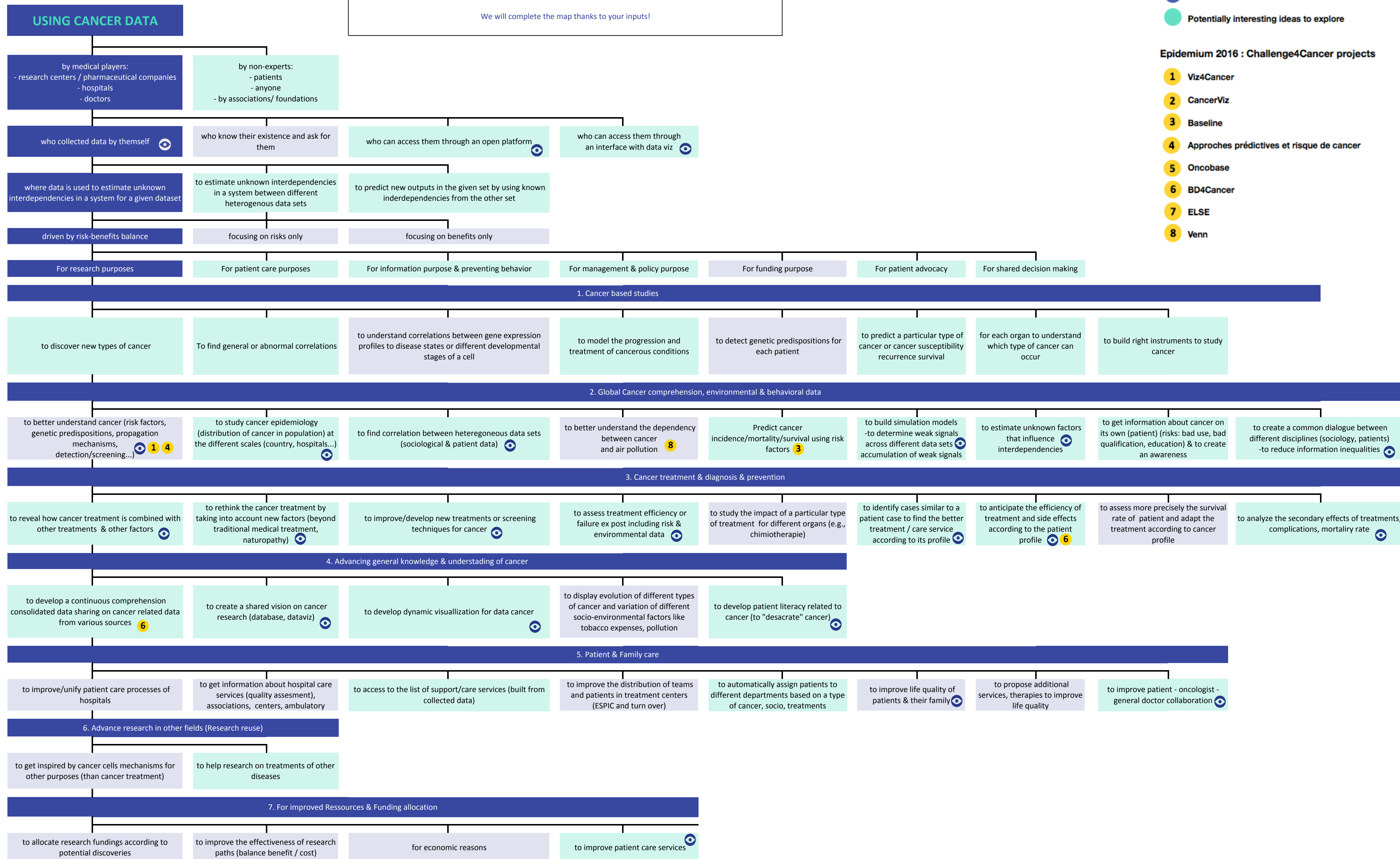## CONCEPT SPACE

Ideas explored generated during workshops

Dominant design for cancer related research

Potentially interesting ideas to explore

Epidemium 2016 : Challenge4Cancer projects

1 Viz4Cancer

2 CancerViz

3 Baseline

4 Approches prédictives et risque de cancer

5 Oncobase

6 BD4Cancer

7 ELSE

8 Venn

KNOWLEDGE SPACE

USING CANCER DATA

by medical players:
- research centers / pharmaceutical companies
- hospitals
- doctors

by non-experts:
- patients
- anyone
- by associations/ foundations

who collected data by themself	who know their existence and ask for them	who can access them through an open platform	who can access them through an interface with data viz

where data is used to estimate unknown interdependencies in a system for a given dataset	to estimate unknown interdependencies in a system between different heterogenous data sets	to predict new outputs in the given set by using known inderdependencies from the other set	

driven by risk-benefits balance	focusing on risks only	focusing on benefits only

For research purposes	For patient care purposes	For information purpose & preventing behavior	For management & policy purpose	For funding purpose	For patient advocacy	For shared decision making

1. Cancer based studies

to discover new types of cancer	To find general or abnormal correlations	to understand correlations between gene expression profiles to disease states or different developmental stages of a cell	to model the progression and treatment of cancerous conditions	to detect genetic predispositions for each patient	to predict a particular type of cancer or cancer susceptibility recurrence survival	for each organ to understand which type of cancer can occur	to build right instruments to study cancer

Cancer based studies

Quick concept: quantitative imaging in cancer: connecting cellular process with therapy; tools for drug developers

Online Gaming: Phylo Human based computing for bionformatics to pinpoint mutations in DNA : http://www.dw.com/en/crowdsourcing-approach-to-fighting-cancer/a-17630275

2. Global Cancer comprehension, environmental & behavioral data

to better understand cancer (risk factors, genetic predispositions, propagation mechanisms, detection/screening...) 1 4	to study cancer epidemiology (distribution of cancer in population) at the different scales (country, hospitals...)	to find correlation between heterogeneous data sets (sociological & patient data)	to better understand the dependency between cancer and air pollution 8	Predict cancer incidence/mortality/survival using risk factors 3	to build simulation models -to determine weak signals across different data sets accumulation of weak signals	to estimate unknown factors that influence interdependencies	to get information about cancer on its own (patient) (risks: bad use, bad qualification, education) & to create an awareness	to create a common dialogue between different disciplines (sociology, patients) -to reduce information inequalities

3. Cancer treatment & diagnosis & prevention

to reveal how cancer treatment is combined with other treatments & other factors	to rethink the cancer treatment by taking into account new factors (beyond traditional medical treatment, naturopathy)	to improve/develop new treatments or screening techniques for cancer	to assess treatment efficiency or failure ex post including risk & environmental data	to study the impact of a particular type of treatment for different organs (e.g., chimiotherapie)	to identify cases similar to a patient case to find the better treatment / care service according to its profile	to anticipate the efficiency of treatment and side effects according to the patient profile 6	to assess more precisely the survival rate of patient and adapt the treatment according to cancer profile	to analyze the secondary effects of treatments, complications, mortaliry rate

Cancer treatment & diagnosis & prevention

Childhood cancer -> treatment : **IBM world community grid intiiative**

Moonshot initiative to make more therapies available : https://www.cancer.gov/research/key-initiatives/moonshot-cancer-initiative

4. Advancing general knowledge & understanding of cancer

to develop a continuous comprehension consolidated data sharing on cancer related data from various sources 6	to create a shared vision on cancer research (database, dataviz)	to develop dynamic visuallization for data cancer	to display evolution of different types of cancer and variation of different socio-environmental factors like tobacco expenses, pollution	to develop patient literacy related to cancer (to "desacrate" cancer)

Advancing general knowledge & understanding of cancer
- **Cancer epidemiology cohorts AP - HP Compare Project** - longitudinal observations of healthy individuals to pbetter understand cancer causes
- **Cancer Base project at Stanford**
- **Cancer prediction tool based on open clinical data trial - Univercity of Colorado** : https://medicalxpress.com/news/2016-11-crowdsourcing-prostate-cancer-tool.html

5. Patient & Family care

to improve/unify patient care processes of hospitals	to get information about hospital care services (quality assesment), associations, centers, ambulatory	to access to the list of support/care services (built from collected data)	to improve the distribution of teams and patients in treatment centers (ESPIC and turn over)	to automatically assign patients to different departments based on a type of cancer, socio, treatments	to improve life quality of patients & their family	to propose additional services, therapies to improve life quality	to improve patient - oncologist - general doctor collaboration

Patient care

Patient advocacy (territories inequality, health issues)
Start ups like Ma Bulle
Ethical aspects : Patient ≠ data

6. Advance research in other fields (Research reuse)

to get inspired by cancer cells mechanisms for other purposes (than cancer treatment)	to help research on treatments of other diseases

7. For improved Ressources & Funding allocation

to allocate research fundings according to potential discoveries	to improve the effectiveness of research paths (balance benefit / cost)	for economic reasons	to improve patient care services