

# The PopGroup Project:

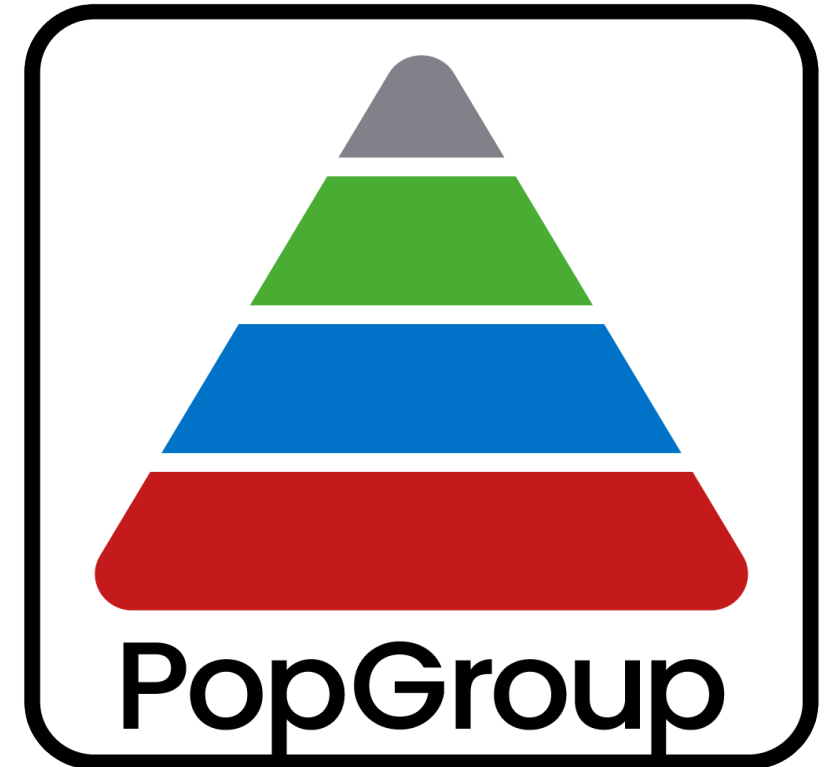
## *Progress in the Development of a population-based classification system for the cross-sectoral determination of morbidity-related care needs*

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Bled, Slovenia, 30. May 2024



# Project Objectives:

1. Development of a German population-based classification system to measure morbidity burden
2. Potential applications:
  - PopGroups as a basis for cross-sectoral demand planning (presentation tomorrow)
  - Casemix-adjustment for regional benchmarking analyses of quality and efficiency (presentation was yesterday)
  - Evaluation of health care reforms and new care models
  - Identification of insured individuals for case management
3. Development of scenarios and proposals for institutionalization of further development, maintenance and application of the PopGrouper classification system

# Reform in health system planning: need for a greater focus on morbidity

## Beschluss



des Gemeinsamen Bundesausschusses zur Abnahme des Endberichts zur Entwicklung der Bedarfsgerechten Versorgung nach § 99 ff. SGB V zur Sicherung der vertragsärztlichen Versorgung

Vom 20. September 2018

Der Gemeinsame Bundesausschuss (G-BA) beschließt, den Endbericht „Gutachten zur Entwicklung der Bedarfsgerechten Versorgung nach § 99 ff. SGB V zur Sicherung der vertragsärztlichen Versorgung“ gemäß der Anlage, abzunehmen.

Dieser Beschluss wird auf den Internetseiten [www.g-ba.de](http://www.g-ba.de) veröffentlicht.

Berlin, den 20. September 2018

Gemeinsamer  
gemäß  
Der

Prä

**... stronger morbidity orientation**

Anlage:

Endbericht „Gutachten zur Weiterentwicklung der Bedarfsgerechten Versorgung nach § 99 ff. SGB V zur Sicherung der vertragsärztlichen Versorgung“

**Gutachten**  
Krankenhauserstattung  
Nordrhein-Westfalen

Berlin, August 2019

SACHVERSTÄNDIGENRAT  
zur Begutachtung der Entwicklung  
im Gesundheitswesen

Bedarfsgerechte Steuerung  
der Gesundheitsversorgung

**... morbidity-oriented cross-sector planning**



LOHFERT & LOHFERT

Gutachten 2018



**... morbidity-based hospital budgets**

Dritte Stellungnahme und Empfehlung  
der Regierungskommission für eine moderne  
und bedarfsgerechte Krankenhausversorgung

Grundlegende Reform  
der Krankenhausvergütung



# The development of the PopGrouper took inspiration from other international classification systems



The Johns Hopkins ACG System  
Excerpt from Version 11.0 Technical Guide  
November 2014



Chong et al. *Systematic Reviews* (2019) 8:202  
<https://doi.org/10.1186/s13643-019-1105-6>

## RESEARCH

### Population segmentation based on healthcare needs: a systematic review

Jia Loon Chong, Ka Keat Lim and David Bruce Matchar\*

#### Abstract

**Background:** Healthcare needs-based population segmentation is a promising approach and evaluation of integrated healthcare service models that meet healthcare needs. Healthcare providers and interested in understanding adult population healthcare needs may not be aware of several tools available for use in the literature and barring better-known alternatives, may rely on validating their own tools rather than adapting available tools in the literature. Therefore, this review to identify all available tools which operationalize healthcare need-based population segmentation for policymakers developing population-level health service programmes.

**Methods:** Using search terms reflecting concepts of population, healthcare need and evaluation of integrated healthcare service models that meet healthcare needs, we reviewed and included articles containing healthcare need-based adult population segmentation tools from CINAHL and Web of Science databases. We included tools comprising mutually exclusive and clinically relevant outcomes. An updated secondary search on the PubMed database was conducted the last search was conducted 2 years ago. All identified tools were characterized in terms of their segmentation base, whether they received peer-reviewed validation, requirement for medical records, proprietary status and number of segments.

**Results:** A total of 16 unique tools were identified from systematically reviewing 9970 studies were found for 9 of these tools.

**Discussion and conclusions:** The underlying segmentation basis of most identified tools was conceptually comparable to each other which suggests a broad recognition of healthcare need profiles. While many tools operate based on administrative or healthcare systems without comprehensive electronic medical records would not be able to segment populations through primary data collection. Future work could therefore focus on the development and validation of such primary data collection-based tools. While this study is limited to English literature, the identified and characterized tools will nonetheless facilitate the development and evaluation of service models that meet healthcare needs and improve patient-centred care through development and evaluation of service models that meet healthcare needs and improve patient-centred care through development and evaluation of service models segmented by these tools.

**Keywords:** Population segmentation, Integrated care, Health care reform, Core health services needs and demand, Person-focused health



## CIHI's Population Grouping Methodology 1.3

Overview and Outputs, 2021



# Data basis

- **Secondary data:**

- BARMER Science-Data-Warehouse (W-DWH) with pseudonymized claims data (including cross-sectoral diagnoses, clinical activity, billing and demographic information) covering four years with the possibility to extrapolate to the total population. (N=9.4 million)

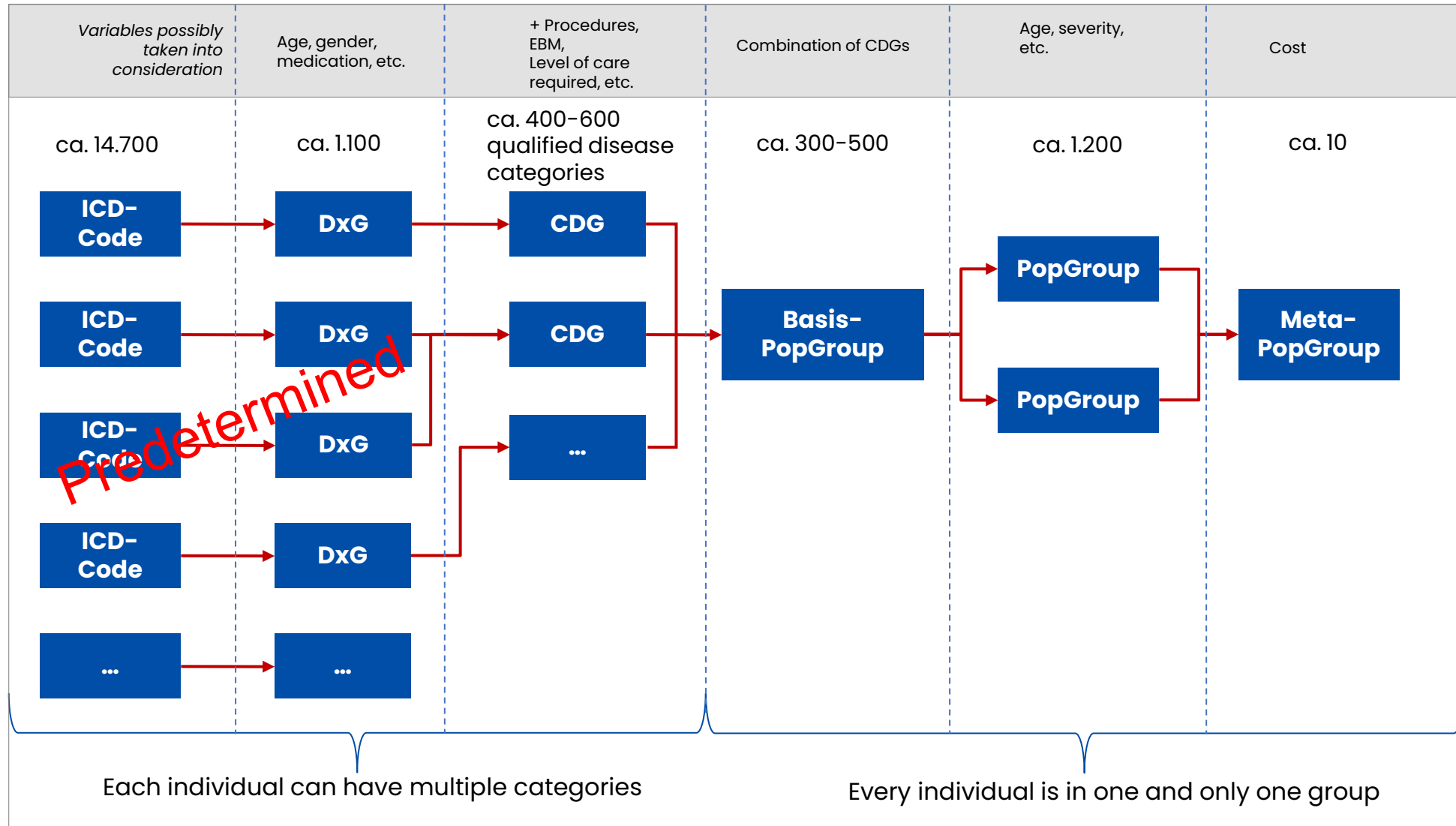
- **Primary data:**

- Interviews/Focus groups with clinical experts/Workshops

- **Additional Resources:**

- Pschyrembel

# Conceptual Origin of the PopGrouper: medically sensible and economically homogenous groups



# The beginning...

1. Starting point: German modified Diagnostic Groups (DxGs)
2. Classifying the DxGs into different, mainly organ system based groups (Macro Disease Groups, "MDGs")
  - Exception: infections, neoplasms, pregnancy, drug & alcohol related, burns, chronic pain, transplantations, complications
3. Formation of Consolidated Disease Groups (CDGs) based on DxGs within a MDG based on predetermined criteria

## Example:

- Within the MDG "Cardiology", the DxGs "Ventricular septal defect (age < 18 years)" and "Ventricular septal defect (age > 17 years)", were combined into the CDG "Ventricular septal defect" on the basis of our CDG assignment criteria.



# The result was 32 Macro Disease Groups (MDGs)

MDG Nr.	Macro Disease Group (MDG)	Origin
1	Infections	● ●
2	Neoplasms	● ● <b>interorganic</b>
3	Diabetes mellitus	● ●
4	Metabolic diseases	● ●
5	Diseases of the liver	●
6	Gastrointestinal diseases	●
7	Diseases of the musculoskeletal system	● ●
8	Diseases of the blood	● ●
9	Cognitive diseases	●
10	Alcohol and drug abuse	● ●
11	Psychological diseases	● ●
12	Developmental disorders	●
13	Diseases and injuries of the spine	●
14	Neurological diseases	● ●
15	Diseases of the heart	● ● <b>organ specific</b>
16	Cerebrovascular diseases	●

MDG Nr.	Macro Disease Group (MDG)	Origin
17	Vascular and circulatory system diseases	●
18	Diseases of the lung	● ●
19	Diseases of the urogenital system	● ●
20	Pregnancy, birth, and postpartum	● ●
21	Diseases of the skin	●
22	Burns	●
23	Injuries	● ●
24	Complications	●
25	Transplantations	●
26	Diseases of the eye	● ●
27	Diseases of newborns	● ●
28	Chronic Pain	●
29	Ear, nose and throat diseases	● ●
30	Nutritional diseases and poisoning	●
31	Gynecological and reproductive diseases	●
32	Andrological and reproductive diseases	●



# Consolidated Disease Groups (CDGs)

[Zusammengefasste Krankheitsgruppen (ZKGs)]

## DEFINITION

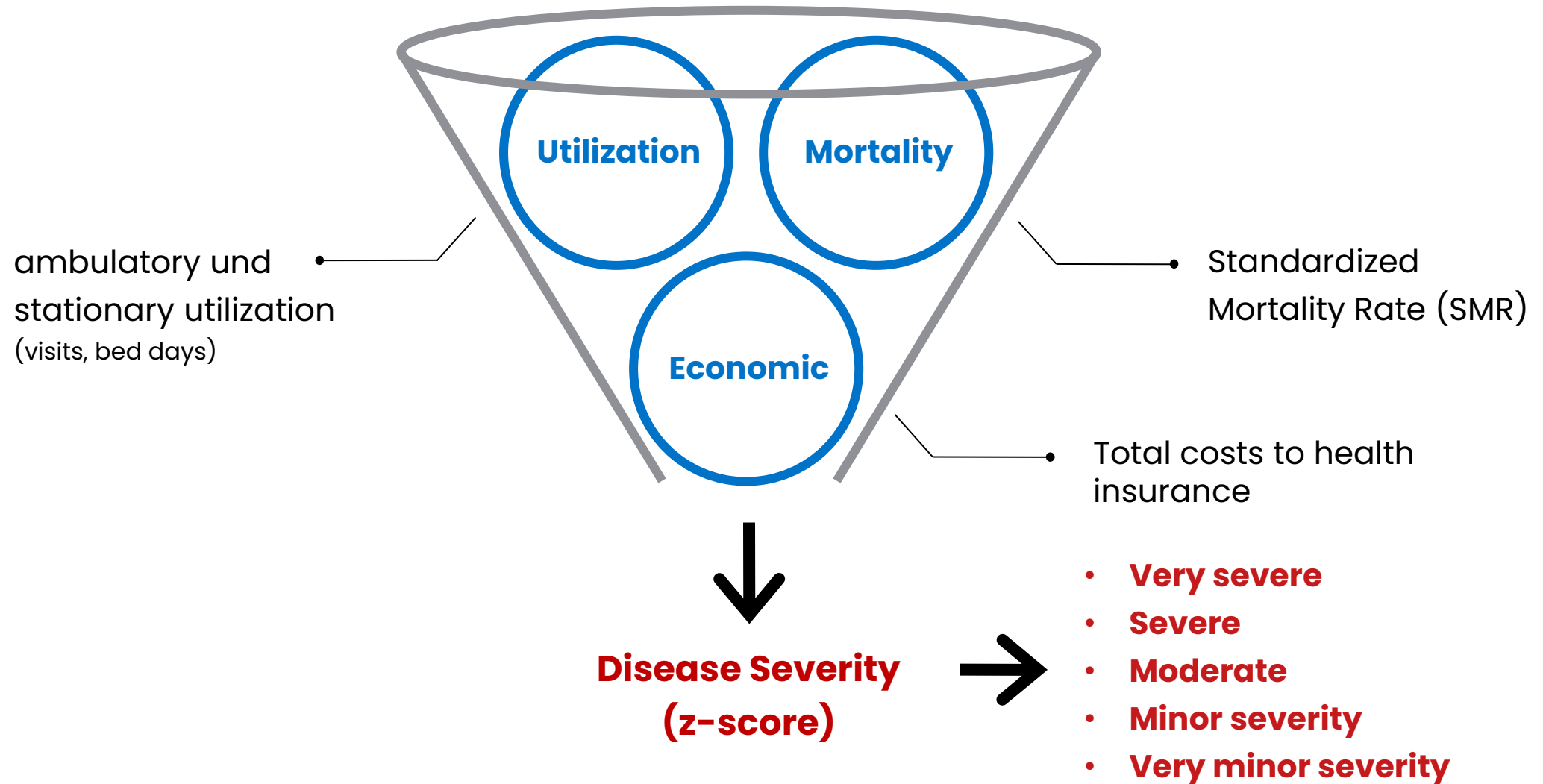
Unit of Analysis	=	DxGs
Basis of Analysis	=	Diagnoses (ICD codes)
Basis of Grouping	=	Medical meaningfulness

ICD → DxG → one and only one ZKG

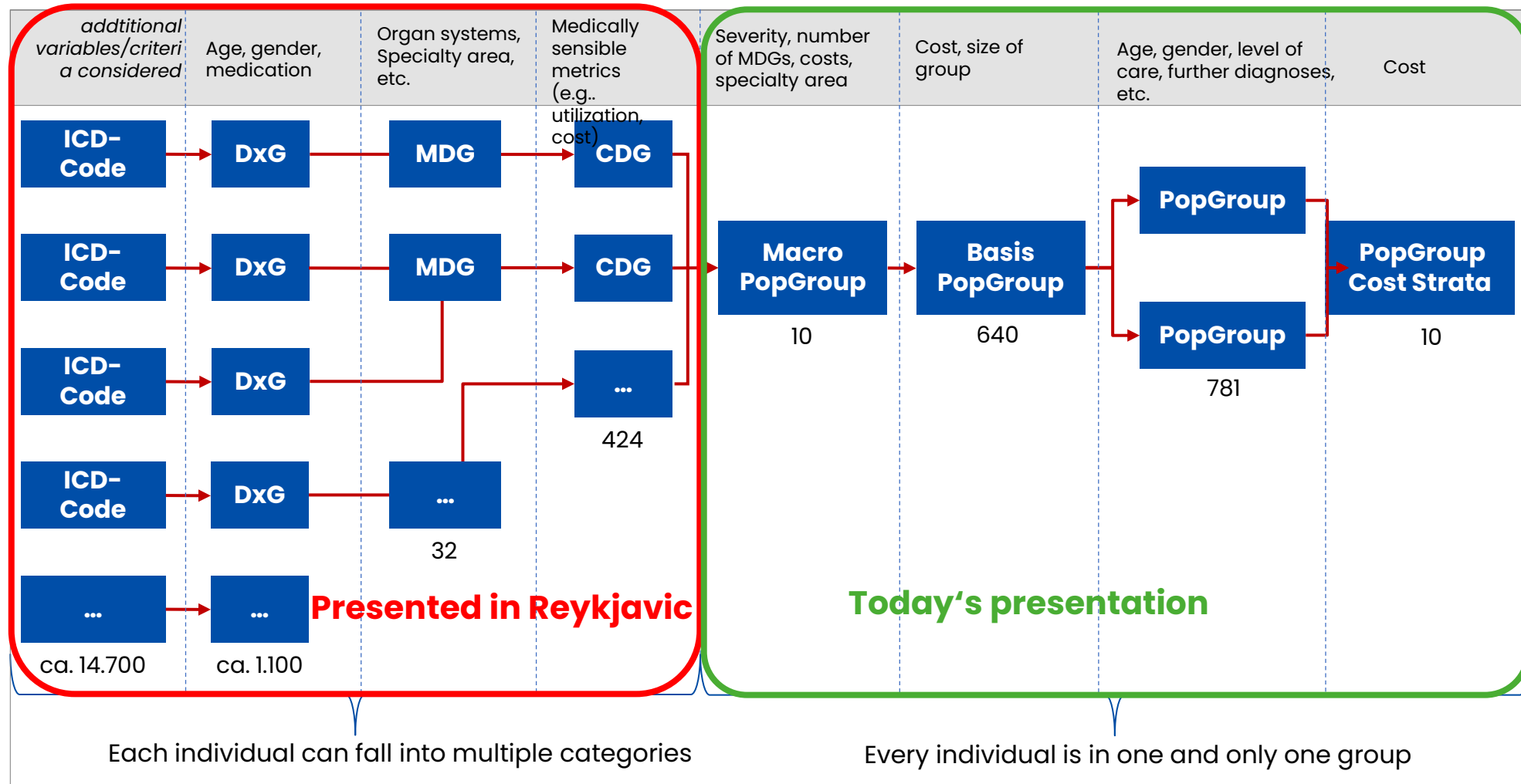
“a CDG clusters diagnoses within an MDG in a medically meaningful way. The focus is on the clinical picture and medical care requirements of a disease/disease group.”

Reduction of DxGs reached = 43%

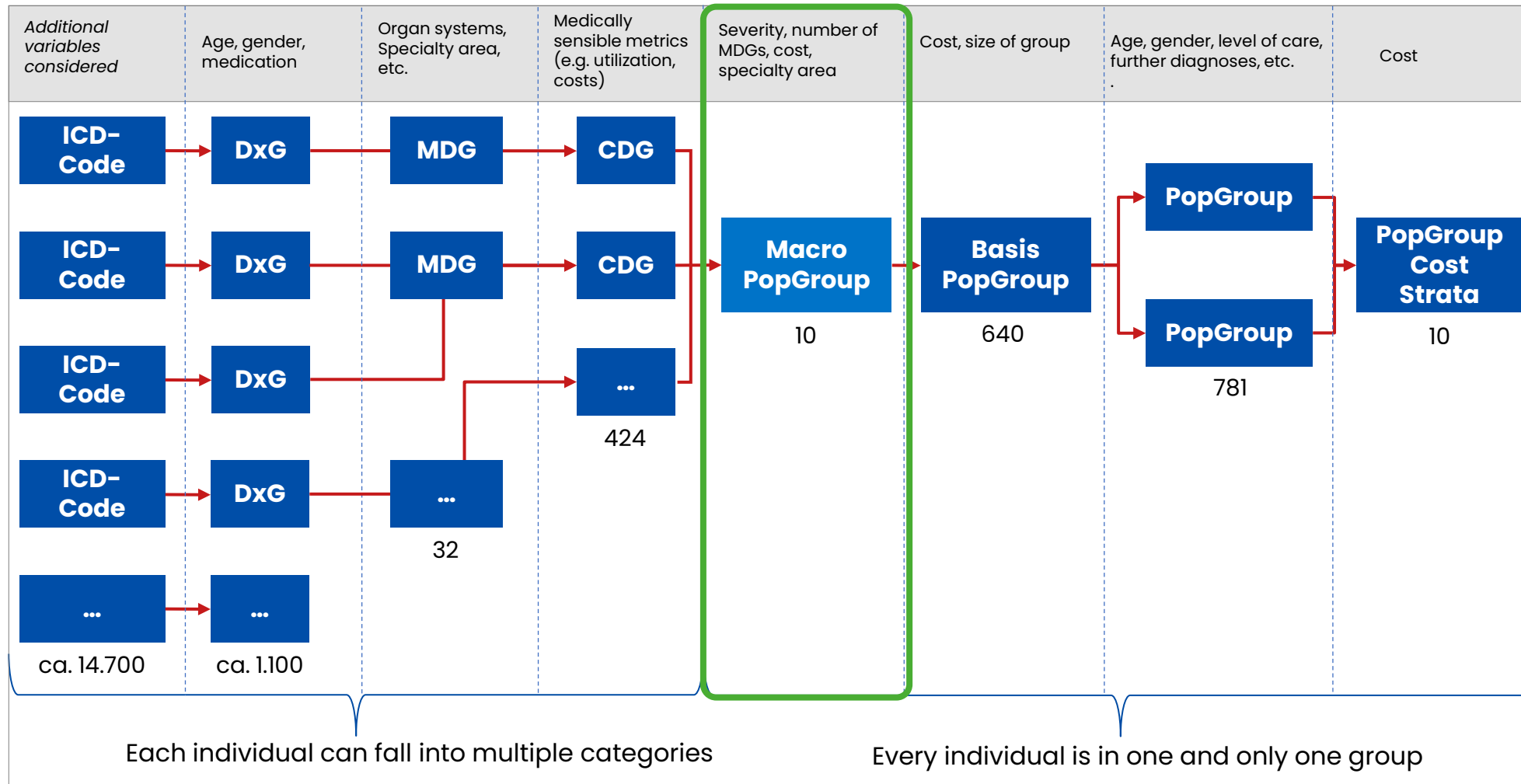
# Severity was defined for each CDG through three equally weighted dimensions



# The development of the PopGrouper can be divided in two parts



# As a middle step, Macro PopGroups (MPGs) were developed



# Individuals were categorized within 10 Macro-PopGroups (MPGs)

- **Mutually exclusive** – each individual would be assigned a single MPG
- **Hierarchically ranked** – each individual would be assigned the highest ranking MPG that they fulfill.

MBPG	Designation	# of persons (BARMER)	Average total costs/person
1	Newborn	137.685	3.152 €
2	Pregnancy, birth, and post-partum	117.452	4.158 €
3	Serious high-costs case	80.256	47.574 €
4	Actively treated malignant neoplasm	136.634	20.347 €
5	At least one (very) severe disease	1.331.769	7.512 €
6	At least one moderate disease	1.818.756	3.318 €
7	At least one minor disease	2.128.912	1.663 €
8	At least one very minor disease	1.345.266	686 €
9	Utilization without disease	1.702.978	279 €
10	No utilization	619.708	0 €

**Special need categories**

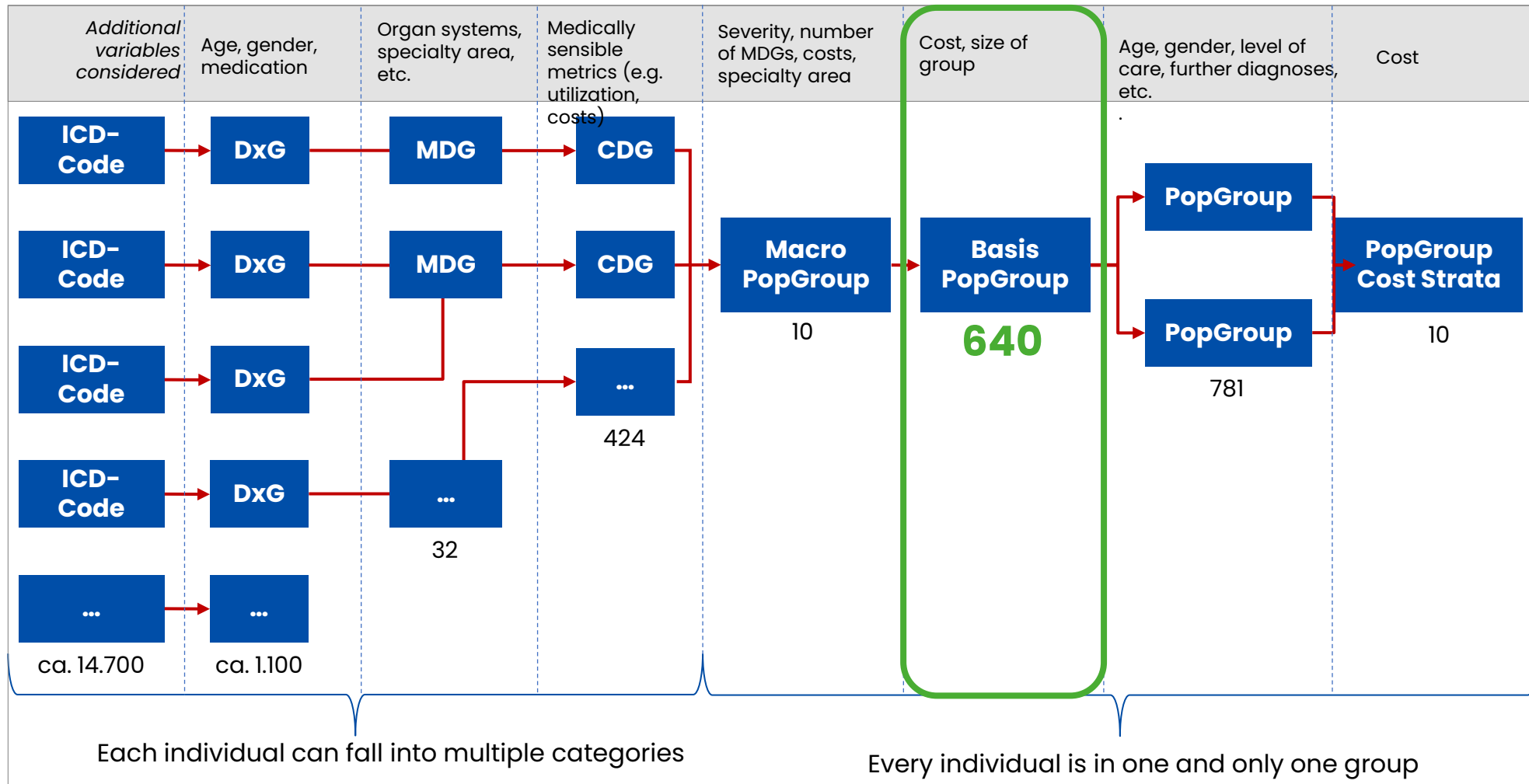
**Severity and costs**

**No Diagnoses**

## **Development of BPGs was done using a four step process**

1. Within each MPG, determination of “dominant disease” groups (based on total costs)
2. Identification of combinations of diseases for each “dominant disease” group
3. Utilization of Decision Lists based on MDGs, CDGs, and combinations of CDGs
4. Division of “pre-BPGs” into actual BPGs based on cost differentials

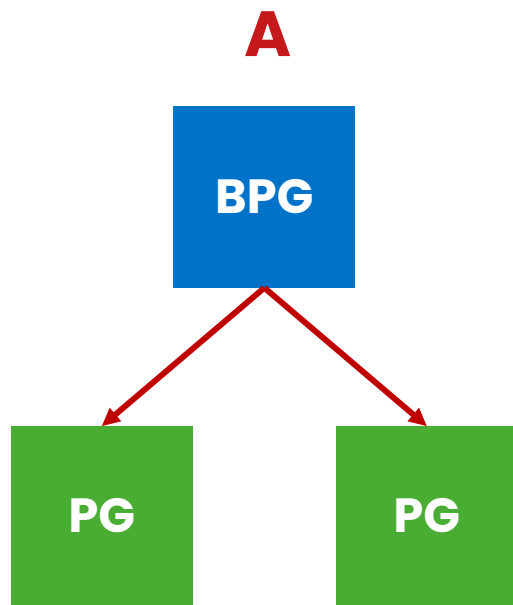
# Resulting in 640 BPGs



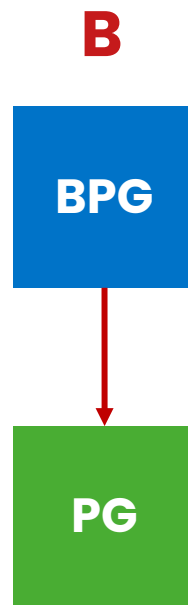


## Within each BPG, PopGroups (PGs) were determined

Regression Tree analysis was conducted within each BPG to identify if further relevant (diagnosis independent) characteristics (i.e. age, gender, level of care dependency, hours of artificial ventilation) could provide distinctions



A separation was warranted resulting in two PGs



No separation was warranted

### Example: PopGroups from MPG3

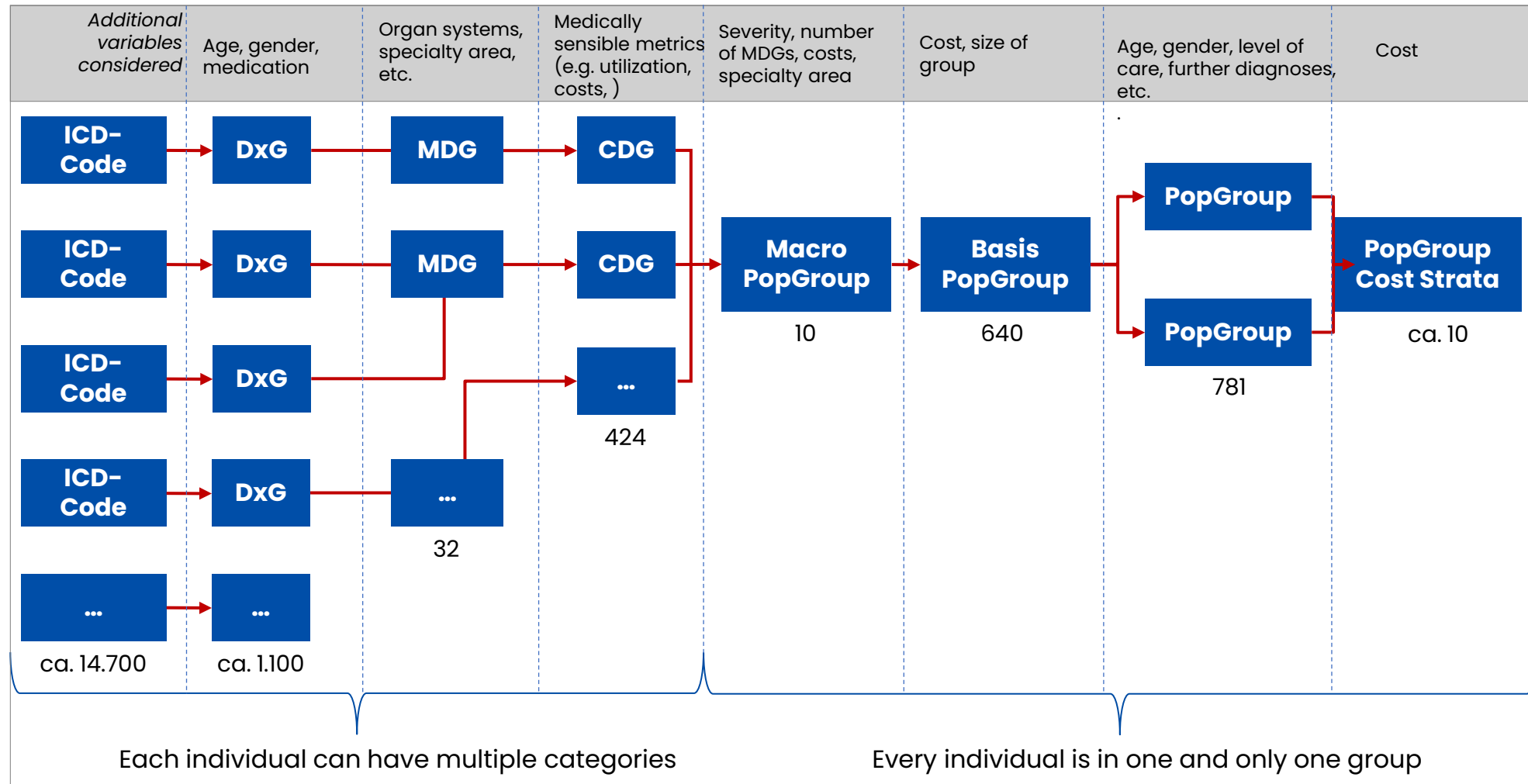
Group	PopGroups (PGs)
1	Certain metabolic diseases with drug therapy & congenital musculoskeletal anomaly
2	Hemophiliia with medication & diseases of the lung (MKG)
...	
	Certain metabolic disease with drug therapy and care level > 1
	Certain metabolic disease with drug therapy and care level ≤ 1
...	



## Each person is assigned to exactly one Macro-PopGroup (MPG), Basis-PopGroup (BPG) and PopGroup (PG)

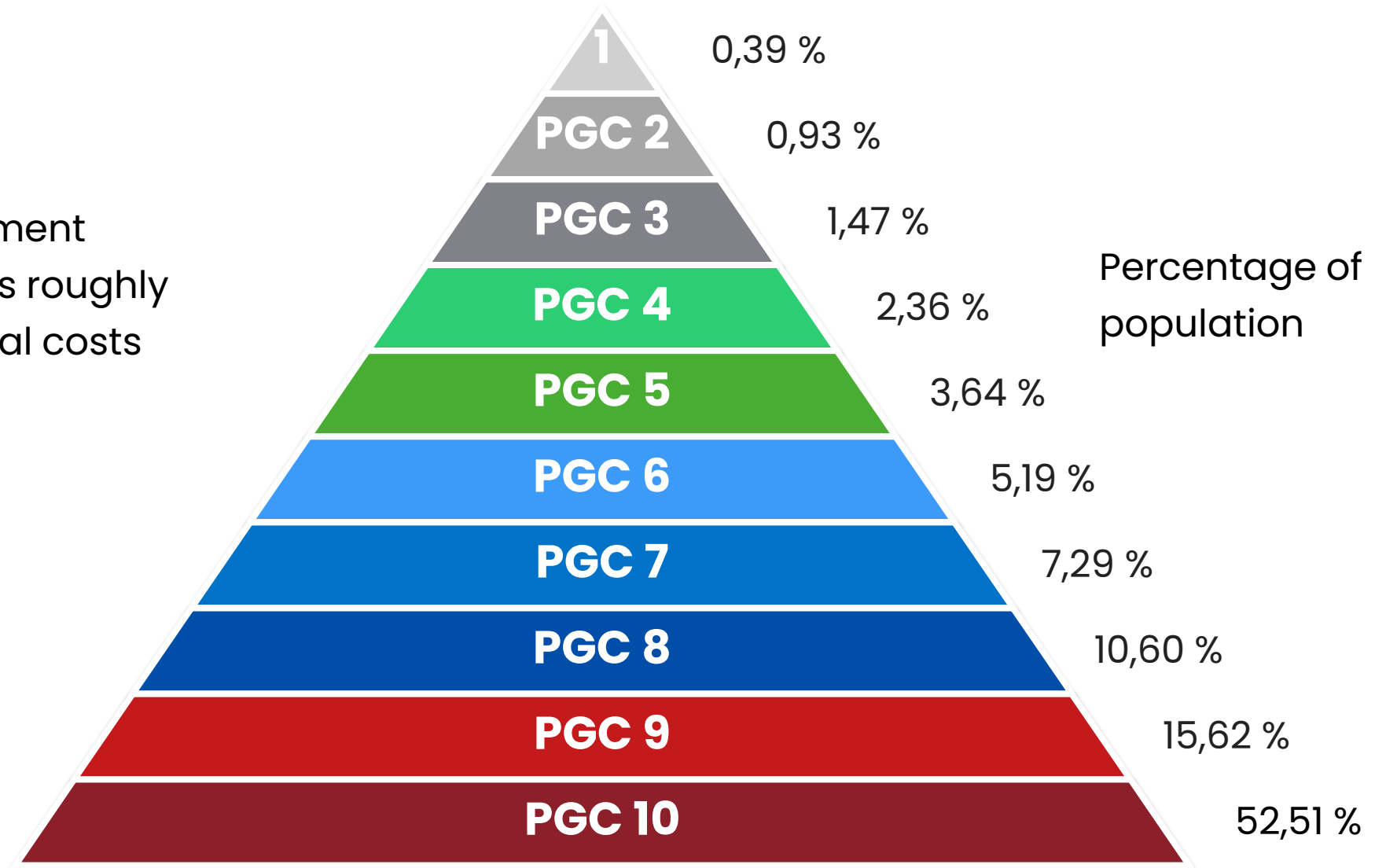
MPG	Designation	Number of BPGs (N=640)	BPG Example	Number of PGs (N=781)	PG Example
1	Newborn	16	birthweight 1250 - 2500 grams and high risk birth	18	... with > 95 h of artificial ventilation
2	Pregnancy, birth, and post-partum	15	diabetes mellitus (MKG)	15	<i>No further division</i>
3	Serious high-costs cases	72	acute graft-versus-host disease and SIRS with organ complications	95	<i>No further division</i>
4	Actively treated malignant neoplasms	84	malignant melanoma with metastases	101	... with degree of care dependency > 2
5	At least one (very) severe disease	208	... including: advanced chronic renal insufficiency with dialysis and other serious illness from at least 4 other MKGs	263	<i>No further division</i>
6	At least one moderate disease	117	... including: inflammatory bowel disease	148	... with age > 45
7	At least one minor disease	96	... including: arthritis	108	... with degree of care dependency = 0
8	At least one very minor disease	30	... including: cataract	31	<i>No further division</i>
9	Utilization without disease	1	utilization without disease	1	<i>No further division</i>
10	No utilization	1	no utilization	1	<i>No further division</i>

# In the end...



# PopGroup Cost Strata (PGCs) group PopGroups based on their average costs

Each segment represents roughly 10 % of total costs



# The PopGroup will be continuously developed further and validated

## Current Status:

- V0.4 has been developed & is currently being validated

## Next steps:

- Updating with changes to recent DxG assignments
- Develop PopGroup Cost Strata
- Publication of Version 1.0 as open source resource

Project end: end of September 2024

## To summarize, the PopGrouper aims to:

- Support a stronger morbidity orientation and a focus on cross-sectoral infrastructure planning, presently demanded from many sides
- Provide an instrument to measure morbidity on a population basis, which is currently missing in Germany
- Create a valid methodological basis for a determination of the regional morbidity burden
- Potential applications:
  - Planning of health system infrastructure
  - Regional benchmarking-analyses
  - Evaluation of reforms and interventions
  - Case management

# Questions & Discussion

