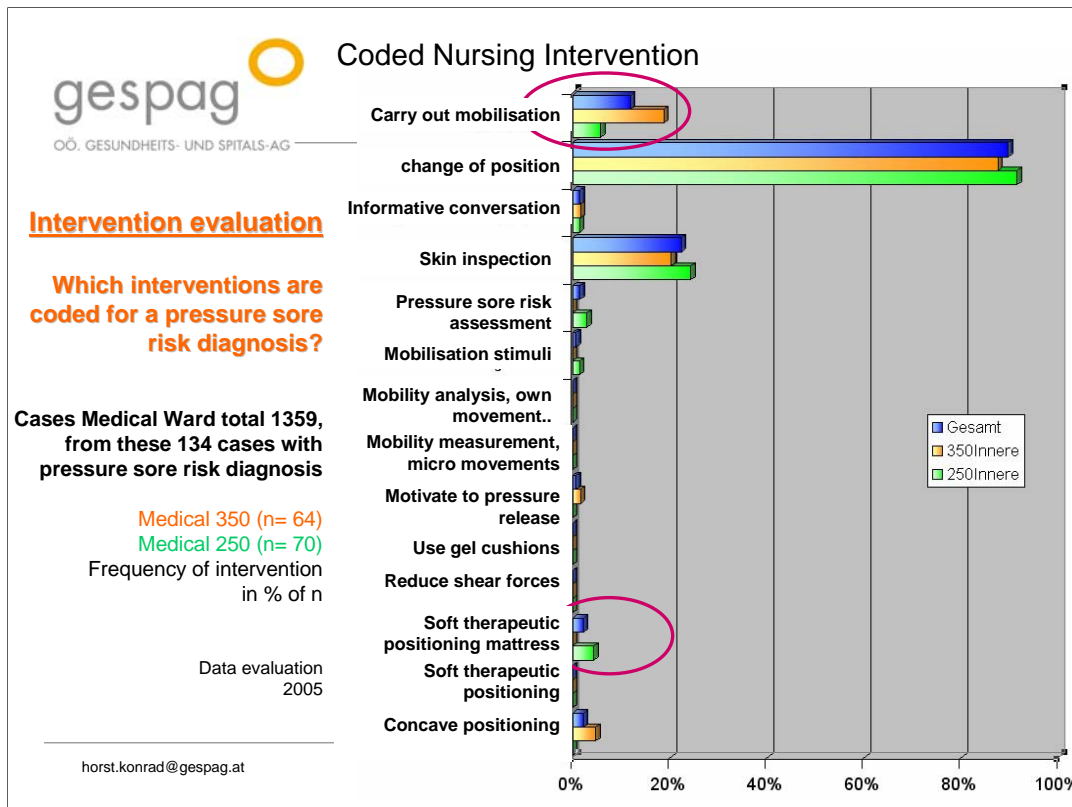
oldStatId = Code for wards			D_160 has an increased pressure sore risk		Total
			0	1	
250	1001,00	Amount	564	70	634
		% von oldStatId	89,0%	11,0%	100,0%
350	1003,00	Amount	661	64	725
		% von oldStatId	91,2%	8,8%	100,0%

Mean age **66,30 years**
Median 71 years.

Mean age **68 years**
Median 73 years.

oldStatId * D_160_has_an_increased_pressure sore risk contingency table (SPSS 12)

Here, you can see the individual data for the two wards. It is noticeable that although the average age of the patients is higher on one ward, the percentage of pressure sore diagnoses is lower. There can be many reasons for this which will not be discussed here.



There are also different results from the two wards at the level of nursing interventions which were carried out for patients at risk. The blue columns of the bar chart indicate the frequency of the interventions on the two wards. Orange and green show the frequency of the interventions on each ward.

As the chart shows, the intervention profiles of the two wards are quite different. One ward uses mobilisation interventions more often than the other, but no therapeutic positioning cushions, whereas the other ward is does this the other way around with regard to frequency. The intervention most often carried out is repositioning.



Electronic Patient Record



How adequate are
our current nursing terminologies for use in
Electronic Patient Records?

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With these examples I hope I have been able to give you an impression of how necessary nursing care process data are which are collected from the daily nursing documentation. The proviso is that the documentation is carried out using a controlled vocabulary and the quality of documentation is good.

But now the question arises as to how adequate nursing terminologies are for using in electronic patient records?

My view is that we still have a lot of work to do, however, I would like to share my ideas with you and hopefully encourage discussion.



Controlled vocabulary has to be linked to other disciplines!

CONSTIPATION

(1975, 1998)

Definition *Decrease in normal frequency of defecation accompanied by difficult or incomplete passage of stool and/or passage of excessively hard, dry stool*

Related Factors

Pharmacological

Aluminum-containing antacids
Anticholinergics
Anticonvulsants
Antidepressants
Antilipemic agents
Bismuth salts
Calcium carbonate
Calcium channel blockers
Diuretics
Iron salts
Laxative overdose
Nonsteroidal antiinflammatory Agents

...

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One demand I would like to highlight so that nursing diagnoses are useful for an electronic patient record within the interdisciplinary context, is that link to other systems have to be established. A nurse should not have to code related factors from the area of pharmacology. For example, if a medication which causes constipation or is likely to cause such effects is coded in the medication tool. The risk diagnoses should be suggested to the nurse right away, or the nurse should receive a reminder or warning notice.

A meaningful implementation of links with controlled vocabulary from other disciplines is required for the use of nursing terminologies in an Electronic Patient Record.

**Example 1: Interventions for body hygiene
- LEP Nursing 3**

- Wash arms
- Carry out eye prosthesis care
- Carry out beard care
- Wash legs
- Wash breast
- Wash buttocks
- Wash face/hands
- Wash genital area
- Carry out oral/dental care
- Carry out nose care
- Carry out nail care
- Carry out ear care
- Refresh patient
- Wash back

← Increasing level of detail
ENP NIC LEP

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A further question, which in my view has not been discussed in depth, is: which abstraction level, which granulation is needed for nursing terminologies to enable nursing documentation in an electronic patient record. To support the discussion I would like to present three levels or granulations of nursing interventions from the field of body hygiene.

I will give you a little bit of time to read the terms for yourself. Please ask yourself what information is necessary in an electronic patient record, what is missing, and what is unnecessary.

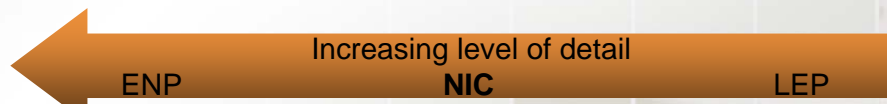
Firstly, I am going to present to you the LEP Nursing 3, a system which provides coding interventions in an electronic patient record.



Example 2: Interventions for body hygiene – NIC 3th

→ Self-Care Assistance: Bathing/Hygiene

- Place towels, soap, deodorant, shaving equipment, **and** other needed accessories at bedside/bathroom
- Facilitate patient's brushing teeth, **as appropriate**
- Facilitate patient's bathing self, **as appropriate**
- Monitor cleaning of nails, according to patient's self-care ability
- Facilitate maintenance of patient's usual bedtime routines, presleep cues/ props, and familiar objects, **as appropriate**
- Encourage parent/family participation in usual bedtime rituals, **as appropriate**
- Provide assistance until patient is fully able to assume self-care



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Here, you can see the formulations of NIC, version 5.

Example 3: Interventions for body hygiene - ENP

ENP- Interventionen

- **Wash body parts individually**
- Wash whole body individually
- Carry out basal stimulating body wash according to Bobath
- Carry out body wash according the levels of learning of the NDT concept (Neuro-Developmental Treatment)
- Carry out body wash with warm moist cloths (Bag-bath/Towel-bath)
- Carry out comforting personal hygiene
- ...

Body part to wash:

- Face/hands
- Arms
- Breast
- Back
- Legs
- Genital area
- Buttocks

Type of support:

- Supervise
- Help through support
- Take over partially
- Take over completely
- Activate/guide

Ort der Teilkörperwaschung:

- In bed
- At edge of bed
- At the sink

Body wash rituals:
(free text)

Care products used:

- List of products of the individual institution

Increasing level of detail

ENP NIC LEP

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In the next example I will show you ENP interventions from the field of body hygiene. There are several other intervention formulations in the fields of skin care, oral care, hair care, nail care, and foot care.



Summary

Nursing terminologies in the future should:

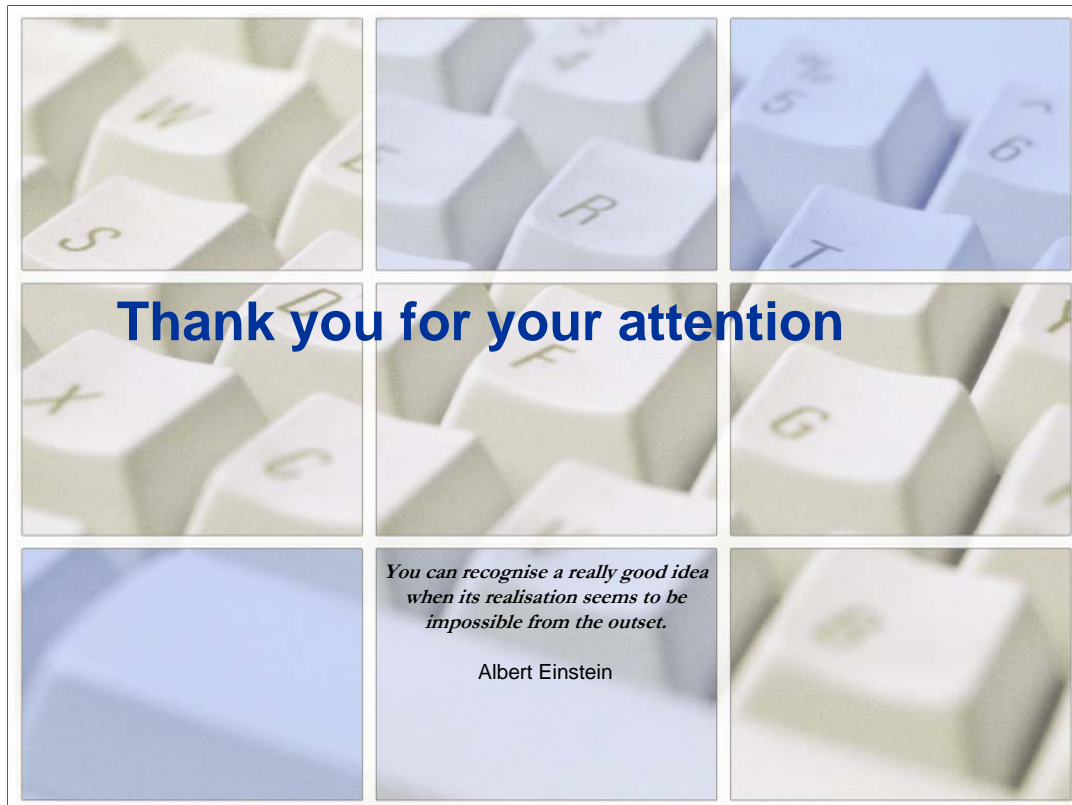
- Be interdisciplinary applicable (integrated treatment),
- Be able to adequately represent the nursing care process
- Represent national/international nursing knowledge and support decision making processes
- Aim for completeness and validity
- Be meaningfully linked to controlled vocabulary of other disciplines

The aim of this presentation was to show that nursing terminologies have to be developed further and that the focus has to be put on the integration in an electronic patient record. Nursing terminologies should be applicable across institutions to support integrated treatment structures. Nursing terminologies have to illustrate the nursing care process on all levels.

For this, a discussion on the level of detail which is required for nursing care documentation is necessary.

From the point of view of documentation it is not very helpful if nursing diagnoses are combined with characteristics which list several examples, for example, the characteristic "psychological limitations (for example psychosis, missing stimuli)". If this term is included in the patient documentation, it would not be clear what is meant exactly. Apart from the fact that nursing care plans would be crammed with inappropriate examples. Similarly, formulations, such as "as appropriate", "and/or", "and others", "or (if appropriate)" should be avoided. Currently, the activities of NIC are not appropriate for patient documentation in an electronic patient record at this time.

In addition to the demand that nursing terminologies should represent national and international nursing knowledge and should aim for validity and completeness, it is necessary to validate the terms for clarity within the context of the nursing documentation. There should be no leeway for interpretation of single terms in the nursing documentation.



Thank you for your attention

*You can recognise a really good idea
when its realisation seems to be
impossible from the outset.*

Albert Einstein

Ladies and Gentlemen, thank you very much for your attention. With this presentation, I have hopefully contributed to the discussion on nursing terminologies in an electronic patient record. I am now available for your questions.

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