Cancer Centre Survey results

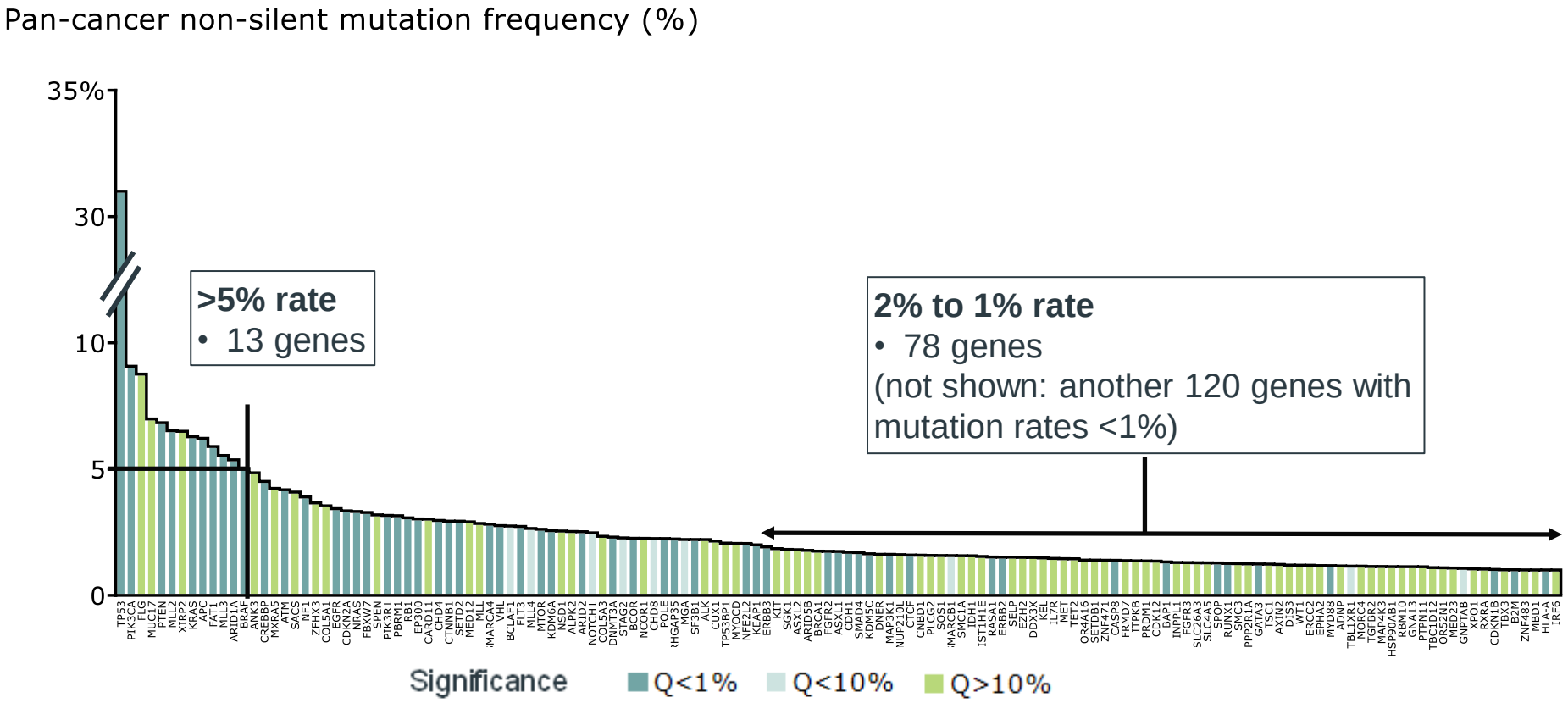
Headline results & main implications

Wednesday 3rd Nov 15.30-16.00 Dr Piers Mahon, DIGICORE Commercial Research Manager

Objectives for this session

- Explain why all of us (even trialists!) should care about real world evidence
- Explain how to get the most from the research planning potential in Connect to win
- Review the challenges in making routine data “fit for research”

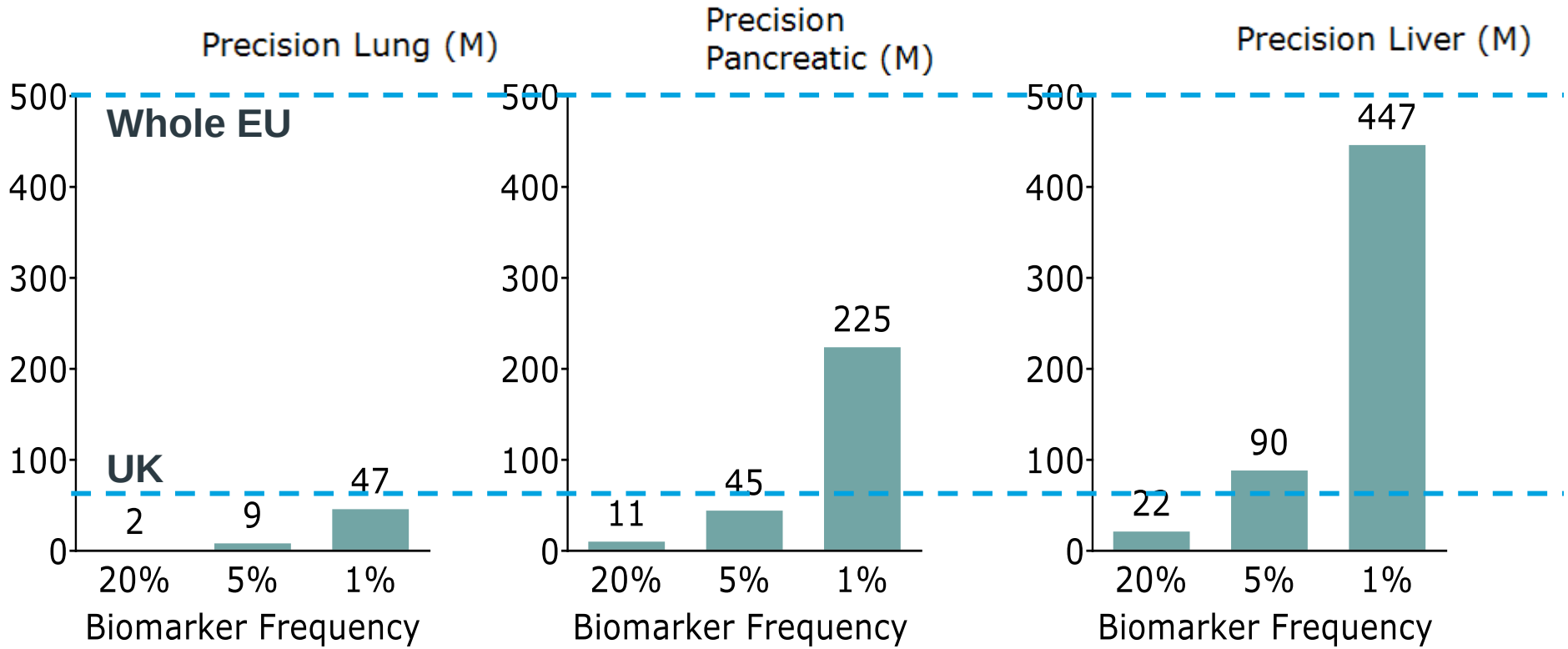
In the era of precision oncology, every patient is an ultra rare patient. We have to collaborate



Source: Mahon & Tenenbaum, J. Precision Medicine 2015 re-analysing Lawrence et al. Nature 2014 – Boston Tumour –normal study over ~6000 cancers, mutation rate is straight average over 21 cancers

The scale we need to succeed is “whole European population” or we won’t have statistical power

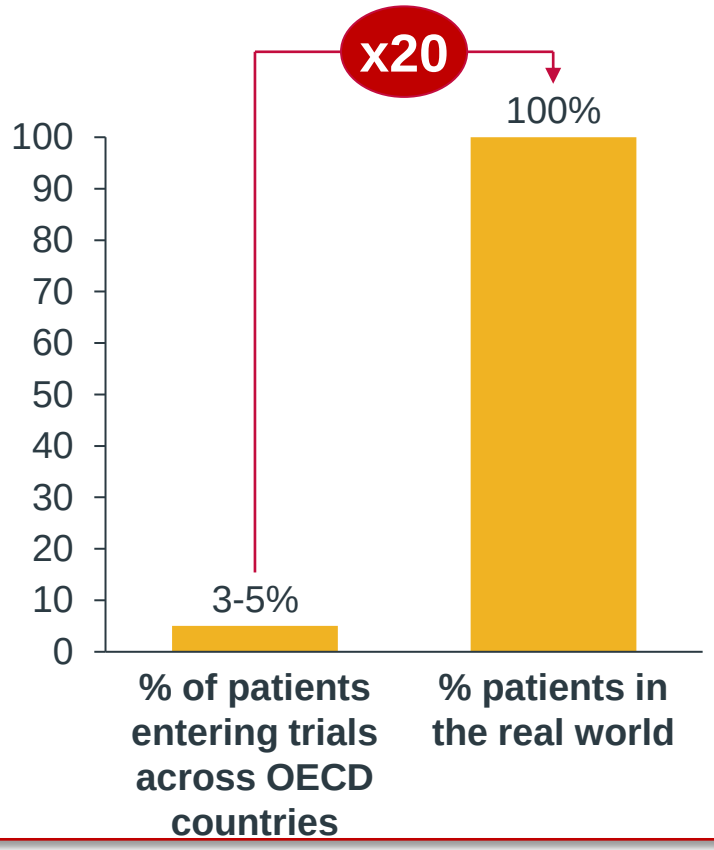
How many people must be screened to find 250 true positive patients per year?



Incidence Rank	# 3	# 10	# 20

Source: Mahon & Tenenbuam: Journal Of Precision Medicine 2015

Done correctly, we can study in real world 20x the patients we can get in trial and study problems trials can't



Hard to enrol patients

- Geriatric
- Paediatric
- Co-morbid
- Disadvantaged
- Non-Caucasian

Hard to study problems

- Hard to randomise, like surgery / treatment sequencing
- Hard to power, like late line therapy optimisation
- Slow to end point: e.g. debulk 1st vs debulk 2nd

Get the information on what works

Drug was…	FDA 2008-2012[1]	EMA 2009-2013[2]
Approved on surrogate markers	67%	57%
Shown within 5 years to improve survival	14%	15%

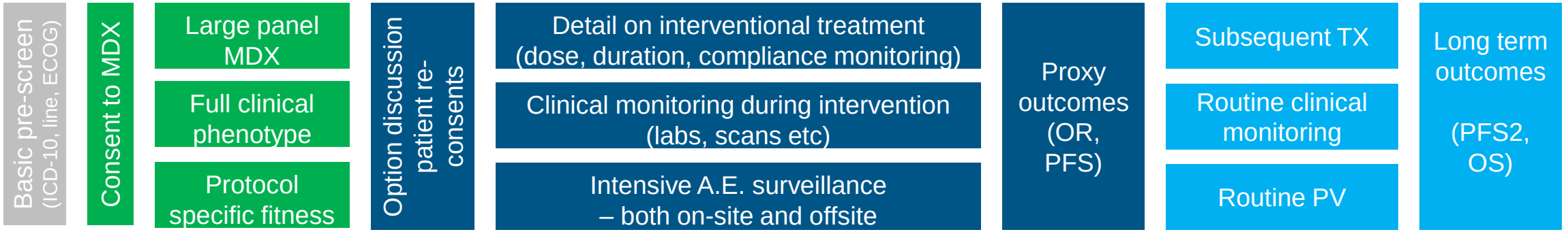
Kim C et al: JAMA Intern Med2015;359:1992-4

To a data scientist, a trial is a data engineering problem with multiple sub-routines, each with improvement opportunities

An illustrative umbrella trial

1. Screening expensive, labour intensive and relatively manual

4. Monitoring burden creates significant barriers to participation - both for clinicians and patients (and duplicative with routine care data collection)



2. Most patients fail screening

- Single gene: 1-5% pass
- Umbrella: 20-30% pass

3. There are structural biases in the patients humanity enrols

5. Long term follow-up prohibitively expensive

Key: Pre-screening | Full-screening & enrolment | Core trial | Long term follow-up

But to collaborate at scale, we need to plan research differently

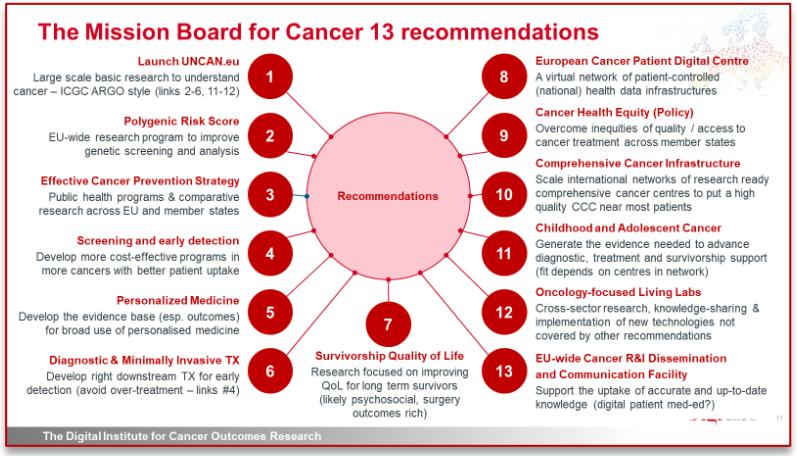
The three surveys you took each had a specific purpose for research planning

A: in which cancers do we have both cohorts and PIs?

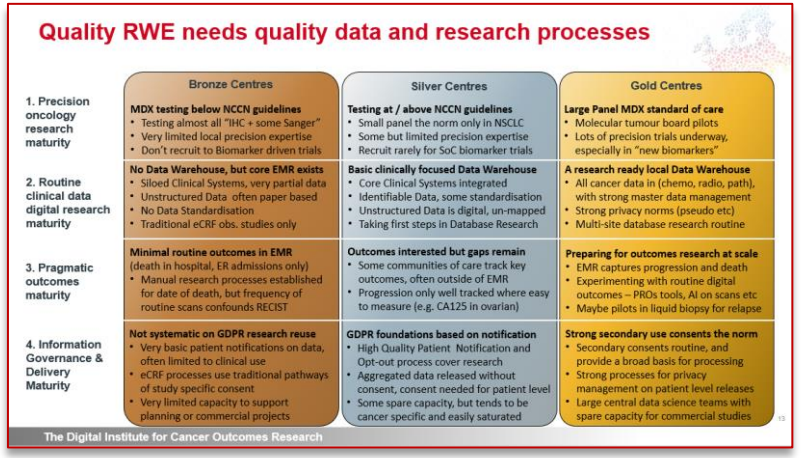
Fondazione IRCCS San Matteo – Pavia & its aassociated PI's

Cancer of interest	Interested PI
Other Solid tumours - Haematological	Catherine Klersy
Other solid tumours	Paolo Pedrazzoli
Lung Cancer	Sergio Scaccabarozzi

B: for which themes of the Mission do we have Interest & Capability?

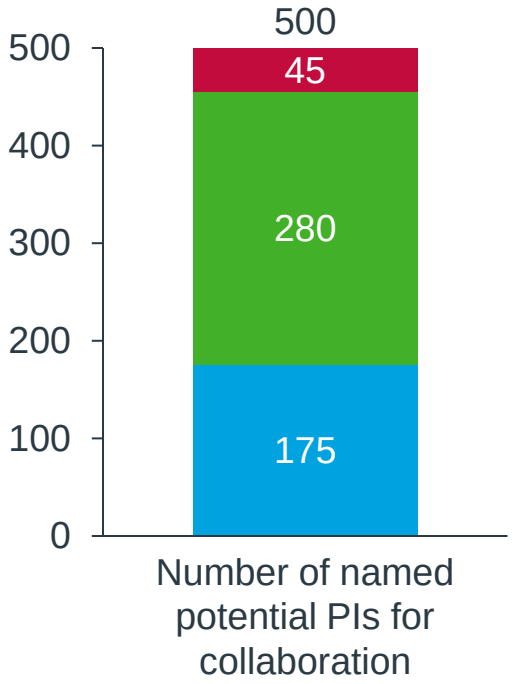


C: How much investment in technology and IG will we need?

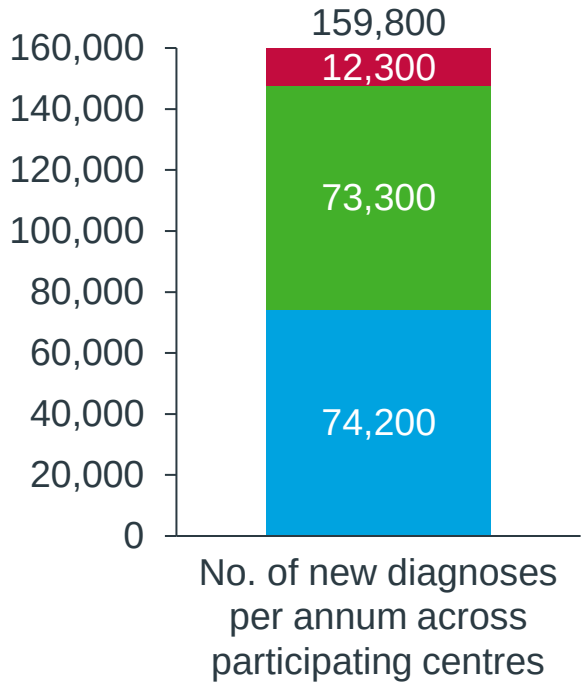


The cancer centres in this room (n=37) have the cohorts and research leadership to be globally exciting

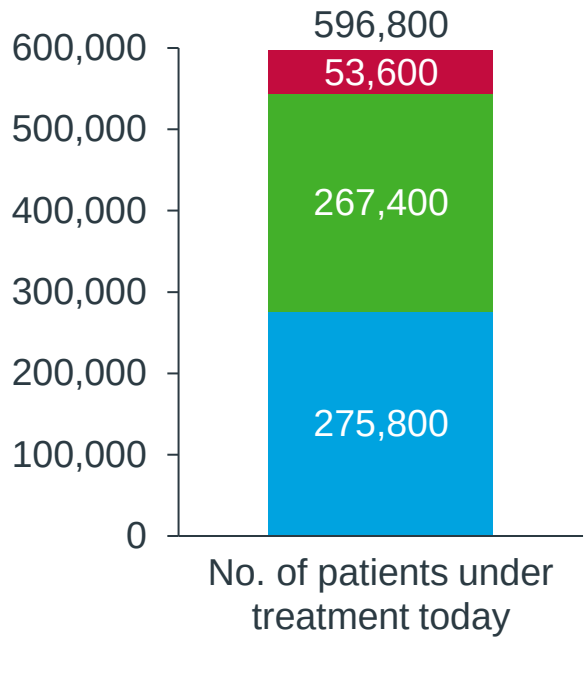
 # clinicians willing to lead RWE programmes



 # new diagnoses made per annum



 # patients under treatment today



Common solid tumours | Other solid tumours | Haem. Cancers

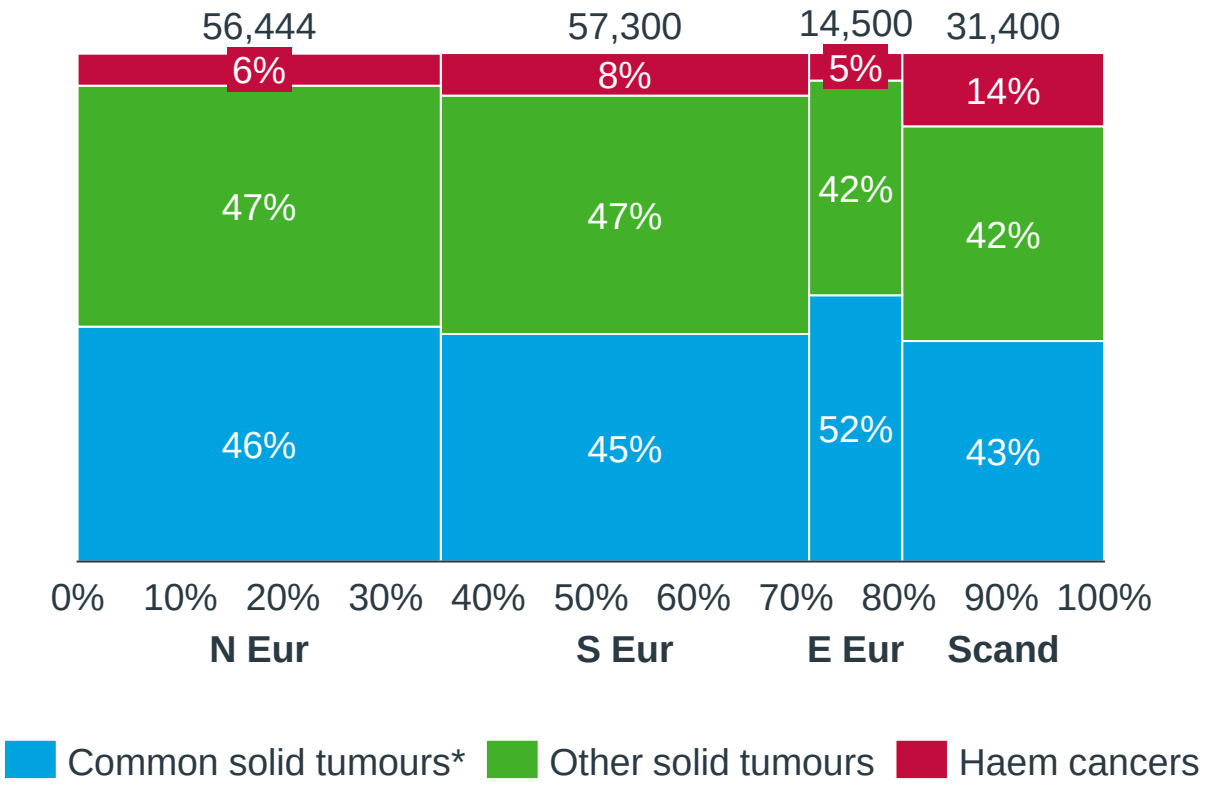
Note: estimates extrapolated to 37 centres attending, using data from 15 centres that returned survey

'Common'=breast, lung, colorectal, prostate

DigiCore

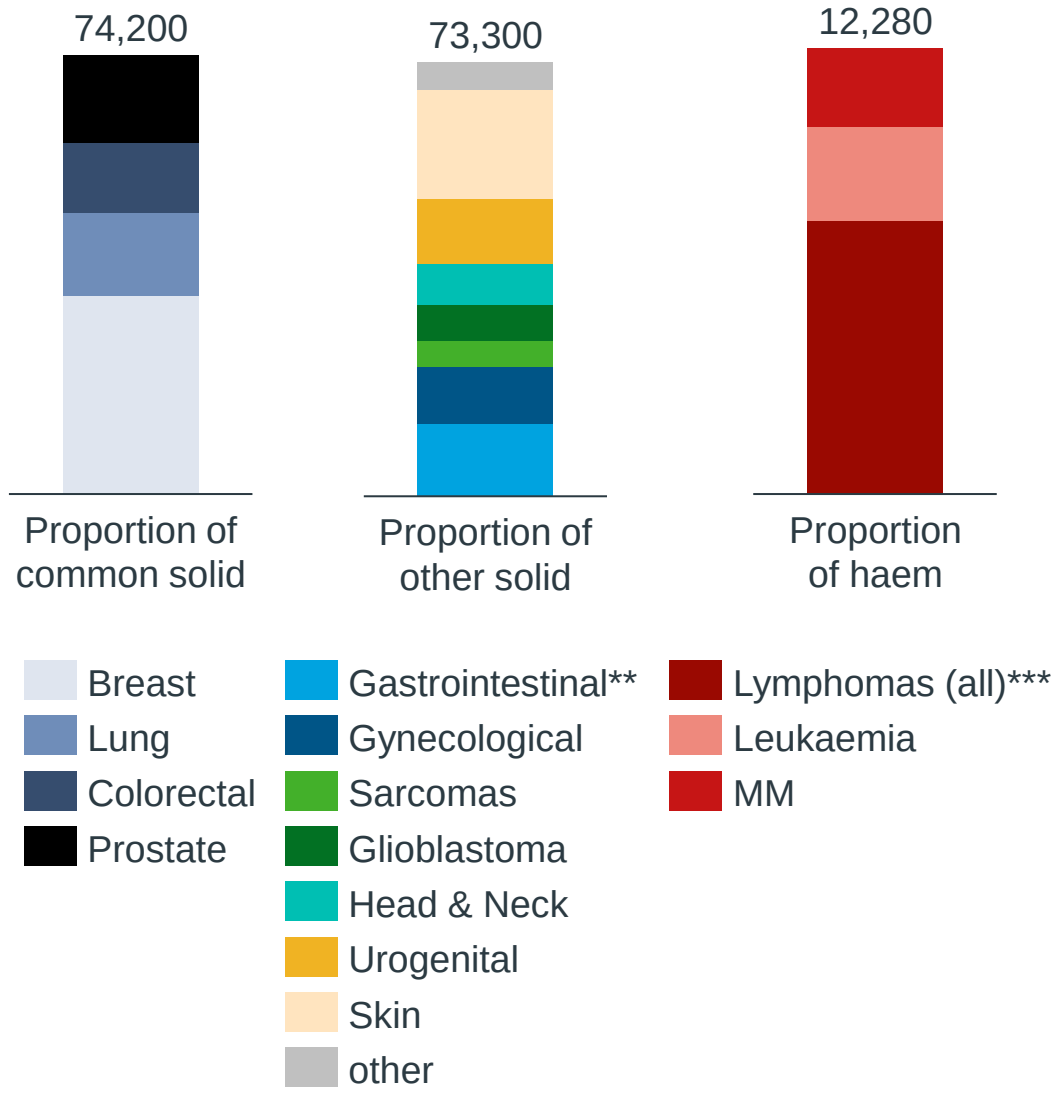
We have both geographic and cancer type diversity

Diversity of cancers across each region here today



** Includes Lung, prostate, breast, and colorectal only*
*** Includes liver, pancreas etc.*
**** includes all NHL, HL, FL*

Cancer type diversity covered across cancer centres here today (New Dx)



Result will be made available to members in the private area of the DIGICORE website to help local researchers connect to win

Centre A: cohorts and PIs

Cancer of interest	Interested Principal investigator
Breast	Prof. A
Prostate	Prof. B
Lung - NSCLC	Dr. C
CRC	Prof. D
Melanoma	Prof. E
Ovarian	Prof. F
Kidney	Prof. G
Haematological cancer	Dr H.

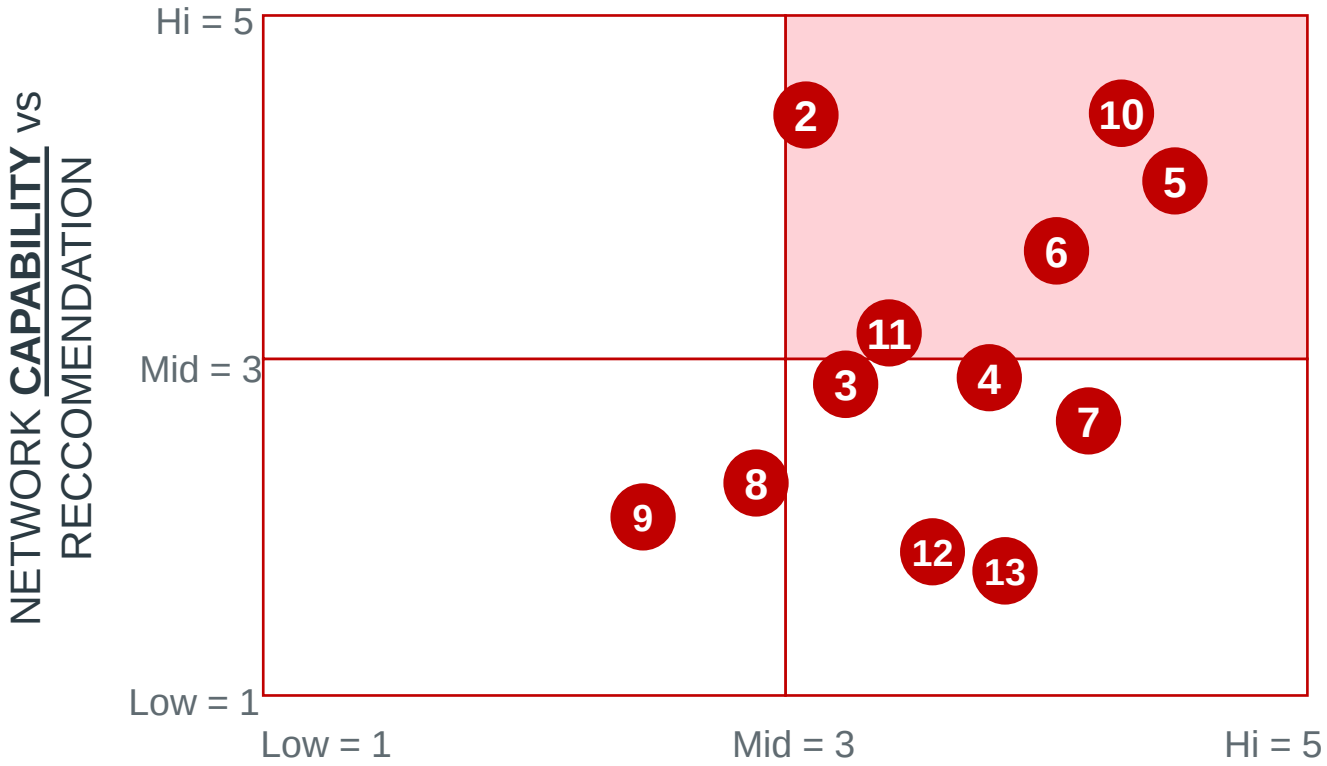
"I am interested in researching the impact of 2L immune checkpoint inhibitors on the treatment of advanced NSCLC, do you want to collaborate?

Centre B: cohorts and PIs

Cancer of interest	Interested Principal investigator
Breast	Prof. I.
Colorectum	Prof. J
Lung – NSCLC	Prof. K
Prostate	Dr. L
Bladder	Dr. M
Ovarian	Dr. N
Kidney	Prof. O
Liver	Prof P.

"hi I am interested in researching 2L treatment outcomes in Ovarian, given introduction of PARP, would it interest you to discuss further?

From the 11 surveys received*, it would seem 3 cancer mission themes are collective priorities



NETWORK **INTEREST**
vs RECCOMENDATION IN USING RWE

(measured by level of investment a centre willing to make in co-developing collaborative bids to secure grant income from Cancer Mission)

5 **Advance and implement personalised medicine**

6 **EU-wide research programme on early diagnostics**

10 **Network of Comprehensive Cancer Infrastructures**

X *Network score vs the 13 cancer mission recommendations*

** 11 surveys received by Monday 1st November*

In your welcome packs are the details of all the “expert and willing” centres by theme

Theme 5: Advance and implement personalised medicine

Centre	Interest	Capability	Total
Ospedale San Raffaele, Milan	5 – highest interest	5- high expertise	10
Romagnolo per lo Studio dei Tumori (IRST)	5 – highest interest	5- high expertise	10
IPO Porto	5 – highest interest	4 – some expertise	9
Istituto Nazionale dei Tumori	5 – highest interest	4 – some expertise	9
Leeds Teaching Hospitals Trust	5 – highest interest	4 – some expertise	9
Masaryk Memorial Cancer Institute, Brno	5 – highest interest	4 – some expertise	9
Tampere University Hospital, Finland	5 – highest interest	3 – some capability	8

How this helps you

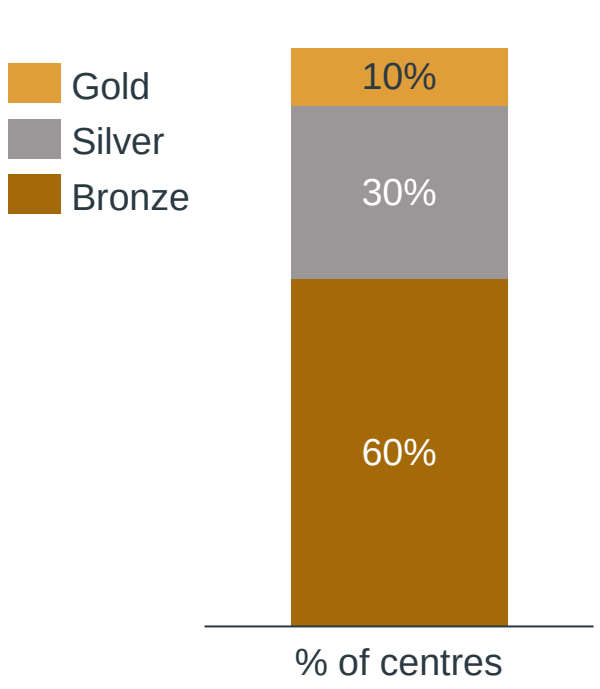
- If your centre is interested in a theme, use the results to find collaborators
- Note the specific expertise may not be in the room today (given only 2 people a centre), but it is likely 1 human away

N.B. results are self reported

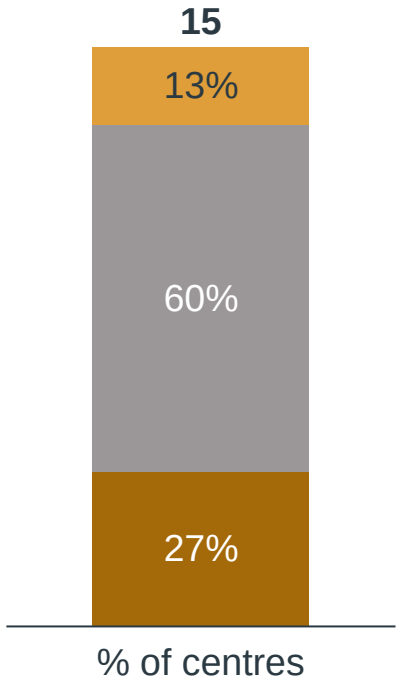
Quality RWE needs quality data and research processes

	Bronze Centres	Silver Centres	Gold Centres
1. Precision oncology research maturity	**MDX testing below NCCN guidelines** • Testing almost all "IHC + some Sanger" • Very limited local precision expertise • Don't recruit to Biomarker driven trials	**Testing at / above NCCN guidelines** • Small panel the norm only in NSCLC • Some but limited precision expertise • Recruit rarely for SoC biomarker trials	**Large Panel MDX standard of care** • Molecular tumour board pilots • Lots of precision trials underway, especially in "new biomarkers"
2. Routine clinical data digital research maturity	**No Data Warehouse, but core EMR exists** • Siloed Clinical Systems, very partial data • Unstructured Data often paper based • No Data Standardisation • Traditional eCRF obs. studies only	**Basic clinically focused Data Warehouse** • Core Clinical Systems integrated • Identifiable Data, some standardisation • Unstructured Data is digital, un-mapped • Taking first steps in Database Research	**A research ready local Data Warehouse** • All cancer data in (chemo, radio, path), with strong master data management • Strong privacy norms (pseudo etc) • Multi-site database research routine
3. Pragmatic outcomes maturity	**Minimal routine outcomes in EMR** (death in hospital, ER admissions only) • Manual research processes established for date of death, but frequency of routine scans confounds RECIST	**Outcomes interested but gaps remain** • Some communities of care track key outcomes, often outside of EMR • Progression only well tracked where easy to measure (e.g. CA125 in ovarian)	**Preparing for outcomes research at scale** • EMR captures progression and death • Experimenting with routine digital outcomes – PROs tools, AI on scans etc • Maybe pilots in liquid biopsy for relapse
4. Information Governance & Delivery Maturity	**Not systematic on GDPR research reuse** • Very basic patient notifications on data, often limited to clinical use • eCRF processes use traditional pathways of study specific consent • Very limited capacity to support planning or commercial projects	**GDPR foundations based on notification** • High Quality Patient Notification and Opt-out process cover research • Aggregated data released without consent, consent needed for patient level • Some spare capacity, but tends to be cancer specific and easily saturated	**Strong secondary use consents the norm** • Secondary consents routine, and provide a broad basis for processing • Strong processes for privacy management on patient level releases • Large central data science teams with spare capacity for commercial studies

This part of the survey has high sample bias to centres that have invested in their data – we want you <u>all</u> to participate



*What we **expected,** having reviewed > 50 centres for commercial RWE studies*



*What we **got back** from the 15 centres that completed the survey*

Why should your centre participate?

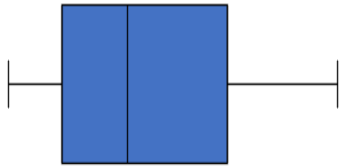
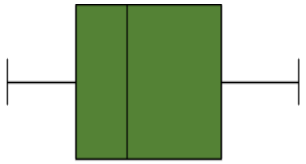
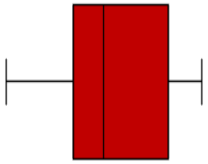
- **Benchmark** your centre's digital maturity to peers (and help you plan upgrades)
- Help us collectively **identify "critical data issues"** we **all** need to solve
- Help us plan **sequencing of investments and research** – "walk before we run"
- Help us **collectively lobby** for EU and government investment in digital research infrastructure
- **NOT** an exam!

DigiCore

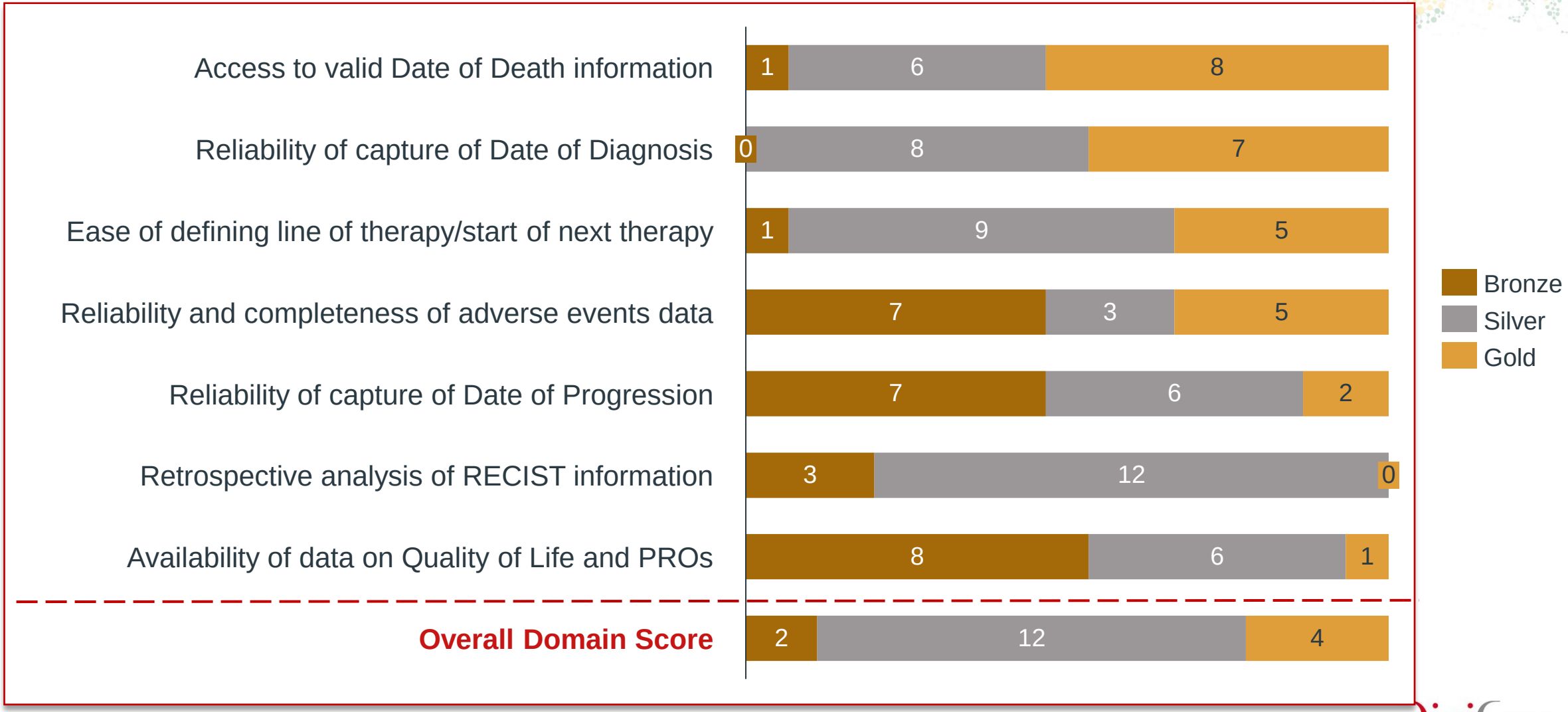
Despite the sample bias to “the mature”, there is insight

Increasing Centre maturity

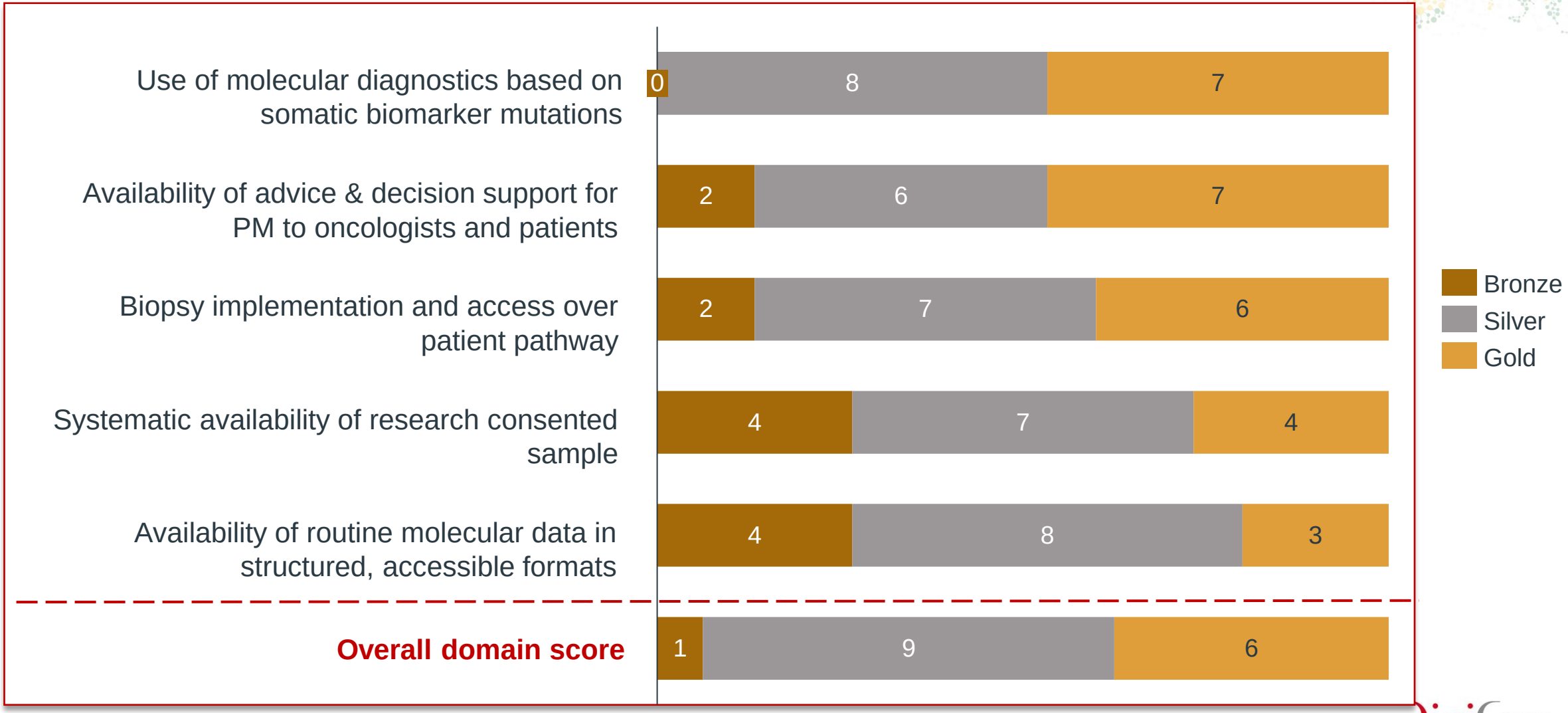
1 = Rudimentary — Excellent = 5

		INSIGHTS FROM THE DETAIL (Directional N=15)
Precision oncology research maturity		Many centres have large panel, but can’t access the data. We have “MDX snapshots only” – biopsy and test at single point in patient journey is the norm
Clinical data digital research maturity		We are OK at managing structured data collectively **BUT** weak at managing unstructured or getting to a common data model or reference data management
Pragmatic outcomes maturity		OK at date of diagnosis, line of therapy and death **BUT** weak at progression, RECIST, A.E. and PROs
Info governance & delivery maturity		While some are well on the journey to strong Information governance post GDPR, many have not started to solve the legal and operational issues

Detail in the pragmatic outcome section shows strength in basic outcomes, more to do on A.E, progression and QoL



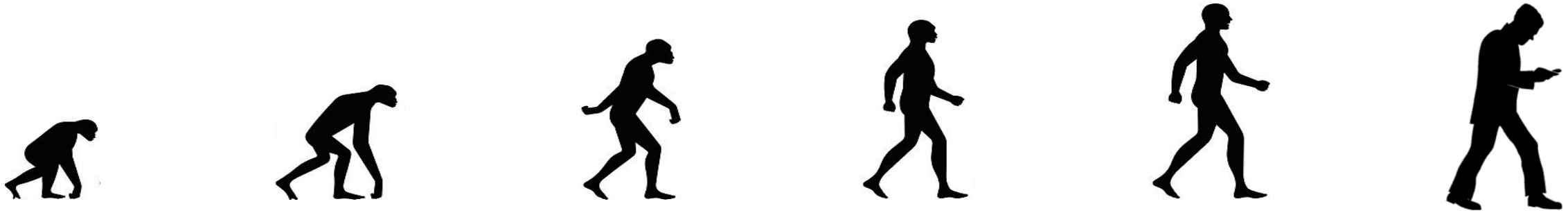
In the precision oncology maturity, there is a large contrast between availability of tests and availability of molecular data



The cancer mission (and Covid recovery funds) create opportunity to invest in our collective data

Fund	Period	Budget € Bn	Actions	DIGICORE
EU4Health	'21-'27	1.25	Fund beating cancer plan and European Health Data Space and European Cancer Patient Digital Centre	+++
Digital Europe	'21-'27	0.25	AI, cybersecurity, data infrastructure & governance etc. 2021 imaging data Pan-Europe; DX, genomic data	++
JRC Knowledge centre	TBC	TBC	Diffusion of knowledge	
HORIZON	'21-'23	0.38	i) UNCAN / basic research, ii) prevention iii) better DX or TX iv) quality of life measurement & improvement	+
EIC Pathfinder	TBC	0.22	European Innovation Council - scale-up funding, typically for digital solutions	no
Erasmus /EIT	TBC	0.50	Education, training, research in cancer + health lifestyles	?
Subtotal €Bn		**€2.59B**		

The institutional path to research ready routine data



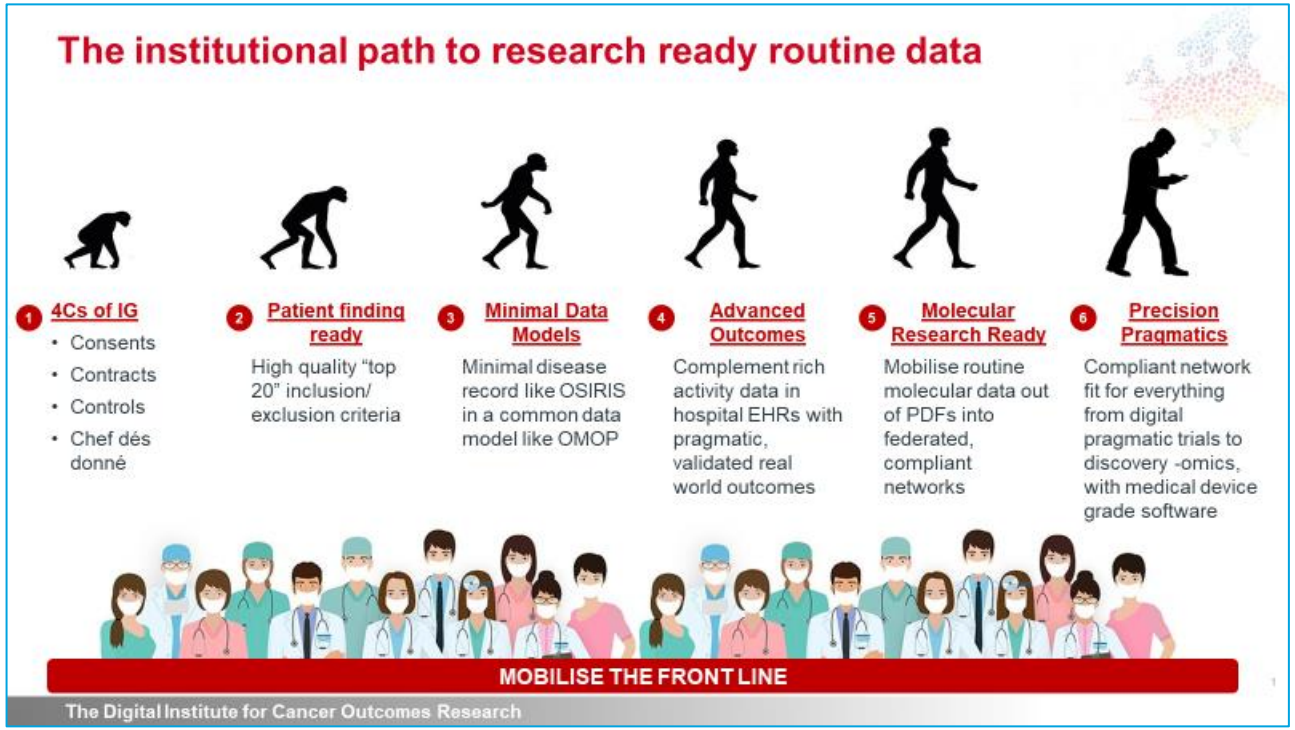
1. **4Cs of IG**
   - Consents
   - Contracts
   - Controls
   - Chef dés donné
2. **Patient finding ready**
   High quality “top 20” inclusion/ exclusion criteria
3. **Minimal Data Models**
   Minimal disease record like OSIRIS in a common data model like OMOP
4. **Advanced Outcomes**
   Complement rich activity data in hospital EHRs with pragmatic, validated real world outcomes
5. **Molecular Research Ready**
   Mobilise routine molecular data out of PDFs into federated, compliant networks
6. **Precision Pragmatics**
   Compliant network fit for everything from digital pragmatic trials to discovery -omics, with medical device grade software

MOBILISE THE FRONT LINE

Our panellists today…

Name	***Dr. Paolo Baili*** *Researcher*	***Dr. Xose Fernandez*** *Chief Data Officer*	***Prof. Geoff Hall,*** *Senior Clinical Lead & Head of Informatics*	***Dr. Bettina Ryll,*** *Patients Advocate Working Group Chair*
Institution	*ITN Milan*	*Institut Curie, Paris*	*Leeds Teaching Trust, NHS, UK*	*Melanoma Patient Network Europe*

Our topic: where has your institution got to, and how?



1. What has you centre done so far to get your routine data research ready?
2. What is your legal basis for processing, and how has that evolved?
3. What benefits has that bought?
4. Then open questions from the floor