

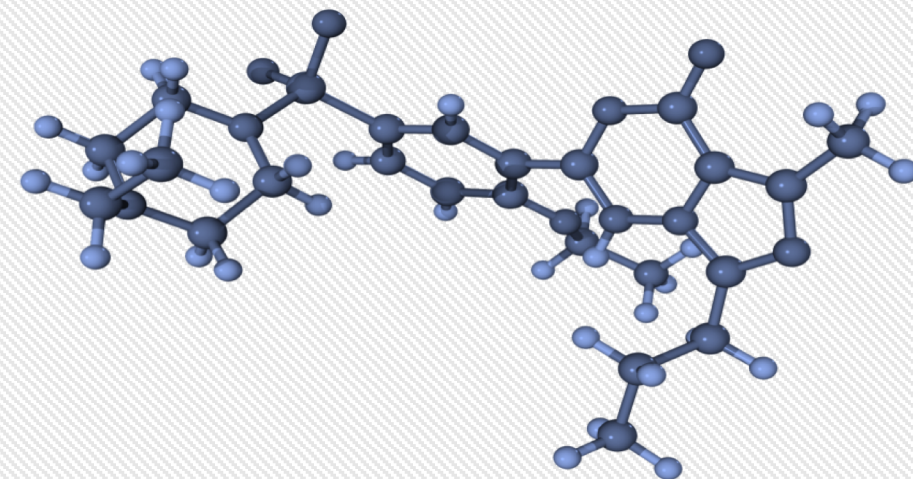


The Implementation of SNOMED CT in Chronic Obstructive Pulmonary Disease to Support Interoperability



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Mengchun Gong, Wenzhao Shi *

2019.10.30





国家呼吸临床研究中心·中日医院
呼吸专科医联体
MEDICAL CLUSTER FOR RESPIRATORY DISEASES

Medical Cluster for Respiratory Diseases, MCRD

promoting the grading diagnosis and treatment of specialist diseases and promoting the development of specialist disciplines.

- Difficult and Critical Respiratory Diseases Teleconsultation
- Outpatient Consultation of Critical Respiratory Diseases
- Establishment of Graded Referral System for Respiratory Diseases
- Promoting Smoking Cessation and Respiratory Disease Prevention
- Talents Training System of Respiratory Speciality



Wang Chen

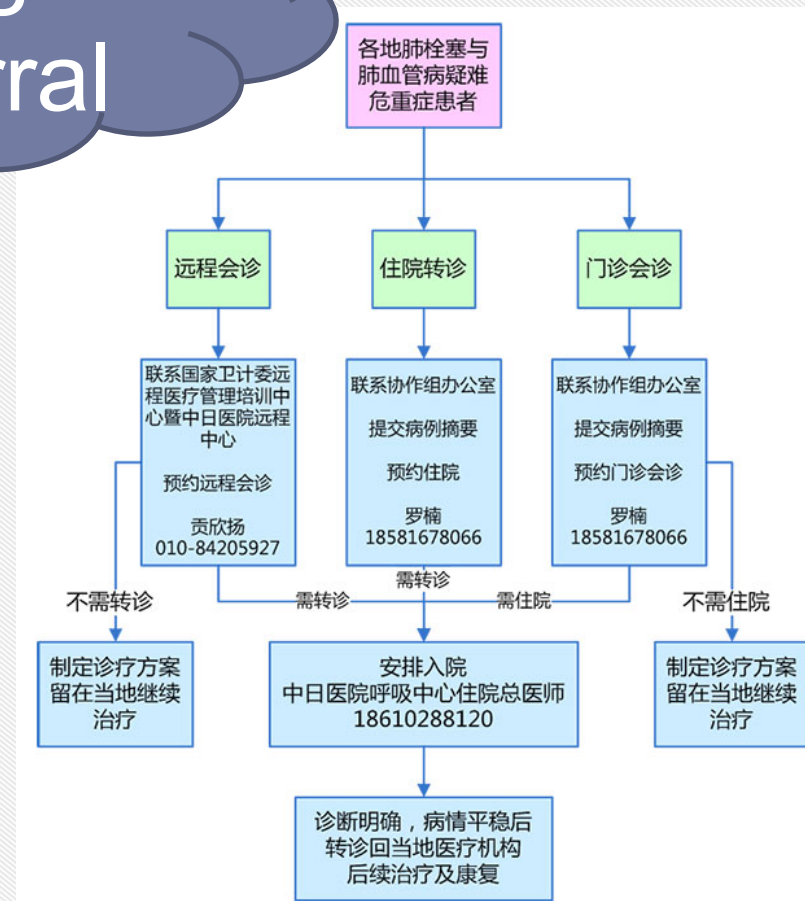
- Academician of Chinese Academy of Engineering
- Chairman of Society of Respiratory Diseases of Chinese Medical Association
- Chairman of Respiratory Medicine Branch of Chinese Medical Doctor Association
- Director, National Clinical Research Center for Respiratory Disease
- President of China-Japan Friendship Hospital

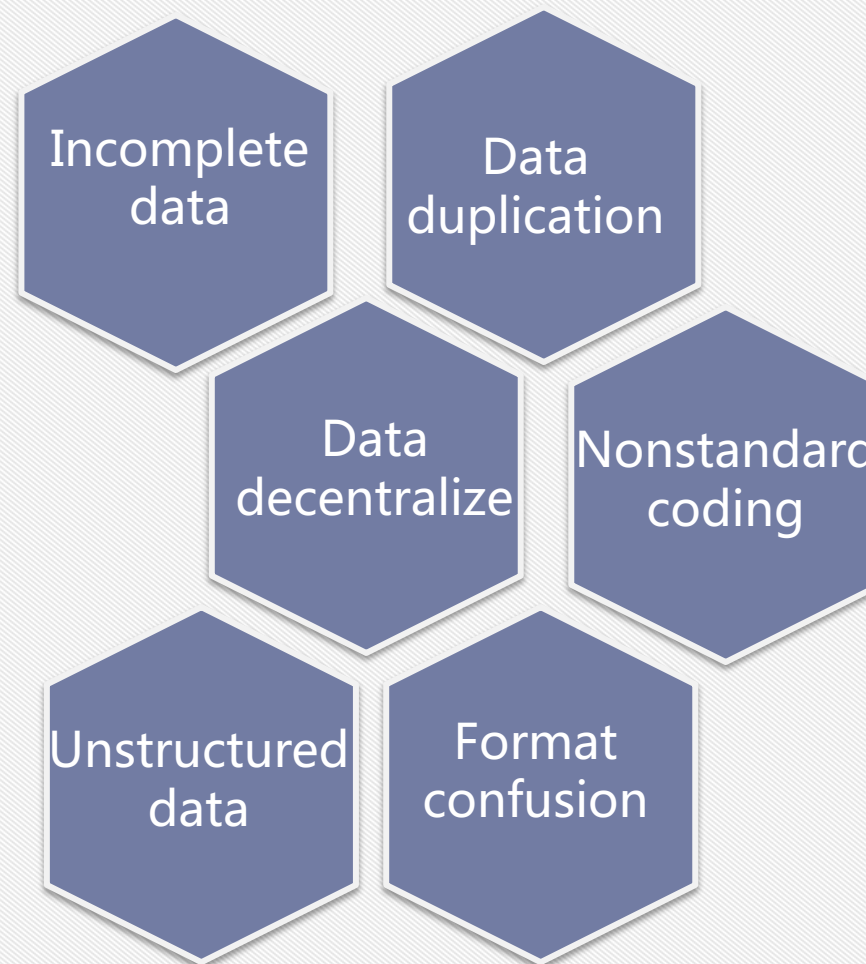
Respiratory failure and respiratory support technology, pulmonary embolism and pulmonary hypertension, new respiratory infectious diseases, chronic obstructive pulmonary disease, tobacco disease and other areas of the **main leaders and promoters**

Establishment of Graded Referral System for Respiratory Diseases

Intelligent referral

1. Hierarchical diagnosis and treatment mode
2. Convenient and efficient diagnosis and treatment
3. **Social Medical Emergency or Critical Care Referral System**














THE LANCET

ARTICLES | [VOLUME 391, ISSUE 10131, P1706-1717, APRIL 28, 2018](#)

Prevalence and risk factors of chronic obstructive pulmonary disease in China (the China Pulmonary Health [CPH] study): a national cross-sectional study

[Prof Chen Wang, MD](#)     • [Prof Jianying Xu, MD](#)  • [Prof Lan Yang, MD](#)  •
[Prof Yongjian Xu, MD](#)  • [Prof Xiangyan Zhang, MD](#)  • [Prof Chunxue Bai, MD](#)  • et al.

[Show all authors](#) • [Show footnotes](#)

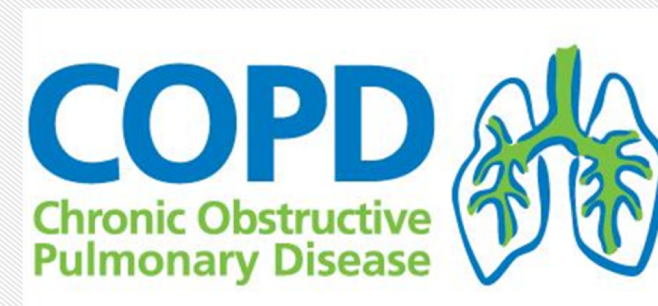
Published: April 09, 2018 • DOI: [https://doi.org/10.1016/S0140-6736\(18\)30841-9](https://doi.org/10.1016/S0140-6736(18)30841-9) •



- The overall prevalence of COPD was **8.6%**
- **99.9 million** people with COPD in China

COPD

- ❑ The total number of deaths in 2010 was **934,000**
- ❑ Mortality is second only to stroke, ischemic heart disease , ranking **third**
- ❑ High morbidity, high disability rate, high mortality and high burden of disease





[Eur Clin Respir J](#). 2019; 6(1): 1660565.

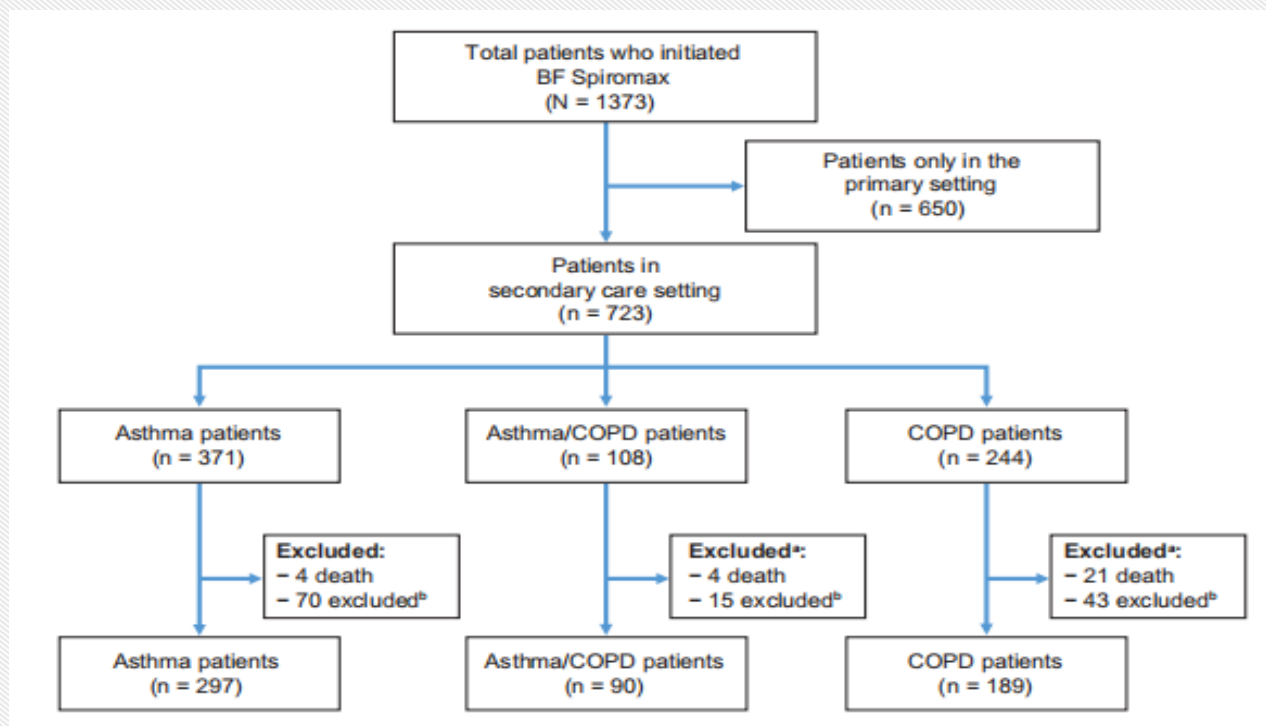
PMCID: PMC6758718

Published online 2019 Sep 13. doi: [10.1080/20018525.2019.1660565](https://doi.org/10.1080/20018525.2019.1660565)

PMID: [31579437](https://pubmed.ncbi.nlm.nih.gov/31579437/)

Real-world evidence effect of budesonide+formoterol Spiromax on patients with asthma and chronic obstructive pulmonary disease in Sweden

[Christer Janson](#),^a [Hicham Benhaddi](#),^b [Michael Törnblom](#),^c [Milica Uhde](#),^c and [Gunnar Johansson](#)^d



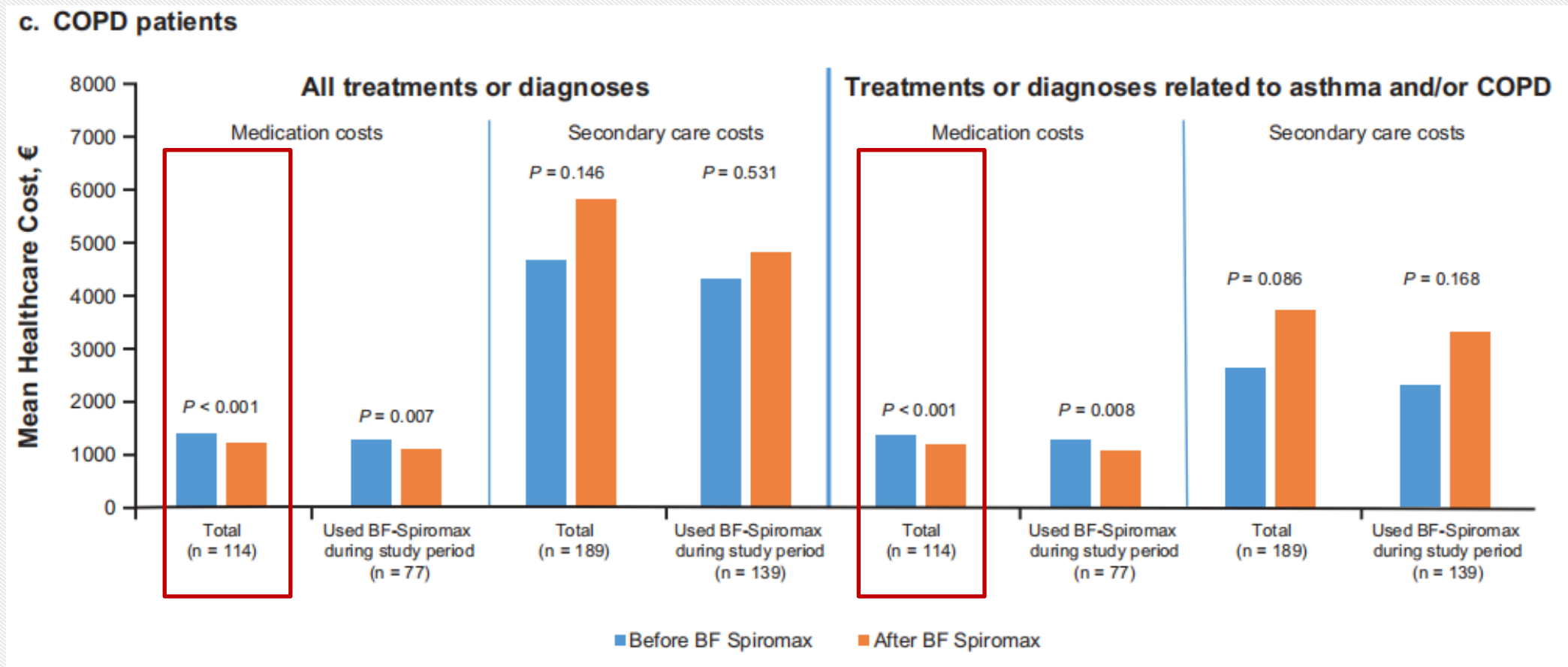
Among patients in the asthma group, SABA use significantly decreased from 59.9% to 51.2% ($P = 0.003$) for the total study population

Table 2. Asthma/COPD treatments before and after initiation to BF Spiromax in the total population.

Treatment <i>n</i> (%)	Asthma			Asthma/COPD			COPD		
	Before BF Spiromax	After BF Spiromax	<i>P</i> value	Before BF Spiromax	After BF Spiromax	<i>P</i> value	Before BF Spiromax	After BF Spiromax	<i>P</i> value
Accuhaler/Diskus	24 (8.1)	3 (1.0)	<0.0001	16 (17.8)	5 (5.6)	0.0023	16 (8.5)	9 (4.8)	0.0707
Turbuhaler	146 (49.2)	32 (10.8)	<0.0001	49 (54.4)	13 (14.4)	<0.0001	109 (57.7)	28 (14.8)	<0.0001
Other fixed ICS +LABA	11 (3.7)	12 (4.0)	0.7815	6 (6.7)	8 (8.9)	0.5271	11 (5.8)	16 (8.5)	0.2752
ICS	93 (31.3)	25 (8.4)	<0.0001	26 (28.9)	5 (5.6)	<0.0001	19 (10.1)	2 (1.1)	0.0001
LABA	35 (11.8)	15 (5.1)	0.0003	21 (23.3)	7 (7.8)	0.0005	25 (13.2)	16 (8.5)	0.0201
SABA	178 (59.9)	152 (51.2)	0.0025	60 (66.7)	55 (61.1)	0.2253	110 (58.2)	118 (62.4)	0.2170
SAMA	4 (1.3)	2 (0.7)	0.4142	4 (4.4)	2 (2.2)	0.3173	8 (4.2)	6 (3.2)	0.3173
LAMA	22 (7.4)	26 (8.8)	0.3458	60 (66.7)	63 (70.0)	0.4054	153 (81.0)	149 (78.8)	0.4328

BF: budesonide+formoterol; COPD: chronic obstructive pulmonary disease; ICS: inhaled corticosteroid; LABA: long-acting β_2 agonist; LAMA: long-acting muscarinic receptor antagonist; SABA: short-acting β_2 -agonist; SAMA: short-acting muscarinic antagonist.

Medication costs and secondary care costs are shown here.



Data sources

1400 COPD patients' EHRs from China-Japan Friendship Hospital

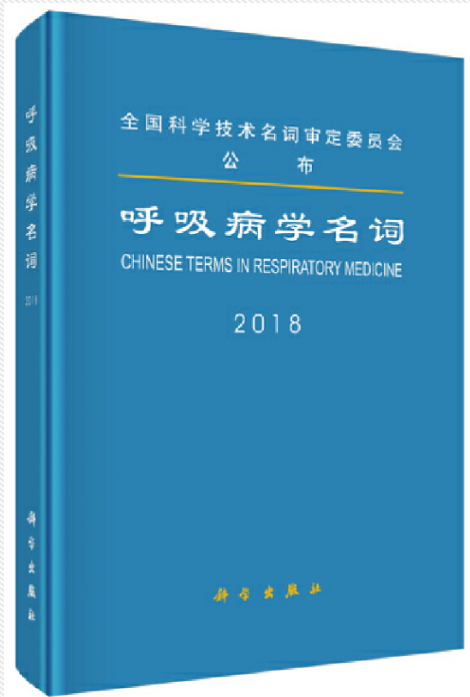
Unstructured data

患者因“反复咳嗽、咳痰、喘憋10余年，加重7天。”入院，入院查体：T38.0°C，P114次/分，R24次/分，BP130/70mmHg，患者神志清，精神可，扁桃体无肿大，桶状胸，双肺呼吸音低，闻及干湿性罗音，心率114次/分，心律规则，各瓣膜听诊区未闻及病理性杂音，腹平软，无压痛及反跳痛，未触及具体包块，肝脾未触及，腹部叩呈鼓音，无移动性浊音，肠鸣音正常，双下肢无水肿。

血沉 46mm/h↑，N-端脑利钠肽前体 1002.00pg/ml↑，白细胞计数 $6.85 \times 10^9/L$ ，红细胞计数 $3.60 \times 10^{12}/L$ ↓，血红蛋白浓度 121g/L↓，血小板 $141 \times 10^9/L$ ，中性粒细胞百分数 78.7%↑，总蛋白 45.5g/L↓，白蛋白 27.2g/L↓，二氧化碳分压 73mmHg↑，氧分压 48mmHg↓，酸碱度 7.38，患者心功能不全，给予芪苈强心胶囊强心利尿，停多索茶碱，特步他林减量，给予茶碱缓释片、丙卡特罗口服平喘，嘱积极佩戴无创呼吸机，注意观察病情变化。



CHINESE TERMS IN RESPIRATORY MEDICINE

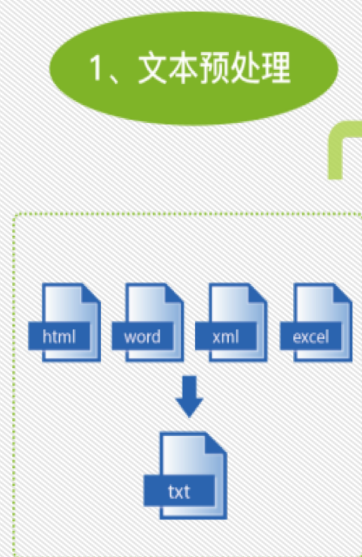


- Introduction
- Anatomy and histology
- Pulmonary circulation
- Respiratory movement regulation
- Etiology
- Symptoms and signs
- Diagnosis and treatment
- Respiratory diseases
- Pulmonary function
- Oxygen and carbon dioxide metabolism
- Body fluid, electrolyte and acid-base equilibrium
- Mechanical Ventilation
- Respiratory related critical illness



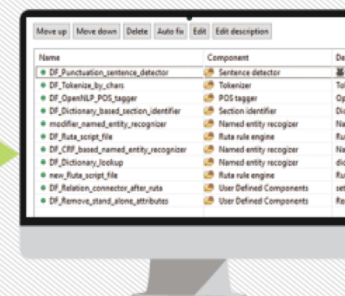
Data processing

Text preprocessing



2、人工标注
Manual annotation

machine learning



4、构建模型
Building model

Model application

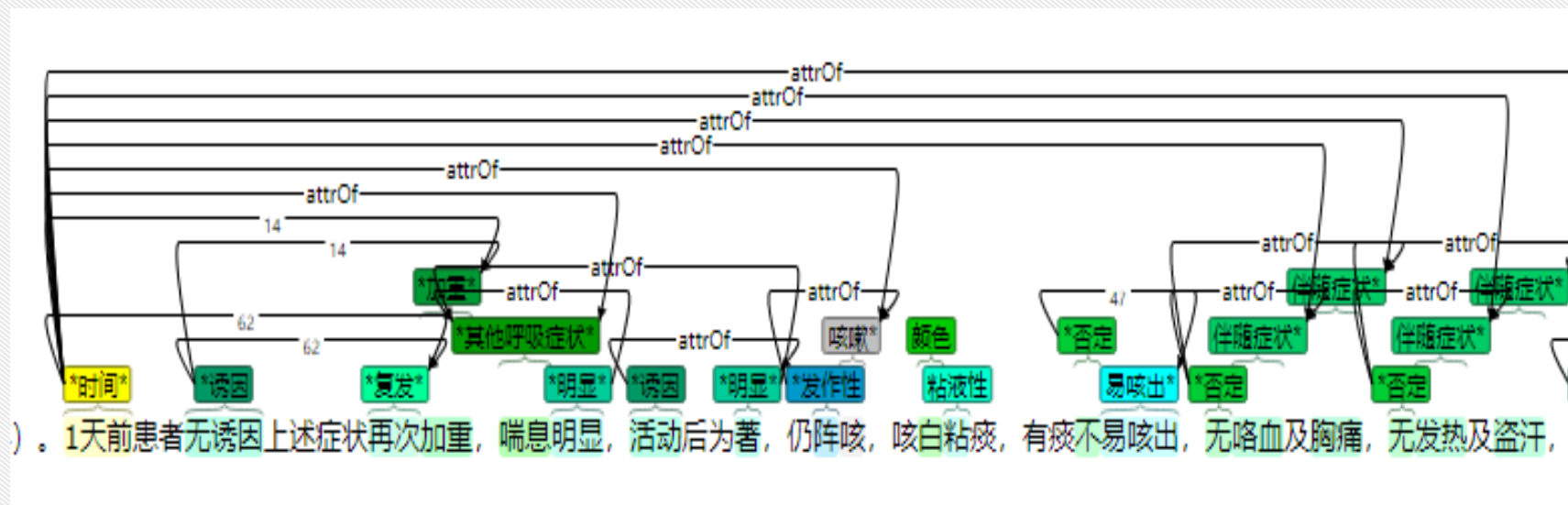
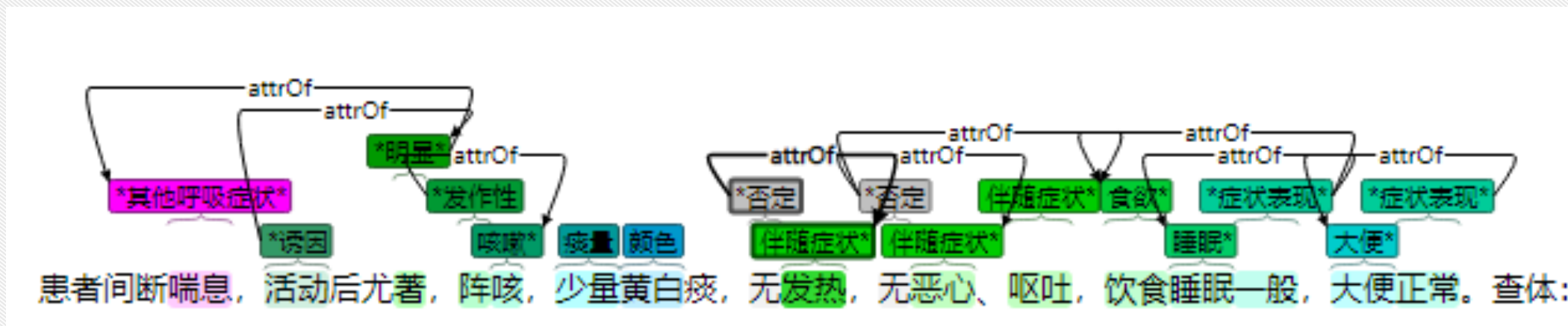


Data de-identification

- ◆ Date
- ◆ Name
- ◆ Address
- ◆ Telephone number
- ◆ Identification number
- ◆ Marriage
- ◆ Gender
- ◆ ...



Natural Language Processing(NLP)



Mapping

Source term :

化痰
祛痰
化痰治疗
化痰祛痰
...

SNOMED CT

Target term:

229296009 :
Sputum induction technique
(regime/therapy)

DC HEALTH 术语智能一体化平台

test3 | 退出

术语映射 / 映射详情

任务名称 映射SOP 修改日志 其他

临床术语信息 第1页 查看全部

词频	映射状态	临床术语	标准术语	相似度	参考编码	标准编码
61	向上	Carlo3指引下痰液喷射技术	心脏射频消融术	0.00		37.3302

精准
 向上
 存疑
 无法映射
 正常
 无效
 待分词

上下文信息 备注

请输入内容 undefined

中文匹配 精准 Carlo3指引下痰液喷射技术

基础信息 同义词 外网搜索 映射历程 中 英

ID: 37.3302

上下位关系

父概念:

暂无数据

术语智能一体化平台

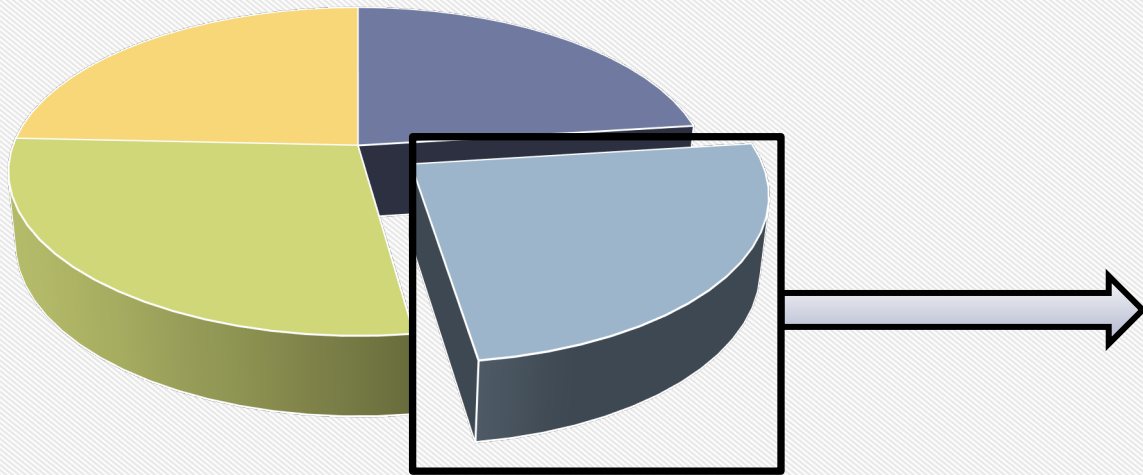
术语智能一体化平台术语智能一体化平台术语智能一体化平台术语智能一体化平台术语智能一体化平台术语智能一体化平台术语智能一体化平台

术语智能一体化平台

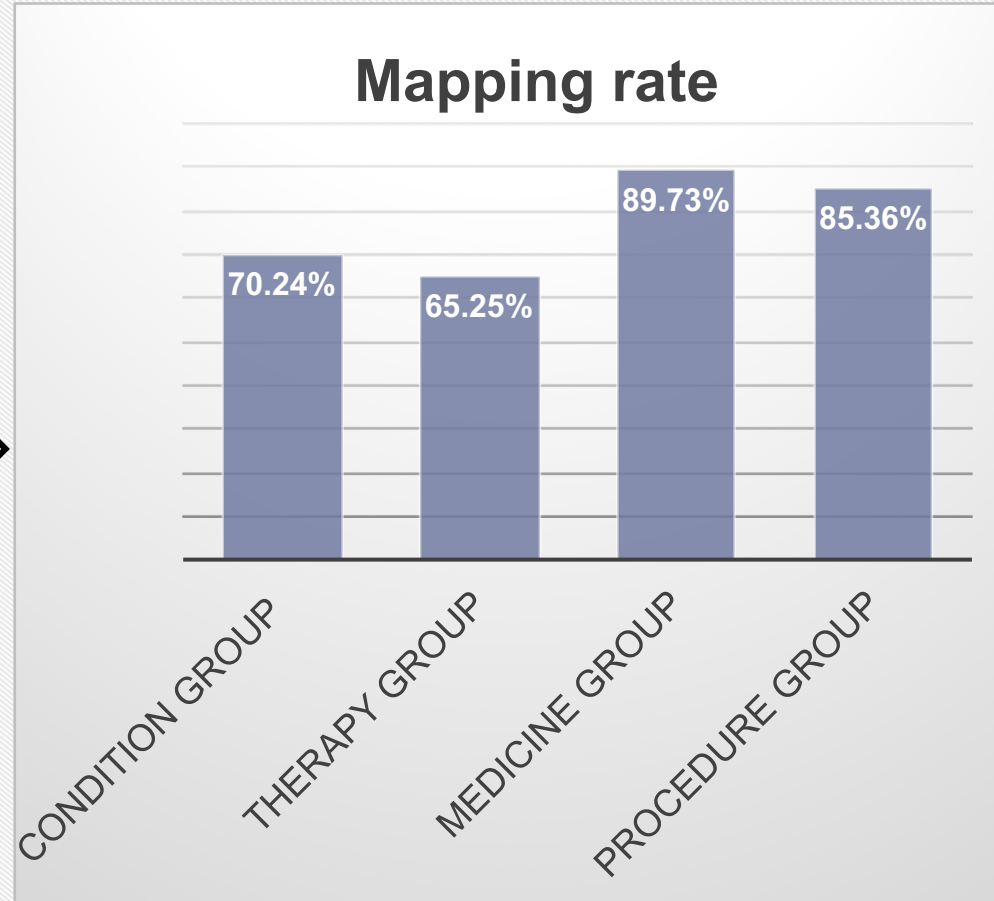
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And average mapping rate was 75%, among which, CG (n=1161, 70%), TG (n=199, 65%), DG (n=280, 89%), PG (n=414, 85%) in SNOMED CT



- Meaningless words
- Respiratory disease related words
- Other clinical words
- Words segmentation in need



呼吸病学术语子集

- + 01 概论
- + 02 解剖和组织学
- + 03 肺循环
- + 04 呼吸运动调节
- + 05 病因
- + 06 症状与体征
- + 07 诊断与治疗
- + 08 呼吸系统疾病
- + 09 肺功能
- + 10 氧和二氧化碳代谢
- + 11 体液、电解质与酸碱平衡
- + 12 机械通气
- + 13 呼吸相关危重症

- + 08.05 弥漫性肺疾病
- 08.06 支气管肺肿瘤
 - 08.223 肺癌
 - + 肺腺癌 (疾患)
 - + 大细胞肺癌 (疾患)
 - + 肺鳞状细胞癌 (疾患)
 - 癌性淋巴管炎 (疾患)
 - 下叶、支气管或肺部癌 (疾患)
 - 中叶、支气管或肺部癌 (疾患)
 - 上叶、支气管或肺部癌 (疾患)
 - 原发性肺小细胞非角化鳞状细胞癌 (疾患)
 - 原发性肺透明细胞鳞状细胞癌 (疾患)
 - 原发性肺基底样鳞状细胞癌 (疾患)
 - 原发性肺乳头状鳞状细胞癌 (疾患)
 - 原发性肺未分化癌 (疾患)
 - 原发性肺梭形细胞癌 (疾患)
 - 原发性肺多形性癌 (疾患)
 - 原发性肺假肉瘤癌 (疾患)
 - 08.224 中央型肺癌
 - 08.225 周围型肺癌
 - + 08.226 小细胞肺癌
 - + 08.227 非小细胞肺癌
 - + 08.228 鳞状细胞癌
 - + 08.229 腺癌

概念详情

- 大细胞肺癌 (疾患)

概念ID: 247540207

英文名称: Large cell carcinoma of lung (disorder)

概念来源: 呼吸病学术语子集

- 上级概念

肺实质癌 (疾患)

08.223 肺癌

- 下级概念

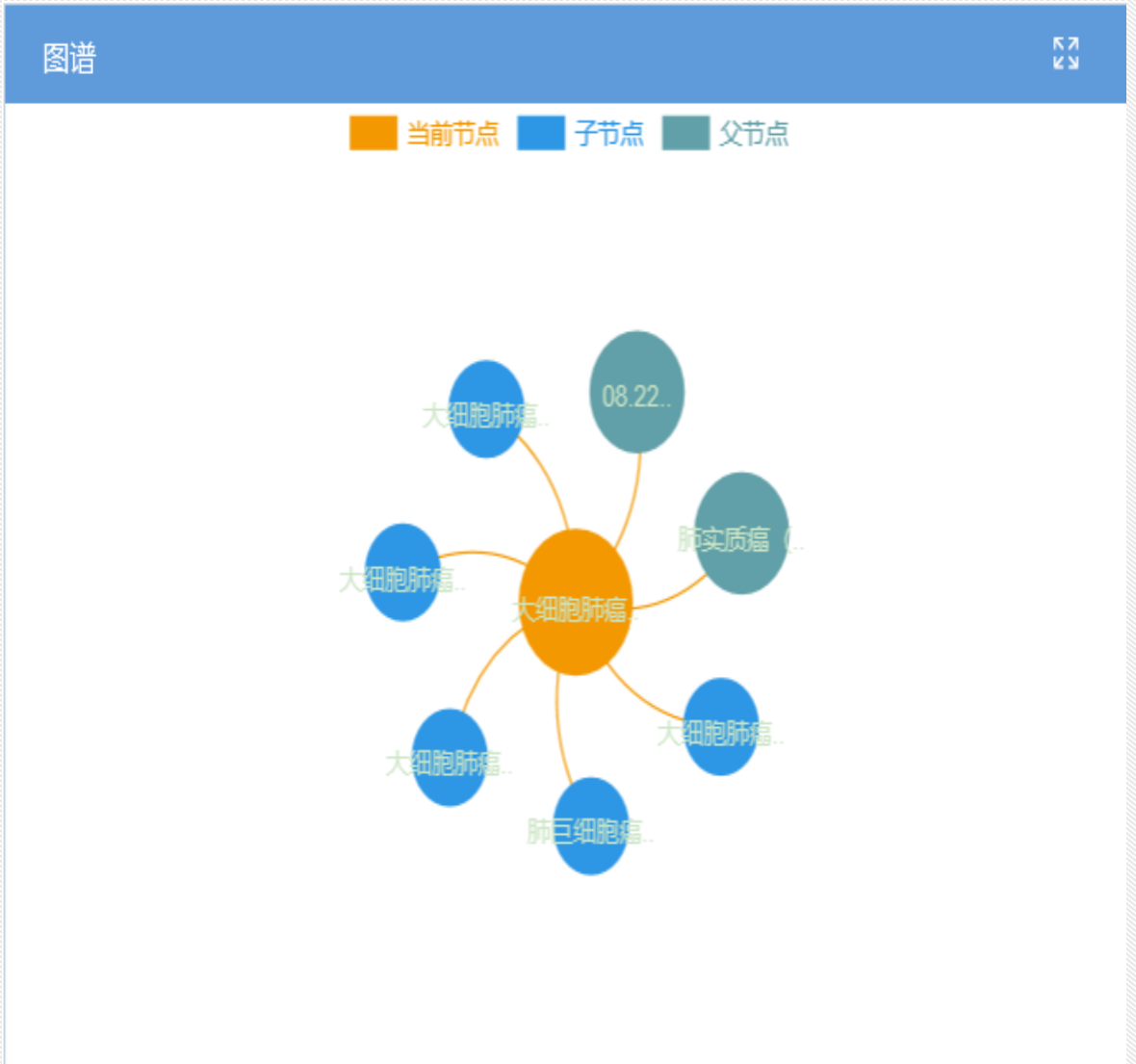
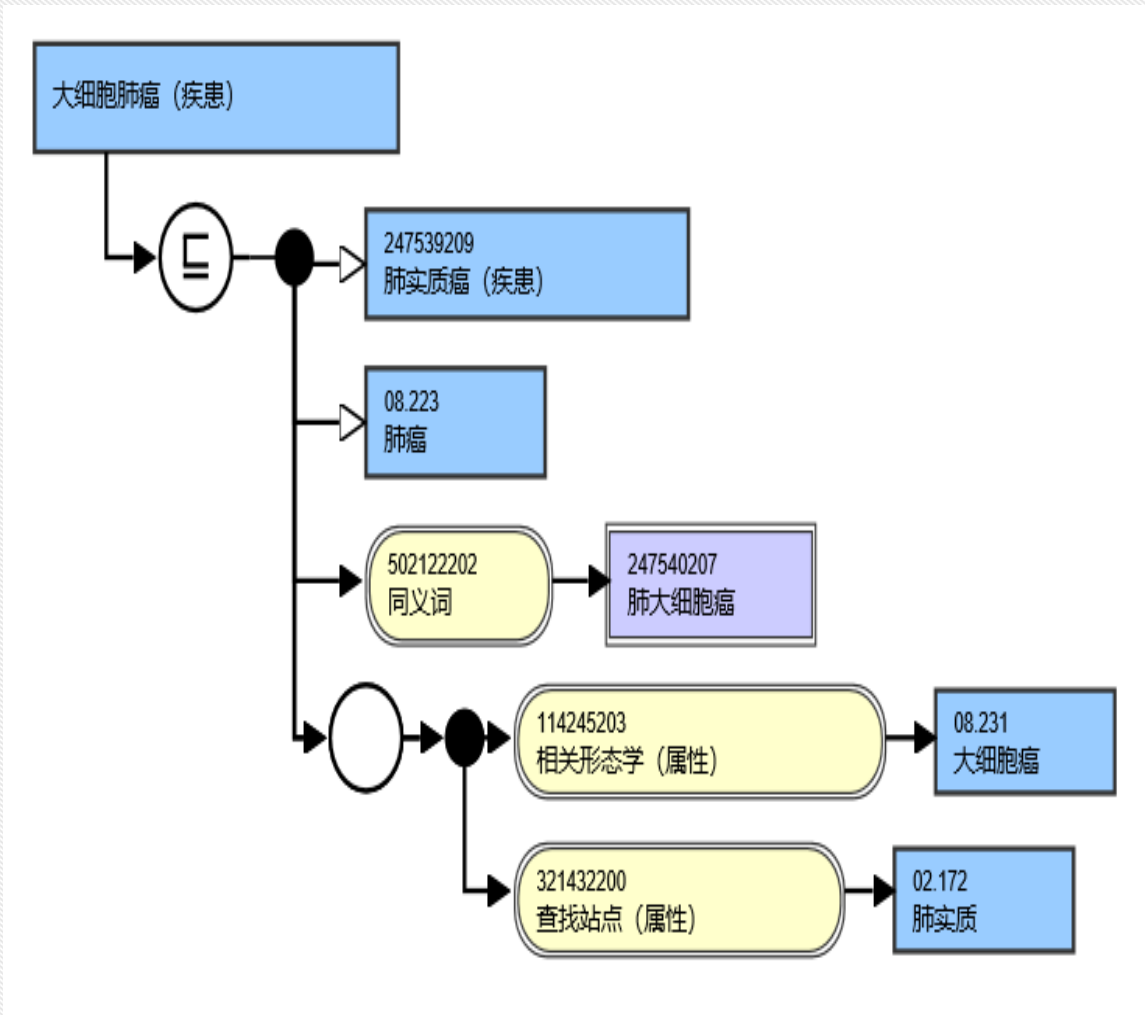
肺巨细胞癌 (疾患)

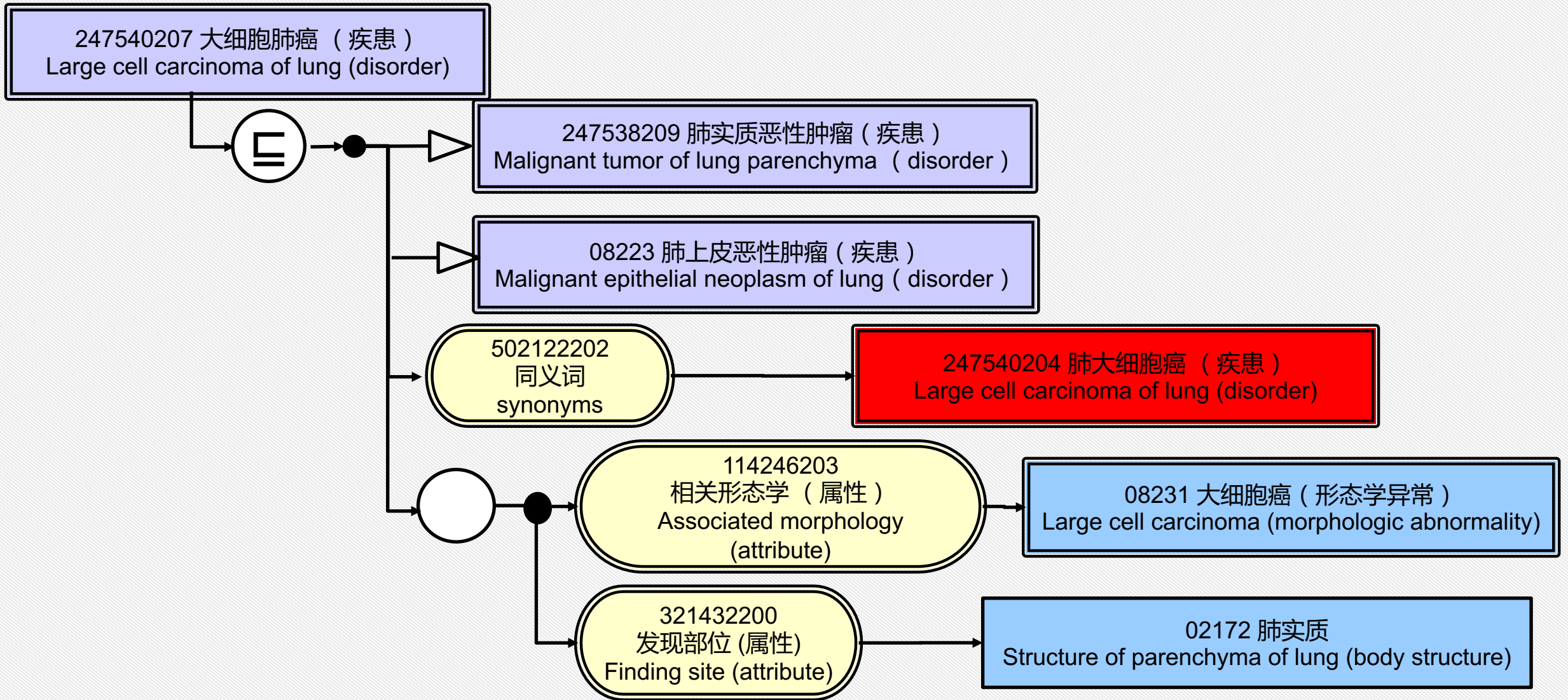
大细胞肺癌, TNM 2期 (疾患)

大细胞肺癌, TNM第4期 (疾患)

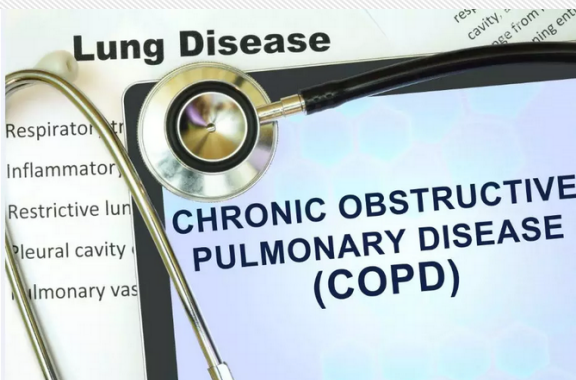
大细胞肺癌, TNM 1期 (疾患)

大细胞肺癌, TNM 3期 (疾患)

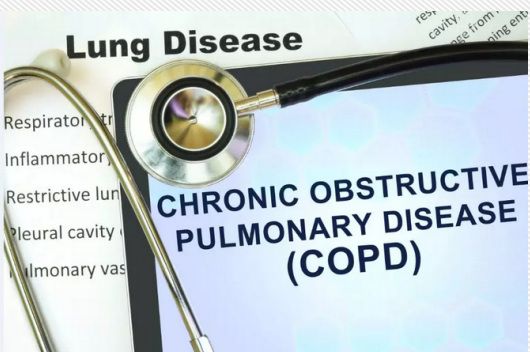


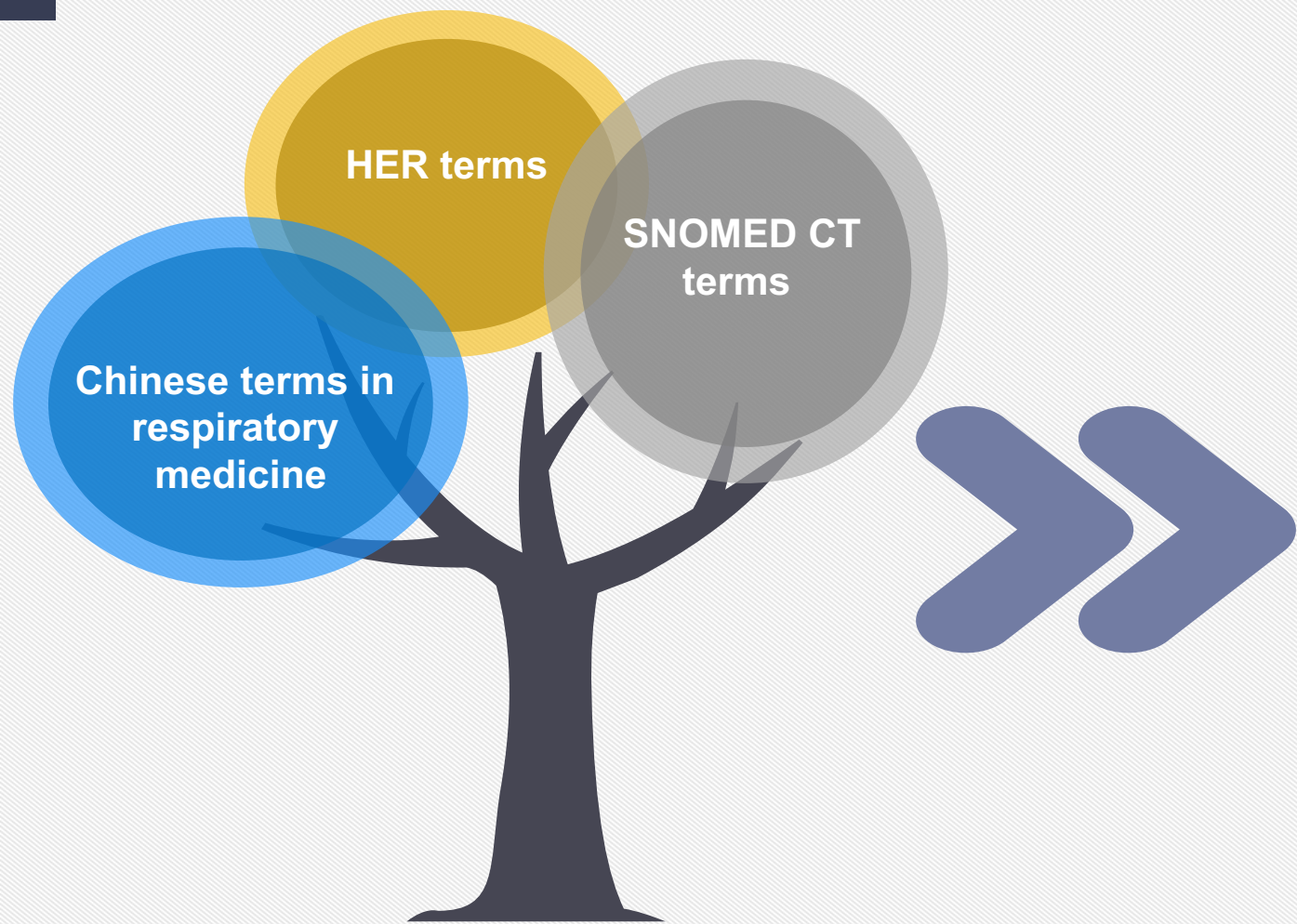


- ◆ Meaningless terms, such as “ok”, “finding”
- ◆ Words segmentation in need, such as “Mild bronchiectasis and infection in both lungs”, “Upper left upper lobe and lower lobe Inflammation”
- ◆ In the examination results, "platelets $176 \times 10^9/L$ ", "total number of white blood cells $4.87 \times 10^9/L$ "
- ◆ The labeling size is too detail, such as "the symptoms are relieved after breathing fresh air", "the first floor needs a short break"



- ◆ Chinese Medicine Description, such as “lung-spleen deficiency syndrome”, “wind-cold attack lung syndrome”
- ◆ Specific diagnosis, such as “grade III cardiac function”, “bilateral carotid atherosclerosis with plaque”
- ◆ Including undetermined and suspicious diagnosis, such as “fever undetermined”, “dyspnea cause undetermined”, and “acute left heart failure?”
- ◆ Deny or exclude a disease, such as “denial diabetes”, “except for intestinal tuberculosis”





Real word study

Intelligent referral



Fengxiang Chang



Ying Zhang



Fang Wang



Chenghuan Ding



Zhi Wang



Yishang Wang



Kuangyu Ma



Thank you!