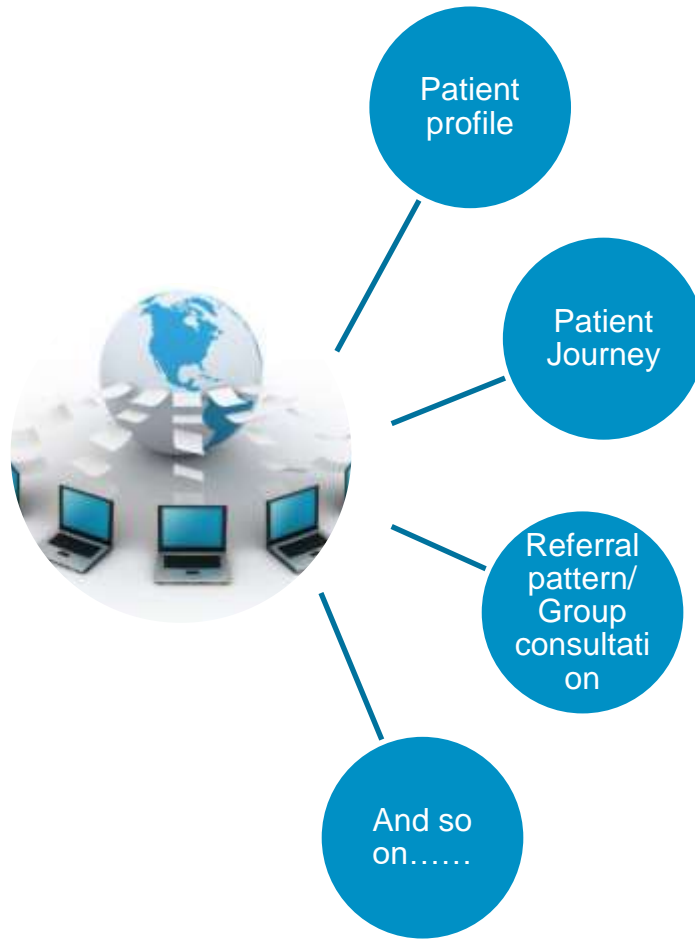




Leverage Medical Big Data & AI Platform to Solve the Challenges of Business Decision Making

2017-11-2 @ Beijing, CMRA Meeting

Background & Business Requirement: what information is needed for new product listing by market research project



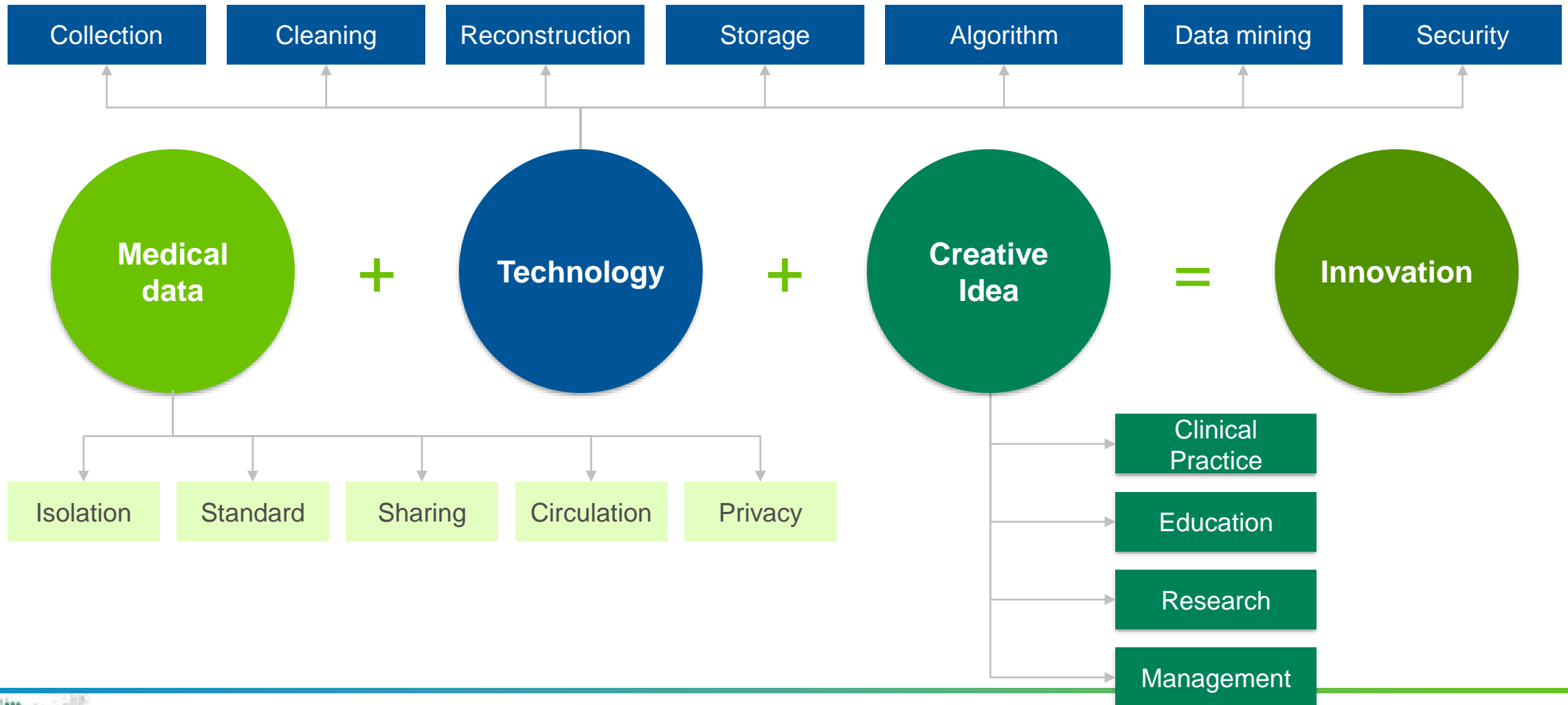
- Find the patient profile by different patient segments/ prescription/disease.
- Days for empirical treatment
- Etiological examination type.
- How long did it took to get the result of Etiological examination.
- Did the doctor change the prescription when the etiological examination result was available?
- Treatment duration for each medicine
- And so on
- Find the referral pattern
- Find the department which will include in group consultation.
- ATU Baseline
- Segmentation
- KOL mapping
- Selling story test.
-

HLT Top Medical Partners

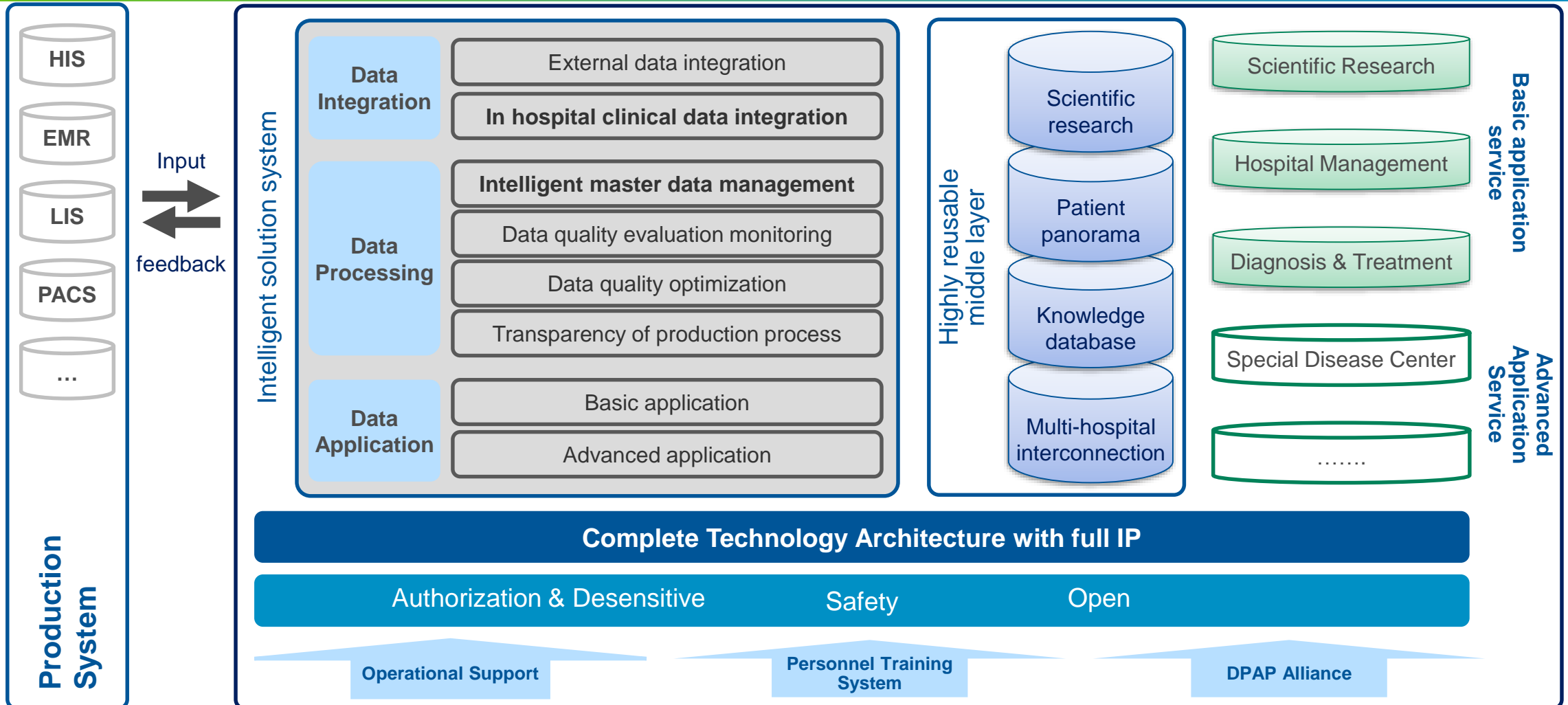
- **80+** of 150 National Top Hospitals
- Covered **20+** main provinces/municipalities
- The annual outpatient visits exceeds **~100 mil**
- The annual hospitalizations exceeds **~8 mil**
- Build more than **3,000+** disease models



Medical Big Data Driven Innovation – Key Elements



HLT DPAP Infrastructures Power Hospital Digitalization

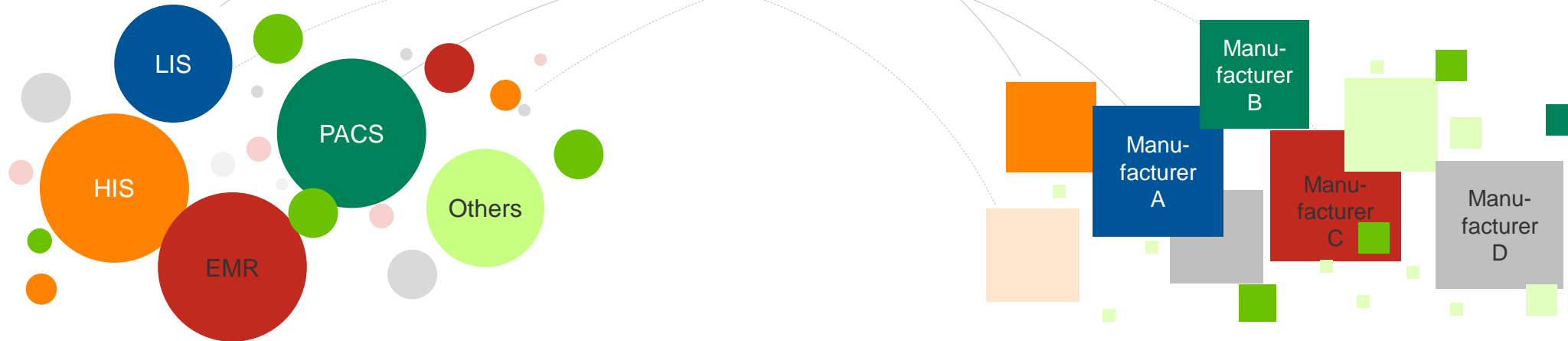


Hospital Data Integration – Intelligent Integration of Multi-source Heterogeneous Data

Supports automatic recognition and integration of 300-500 mainstream systems

Independent of interfaces, fast integration of stock and incremental data

Efficient data platform deployment, 30 days to complete the data synchronization mechanism



80-200 different hospital information systems

More than **300-500** different data storage formats

Yidu Cloud provides intelligent integration of **multi-source and heterogeneous data**,
fast and easy handling without interface reliance

Data Quality Optimization – Structuralization & Standardization

Taking gastric cancer for example: Level 3 Field

Surgery Record

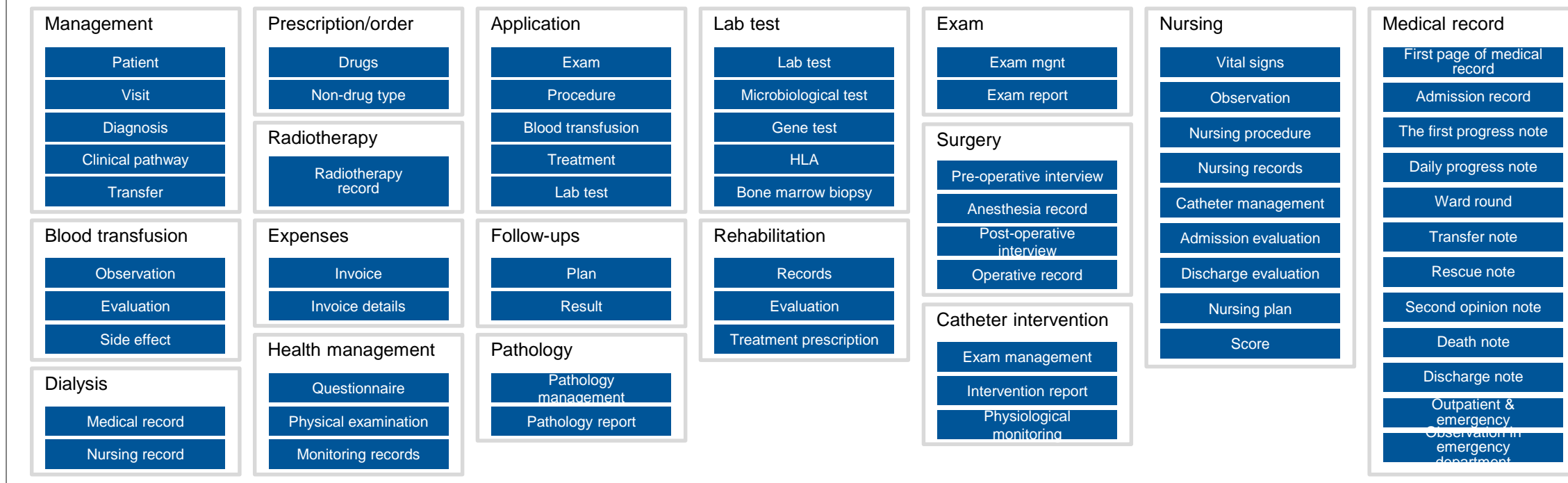
麻醉满意后，取平卧位，碘酒、酒精消毒术野，常规铺巾。行腹腔探查：腹盆腔无粘连，无腹水。肝脏表面无结节，右上腹腔无结节，左上腹腔无结节，左侧腹腔无结节，右侧腹腔无结节，网膜及肠系膜无结节，盆腔无结节，腹腔脏器未见转移。原发病灶位于胃食管结合部癌，肿瘤未侵透浆膜，无肿瘤近端梗阻，无肿瘤穿孔。松解粘连，从横结肠中部切开胃结肠韧带，贴近横结肠处向右侧切断大网膜，直至幽门下，保留胃网膜右动、静脉；向左切除大网膜至脾下极。分离解剖肝十二指肠韧带前叶及肝胃韧带，沿肝下小网膜根部切开小网膜至贲门右侧，清扫No.1组及No.3a组淋巴结，保留胃右动、静脉。游离贲门，锐性分离左、右膈肌脚，清扫No.2组淋巴结。离断食道：拟行食管空肠侧侧吻合：使用60mm Covidien Endo GIA Reinforced Reload with Tri-Staple于食道下段距癌缘上方3cm处离断食道。消化道重建拟采用Double Track吻合（近端胃），使用60mm Covidien Endo 距肿瘤下缘5cm以远，横断整个近端胃，移除标本。距Treize韧带25cm空肠上提，充分游离系膜后使用45mm Covidien 离断；将远端空肠经结肠前上提，超声刀切开食管断端左侧及远端空肠断端侧壁，自切开部位分别伸入45mm Covidien 两臂，完成食管-空肠侧侧吻合，使用Covidien V-loc 3-0可吸收缝线闭合共同开口；在距此吻合口20cm空肠侧壁开口备吻合，切开残胃大弯近端，自开口分别伸入60mm Covidien ，完成残胃空肠端侧吻合，使用60mm Covidien 关闭共同开口。距残胃空肠吻合口20cm打开空肠侧壁备吻合，打开近端空肠断端侧壁，自切开部位分别伸入60mm Covidien Endo ，完成空肠空肠侧侧吻合，使用Covidien V-loc 3-0可吸收缝线关闭共同开口。再次检查各吻合口通畅，无张力，无扭转出血，使用薇乔线行浆肌层间断加固。蒸馏水及生理盐水冲洗腹腔，腹腔止血满意。腹盆腔引流放置：右侧腹壁放置（右）引流1根，引流尖端位于食管空肠吻合口右侧；左侧腹壁放置（左）1根，引流尖端位于食管空肠吻合口左侧胃管：术中留置胃肠减压管，胃管尖端位于食管空肠吻合口下方。空肠营养管：未放置术中治疗：止血材料 防粘连材料 腹腔热灌注化疗 氟尿嘧啶植入剂 术中放疗术中特殊情况说明：无手术结束前再次清点器械纱布无误，腹腔镜手术关闭辅助切口：可吸收薇乔线间断缝合腹膜及腹直肌前鞘，冲洗伤口，未缝合皮下组织，丝线间断缝合皮肤及腹壁Trocar穿刺孔，主切口长度：3cm。患者术中平稳，术后安返普通病房。术中出血50ml，输血0ml。输血：悬浮少白细胞红细胞0U，洗涤红细胞0U，单采血小板0治疗量，全血0U，冰冻血浆0ml。大小与切缘:A: 3.0cm×B:2.0cm，近端切缘Y: 1.0cm，远端切缘Z: 6.0cm

Processing Result

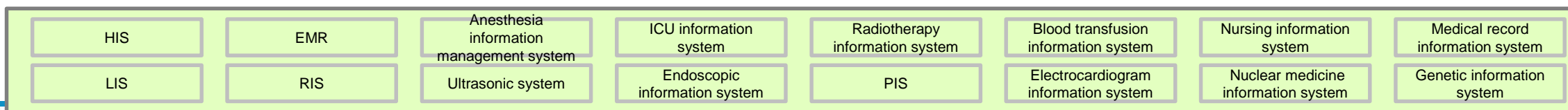
结构化处理	
粘连情况	否
腹水情况	否
肝结节	否
右上腹结节	否
左上腹结节	否
盆腔结节	否
卵巢转移	否
腹腔脏器转移	否
原发灶部位	胃食管结合部
原发灶侵犯	未浸透浆膜
食道离断方式	食管空肠侧侧吻合
食道离断工具	60MM COVIDIEN ENDO
右引流	放置
右引流数	1
胃管位置	食管空肠吻合口下方
术中出血量	50
术中总输血量	0
皮肤闭合方法	缝线缝合
肉眼近端切缘距离	1.0

Data Quality Optimization – Patient Model

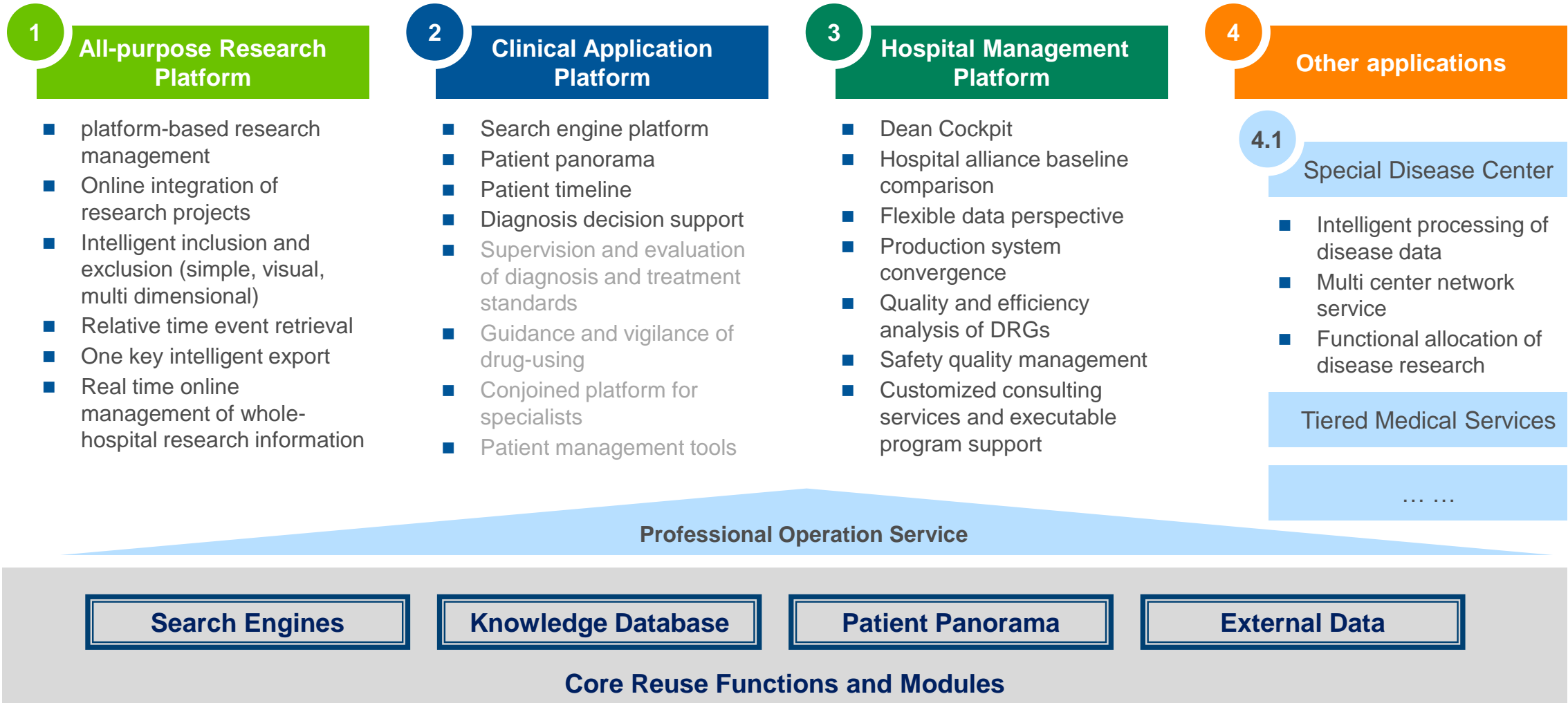
Diagnostic and therapeutic model: an extensible model, fully covering all systems and scenarios



Reconstructed model

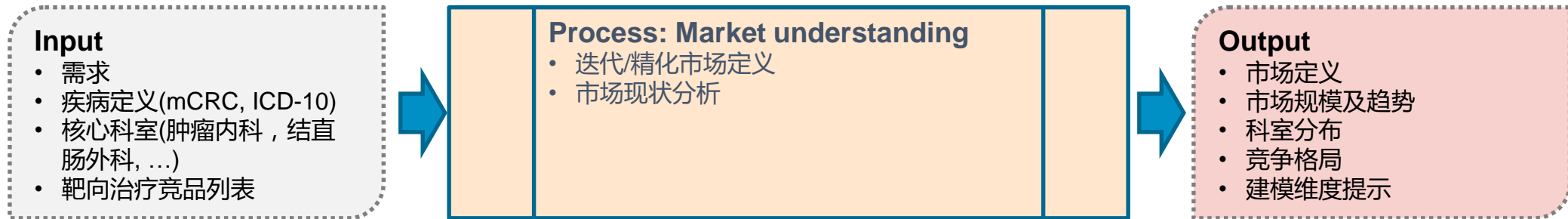


HLT product portfolio offerings comprehensive & extensible applications for AI medical research, clinic, hosp mgmt and other scenarios

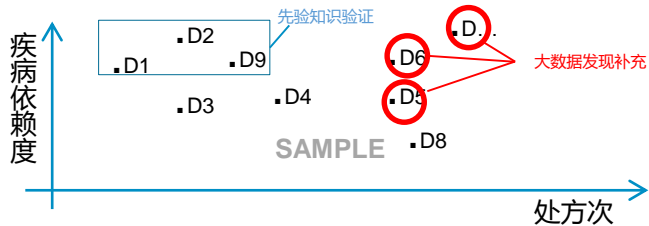


HLT Real World Research Method- Data Mining & Analysis

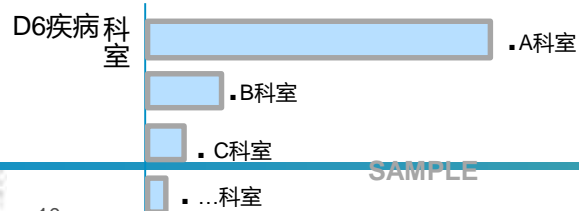
市场定义及市场现状分析



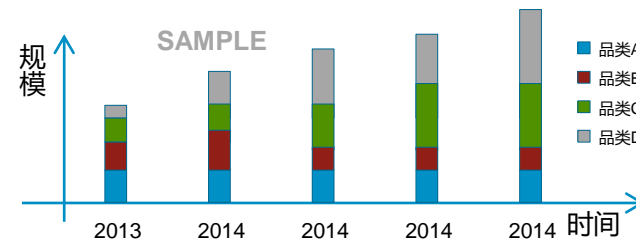
-根据定位人群，查看疾病分布，补充疾病定义



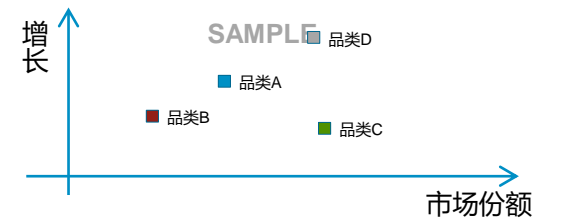
-根据疾病的科室分布，判断该疾病与目标市场的关联度（必要时进行人工辅助判断）



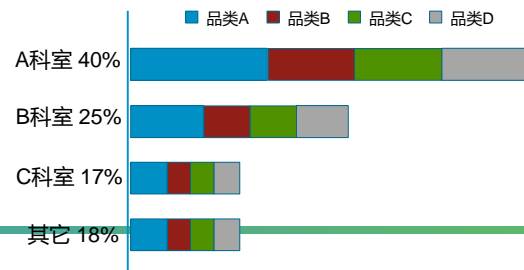
-市场规模及趋势（处方次/金额）



-竞争格局（按化合物/品牌）

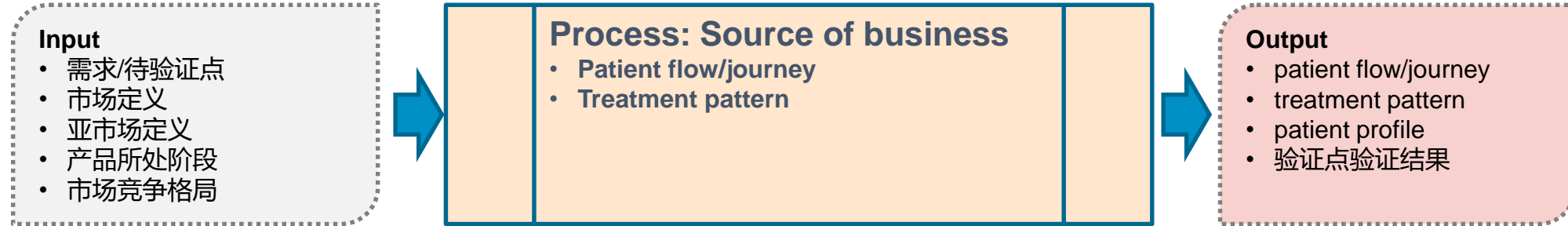


-科室分布（处方次/金额，时间维度扩展）

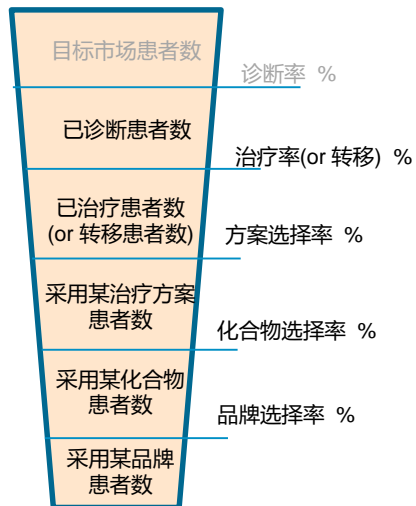


HLT Real World Research Method- Data Mining & Analysis

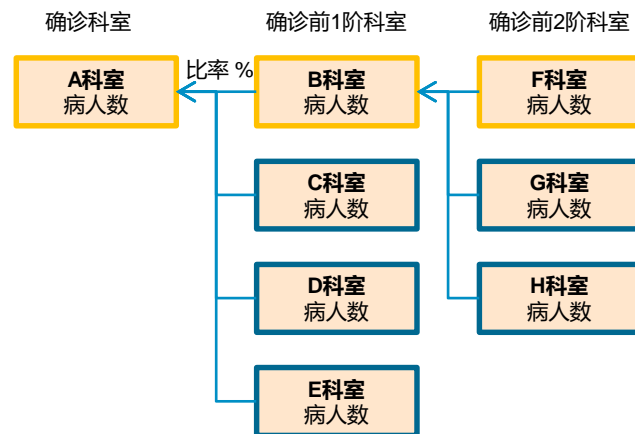
洞察市场机会点



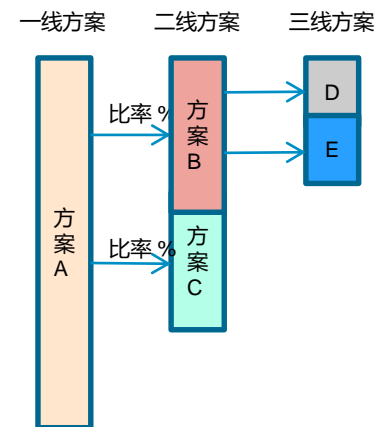
-Patient flow



-Patient journey



-Treatment pattern

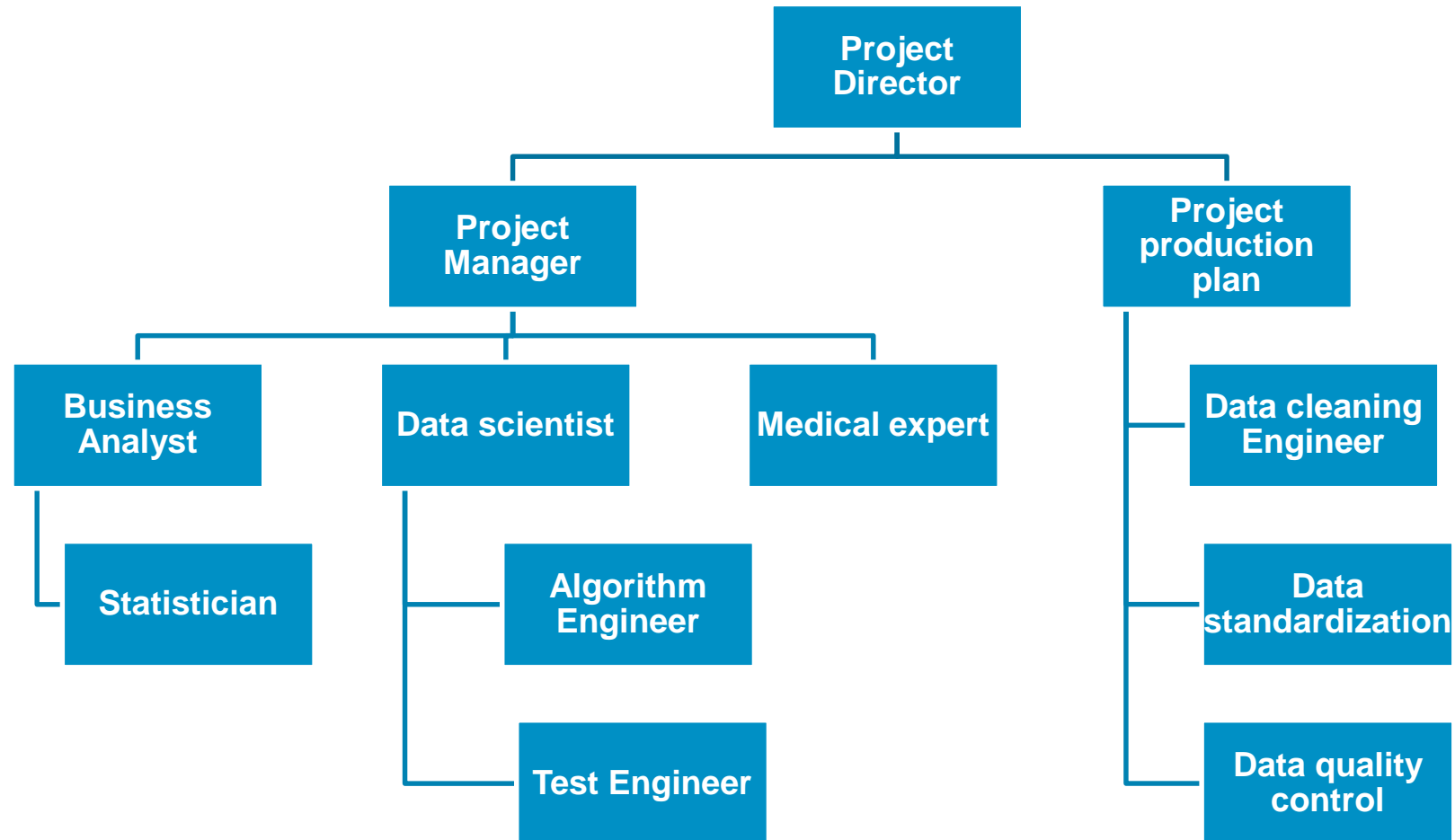


-Patient profile



SAMPLE

HLT multiple functions of big data science in the project team to support the innovated method



大数据引领变革

医学

市场

药物经济学

创新市场营销

临床研究

市场准入

大数据挖掘更多客户洞察

- 病人依从性
- 患者流及转诊流
- 生意来源及药物转换
- 药物经济学评估

病人数据

临床数据

医保数据

医疗费用
数据

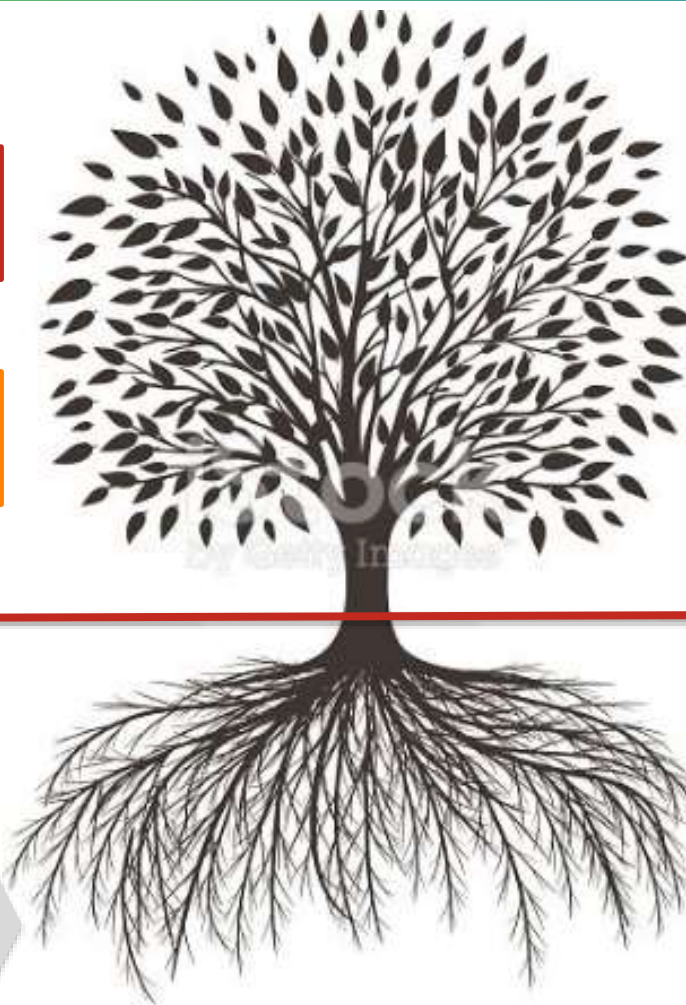
用药数据

调研数据

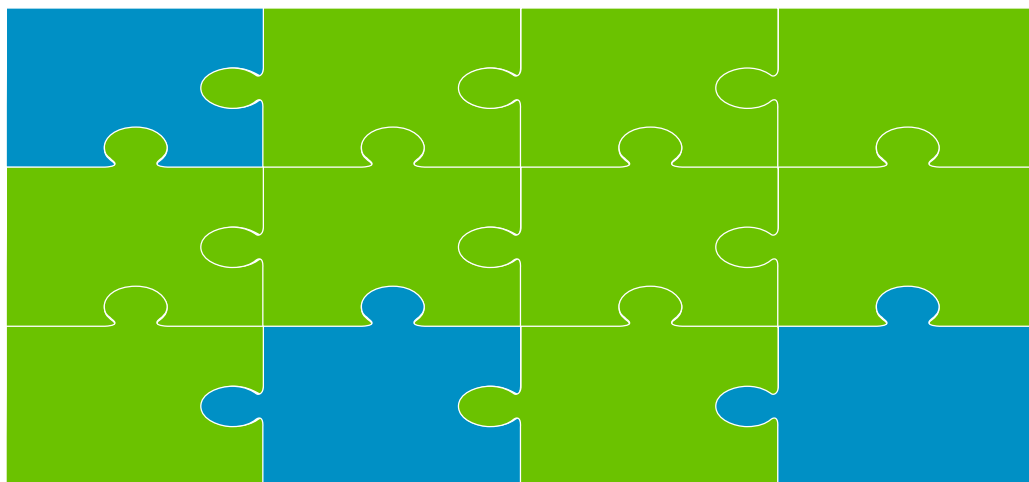
就医行为
数据

社会行为
数据

多媒体
数据



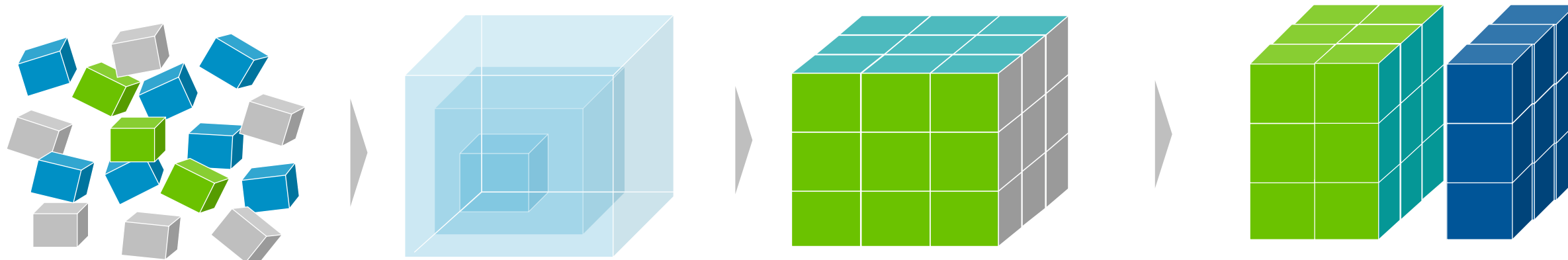
大数据应用模式之一 - 全景视角



长效宫内缓释系统

- 缺少使用宫内缓释系统安全性和有效性的真实世界的证据
- 在止血刮宫术后安装宫内缓释系统的时间间隔
- 真实世界的证据月经过多患者在使用宫内缓释系统之前的用药种类及时长
- 真实世界的证据月经过多患者使用者的年龄分层

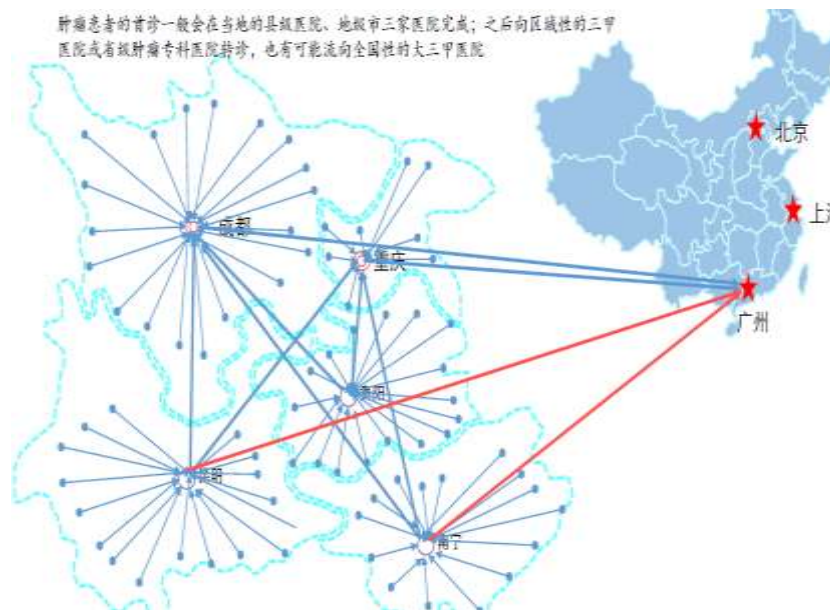
大数据应用模式之二 - 重组突破

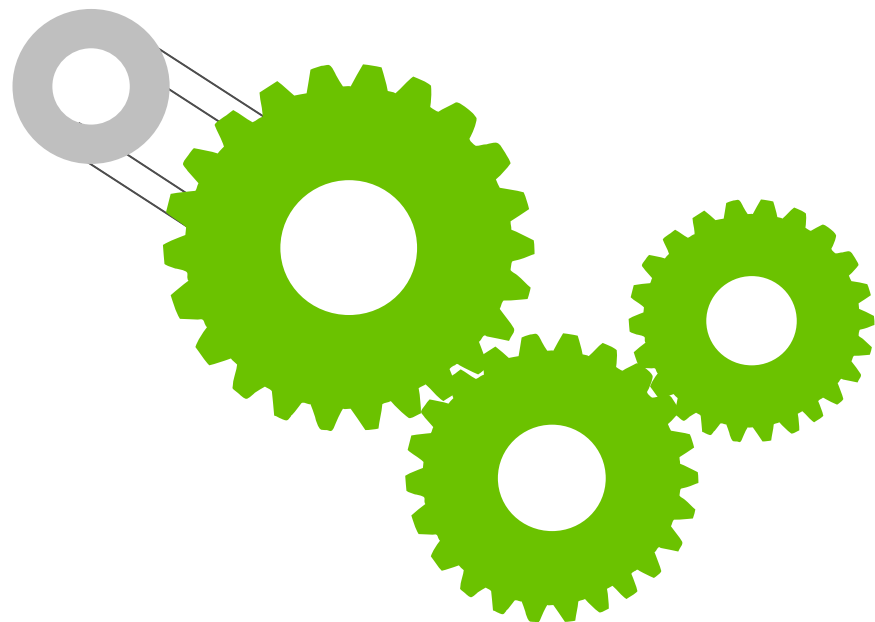


特药领域应用

- 特药患者的特点是数量少、分布分散，大数据能更快、更准确的找到目标患者
- 临床表现判断大量病例分布在哪些科室
- 追溯肿瘤患者的推荐转诊流程
- 更快速的定位病人群，精准划分市场区隔找到市场新机会

肿瘤患者的首诊一般会在当地的县级医院、地级市三甲医院完成；之后向区域性的三甲医院或省级肿瘤医院转诊，也有可能流向全国性的大三甲医院





药物经济学

- 现有方法样本量偏差，大数据探索更多的病人特征、治疗方案、评估疗效（治愈率、死亡率等）
- 大数据回顾性分析，描绘患者特征，更精准更快速的选择入组病人
- 研究用药趋势，并探索建立预测模型

医学临床实验

- 三期、四期临床研究

Thanks for your listening!