

## Towards automated evaluation of patient centered care – assessing the potential of electronic health records

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## Introduction

### Aim of this study:

To assess the potential of using EHRs as information source in the development of tools for assessing patient centered care (PCC)

### Patient centered care (PCC): a cornerstone of high quality nursing

- Improved health outcomes and patient satisfaction
- Evaluating PCC majorly focused on surveying or interviewing patients or professionals, or observing clinical encounters
- Methods are costly, time-consuming and difficult to implement as part of routine care

### Electronic health records (EHR) a potential data source in assessing aspects related to nursing practise

- Nurse managers lack tools to monitor nursing-sensitive quality markers
- Combined with artificial intelligence, secondary use of EHR data would benefit automated evaluation of quality of nursing components



## Methods

### Data collection

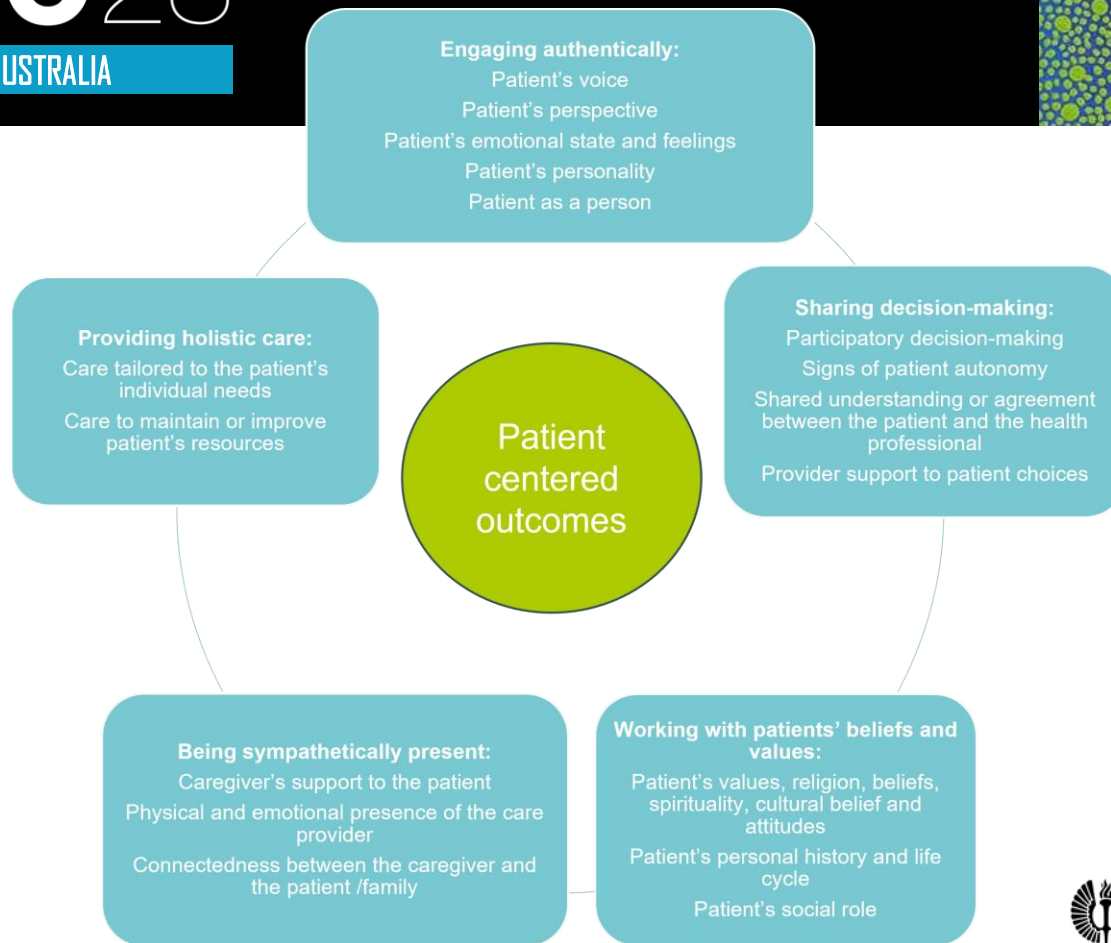
- EHR data obtained from a cardiac center of a hospital district in Finland
- All entries made from patients (n=1852) admitted to the center in January 2020 collected from the data lake
- Structured and free text entries
- Random sampling: 20 patient's documents

### Manual annotation

- Annotation guide: Systematic literature review to describe the use of EHRs in identifying aspects related to PCC
- Eight research articles
- The organizing of the literature was guided by the Person-centered Practice Framework (Mc Cance and McCormack, 2016)
- Annotation of the EHRs: deductive content analysis methods
- Words or phrases describing PCC



## Annotation guide





## Results

20 patient's documentation:

- 10 female, 10 male

Average age: 72,9 years (SD 9,6)

Total number of extracted expressions: 539

- 429 from nursing notes
- 108 from physician notes

Activities of PCC	n	%
Engaging authentically with the patient	329	61.3
Shared decision-making between professional and patient	97	18.1
Working with the patients' beliefs and values	90	16.8
Being sympathetically present	15	2.8
Providing holistic care	6	1.1



## Results

Documented entries related to engaging authentically with the patient (n=329, 61.3%)	n	%	Example expressions
Patient's voice: narrating the patient's speech	140	26.1	<i>"the patient told"</i> <i>"says it's bothering"</i> <i>"according to the patient".</i>
Patient's perspective: e.g. documenting care experiences, expectations, desires	139	25.9	<i>"thinks it might be a good idea"</i> <i>"wants to go home"</i> <i>"the patient feels that"</i>
Patient's emotional state and feelings	42	7.8	<i>"contented"</i> <i>"calm"</i> <i>"in a good mood"</i> <i>"seemingly stressed"</i>
Patient's personality	8	1.4	<i>"talkative"</i> <i>"pleasant in contact"</i>
Patient as a person	0	0	-



## Results

Documented entries related to shared decision-making between professional and patient (n=97, 18.1%)	n	%	Example expressions
Signs of patient autonomy	51	9.5	<i>“refused pain medication”</i> <i>“asks to adjust the flow”</i>
Shared understanding or agreement between the patient and the health professional	27	5.0	<i>“agreed, that the patient walks”</i>
Participatory decision making	19	3.5	<i>“discussed heart healthy nutrition”</i> <i>“thinking about other options”</i>
Provider support to patient choices	0	0	-



## Results

Documented entries related to working with patients' beliefs and values (n=90, 16.8%)	n	%	Example expressions
Patient's social role	49	9.1	"the husband was visiting" "the patient phoned his wife"
Patient's personal history and life cycle	41	7.6	"the patient is living alone" "the patient is living with his wife" "the closest relatives are..." "the patient is still in work-life"
Patient's values, religion, beliefs, spirituality, cultural beliefs and attitudes	0	0	-



## Results

Documented entries related to being sympathetically present (n=15, 2.8%)	n	%	Example expressions
Caregiver's support to the patient	10	1.9	"encouraged the patient to get up"
Physical and emotional presence of the care provider	5	0.9	"long conversation with the patient" "soothed the patient"
Connectedness between the caregiver and the patient or their family	0	0	-

Documented entries related to providing holistic care (n=6, 1.1%)	n	%	Example expressions
Care tailored to the patient's individual needs	4	0.7	"food to suit their appetite"
Care to maintain or improve patient's resources	2	0.4	"to return to hobbies"



## Discussion

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- Potential in evaluating subjective and straightforward aspects related to activities of PCC
- The more complexity was involved in the studied activities, the less they were mentioned in the EHRs:
  - interconnectedness between the patient and the caregiver,
  - information regarding the patient's personal beliefs or values
  - Knowledge related to the patient's personality



## Discussion

- EHRs criticized for dehumanizing the patient by portraying them through their symptoms and metrics
  - The findings indicate that documentation does entail elements of PCC, but not all aspects are adequately presented
- A need for developing documentation guidelines to better promote PCC
- More research on establishing the fine line between information needed to provide best possible care and



## Discussion

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The results of this study validate the annotation guide in evaluating PCC from EHRs

- A larger study with a bigger sample size is required

The evaluation of data quality: not all aspects of nursing care fully presented in the EHRs

To move forward with developing a machine learning model to automatically evaluate PCC from secondary data, guidelines for using and interpreting PCC information should be established

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Thank you!