

P H A R M A C O G E N E T I C S

A N D

A R C H I T E C T U R E



E M M A S M Y T H

COWAN
ARCHITECTS



EMMA SMYTH

HEALTHCARE ARCHITECT for
COWAN ARCHITECTS



SOURCES: The Design Buro, IBI Group & Frankham Consultancy Group

**IT IS POSSIBLE TO PREDICT
THE WAY A PATIENT WILL
RESPOND TO MEDICATION**



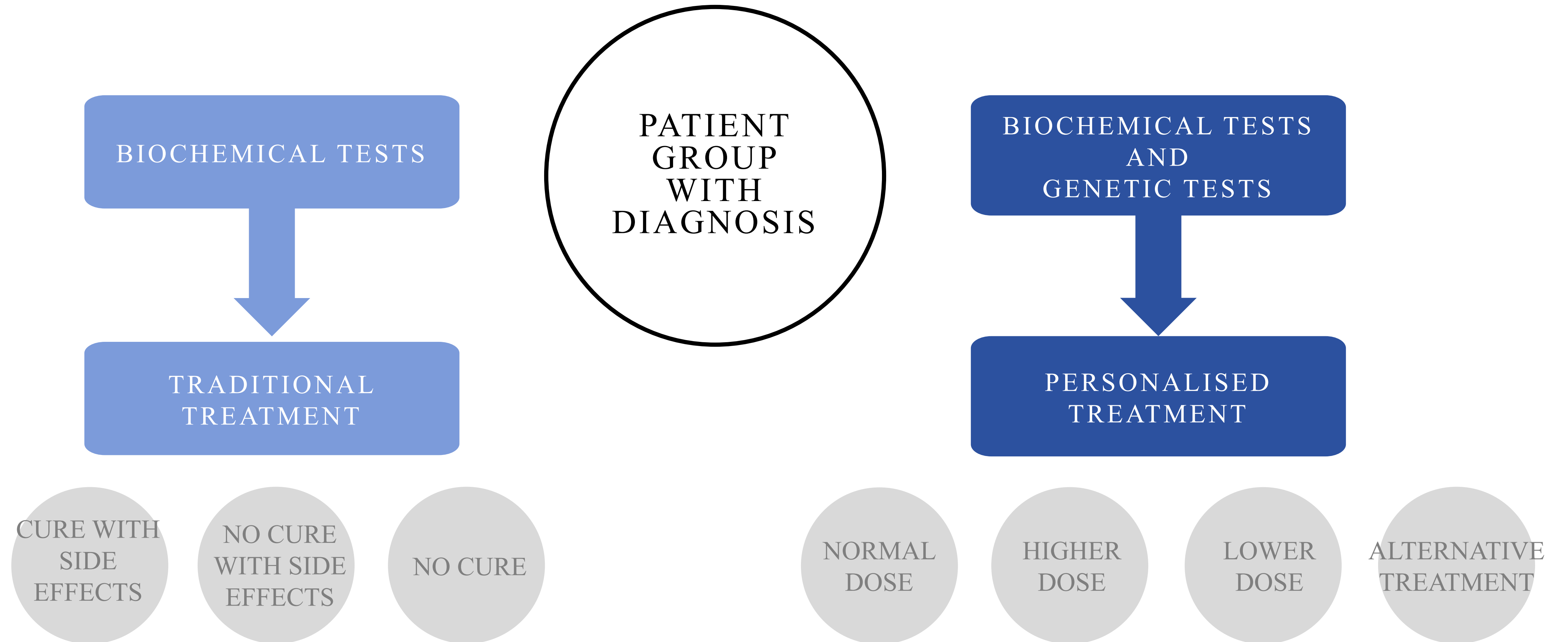
ARNO MOTULSKY

THE FATHER OF
PHARMACOGENETICS

SOURCE: Clare McLean, New York Times

PHARMACOGENETICS:

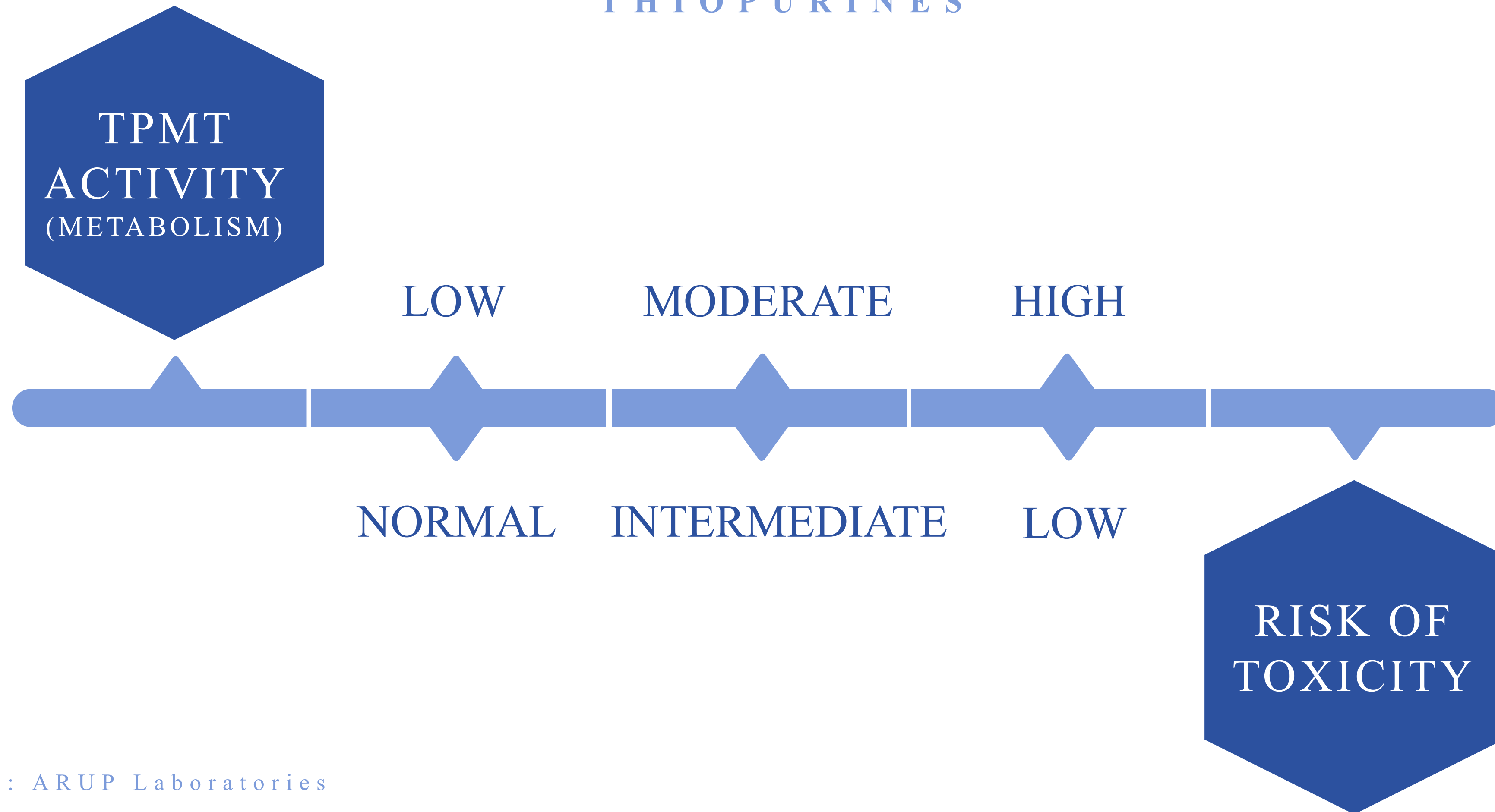
THE TEST THAT INFORMS YOUR TREATMENT



TRADITIONAL DIAGNOSIS vs. PHARMACOGENETICS

INHERITED METABOLIC RATE

THE TPMT GENE INFLUENCES A PATIENTS ABILITY TO METABOLISE
THIOPURINES



SOURCE: ARUP Laboratories

An example of screening:

abacavir

For the treatment of HIV

Up to 20% of patients of Indian descent have a 50%
chance of developing hypertension

Also,

10% of Caucasians

2% of African descent

World population = 7.6 billion

Those with HIV = 36.7 million

= 0.005%

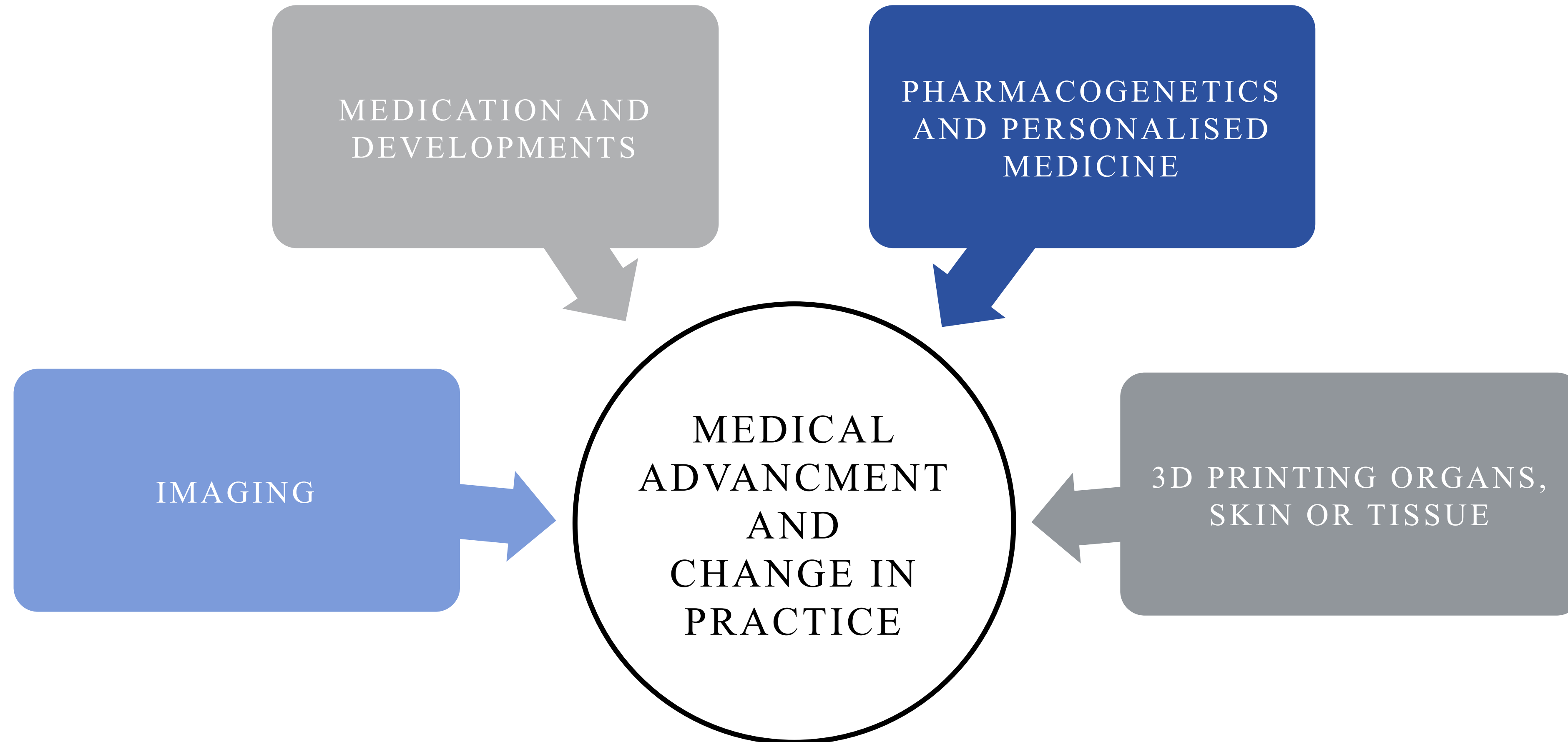


**“THE RIGHT
DRUG, AT THE
RIGHT DOSE,
AT THE RIGHT
TIME”**

THE MAYO CLINIC

DISRUPTIVE TECHNOLOGY

A NEW DEVELOPMENT WHICH CHANGES THE LANDSCAPE OF CURRENT PRACTICE





THE HEALTHCARE ARCHITECT

SOURCES: Google Search Engine



THE
PATIENT
EXPERIENCE

AND ENABLING CLINICIANS TO BE AS
EFFECTIVE AND EFFICIENT AS POSSIBLE

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PHASE 1
OPERATIONAL
CHANGES

HOW DOES THIS AFFECT
ARCHITECTURE?

TREATMENT METHODS - HOSPITAL ATTENDANCES - COMMUNITY MONITORING



LOCATION OF CARE



CENTRALISED PATIENT RECORDS



POINT-OF-CARE

SOURCES: Google Search Engine

PHASE 2
GENETICISTS

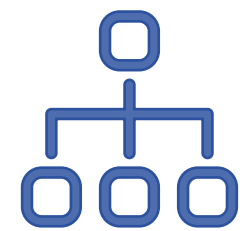


T R E A T M E N T P L A N S



PHARMACISTS

FOCUS ON THE SAFE USE OF DRUGS,
LOCATED AT ALL HOSPITALS



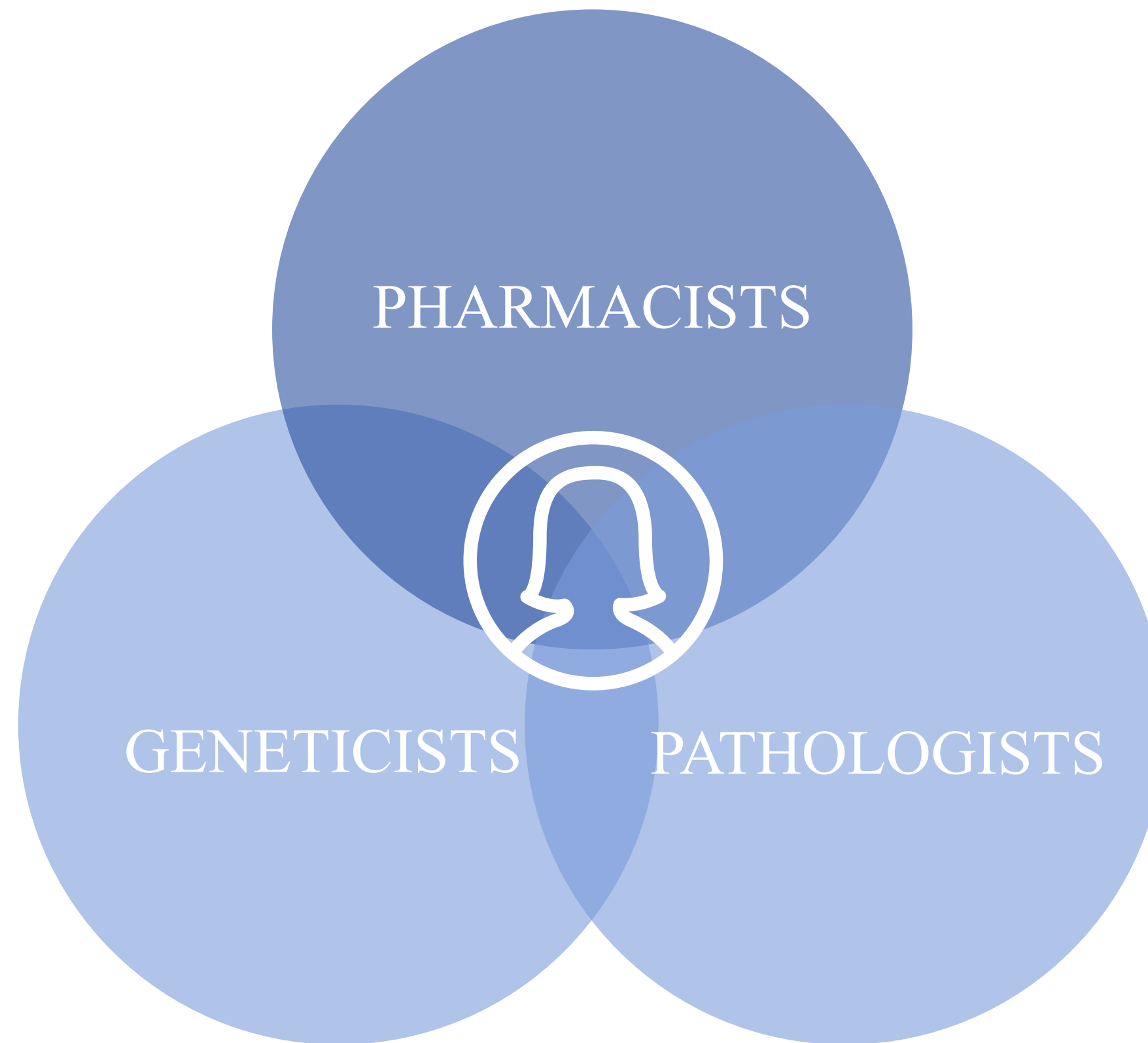
GENETICISTS

TYPICALLY ATTACHED TO RESEARCH, LOCATED
AT UNIVERSITIES + TEACHING HOSPITALS



PATHOLOGISTS

PRESENT AT ALL LARGE ACUTE HOSPITALS

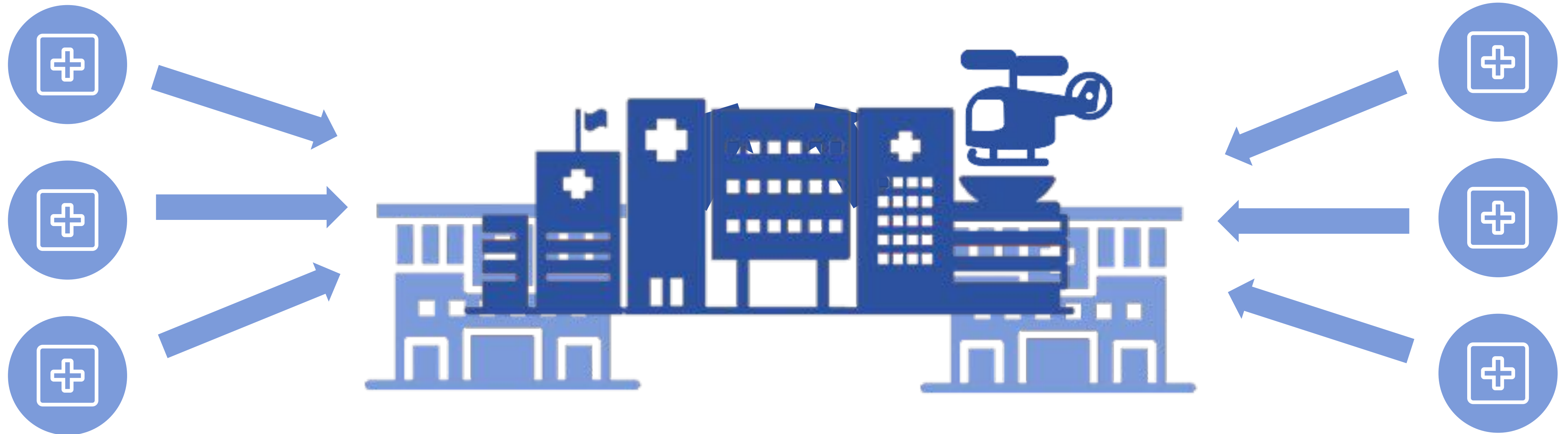


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PHASE 3
ADVANCED
PRIMARY
CARE

LOCATION OF SERVICES

INTRODUCTION OF ADVANCED PRIMARY CARE CENTRE



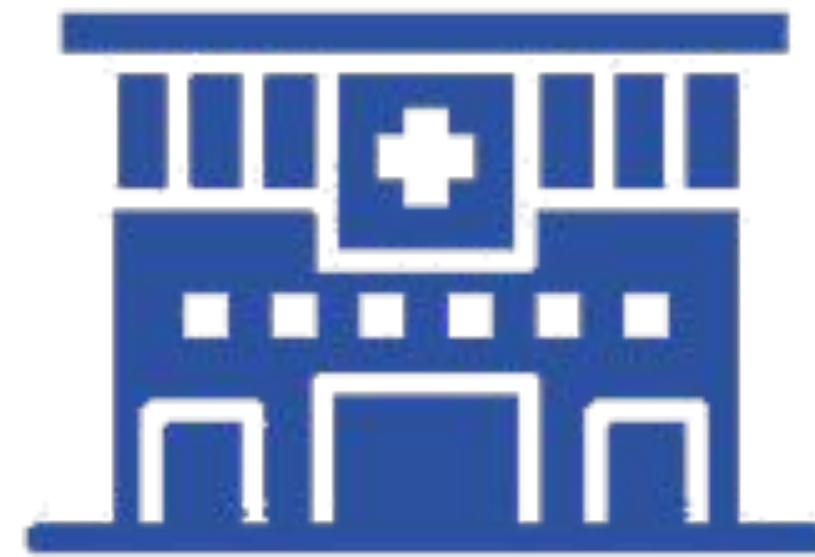
TYPE OF SERVICES

REDISTRIBUTION OF CARE AND SERVICES ACROSS SITES



PRIMARY CARE

Everyday ailments
Phlebotomy



ADVANCED PRIMARY CARE

Chemotherapy
Renal & Haemo Dialysis
Minor Injuries
Monitoring
Routine Tests



ACUTE HOSPITAL

Surgery
Accident & Emergency
Critical Care
High Dependency
Specialist Treatments

PHASE 4
CENTRE OF
EXCELLENCE



An example of screening:

CANCER

The most prevalent types

The four most common Cancers account for 53% of all Cancer diagnoses in the

UK (359,960 new cases in 2015)

Breast cancer = 15%

Prostate cancer = 13%

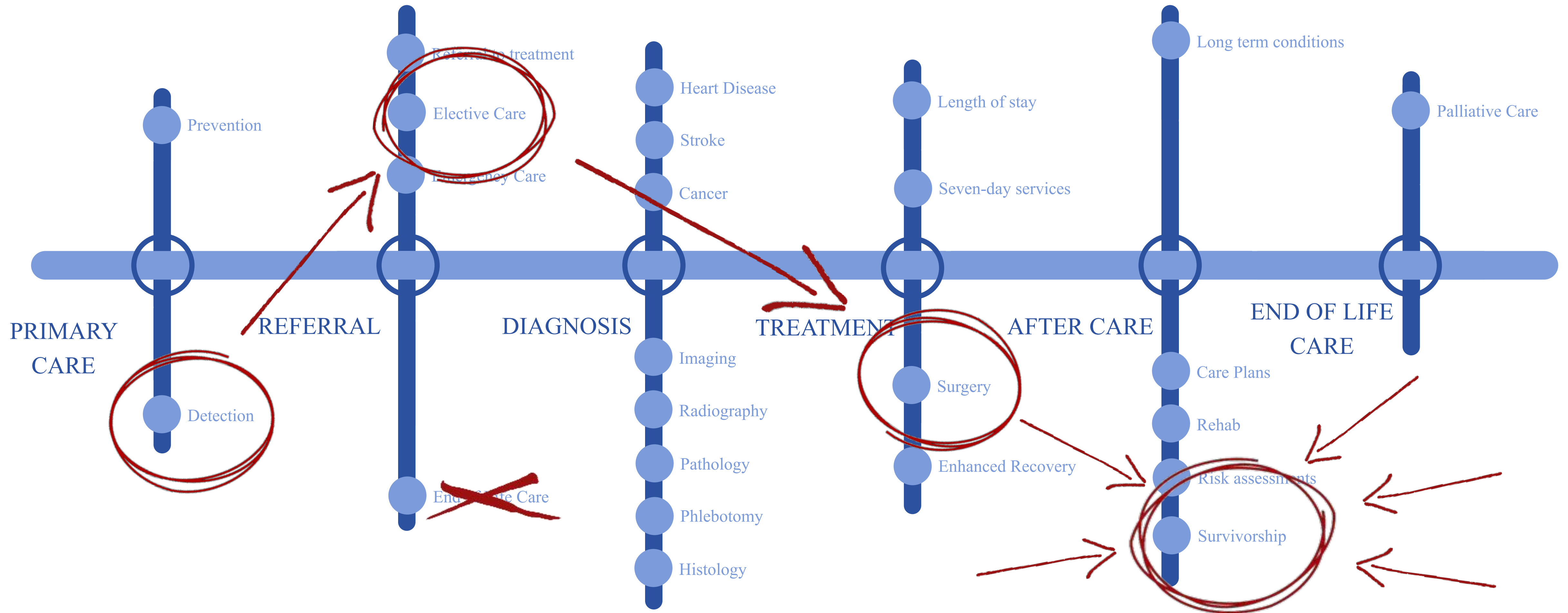
Lung cancer = 12% (decreasing)

Bowel cancer = 12%



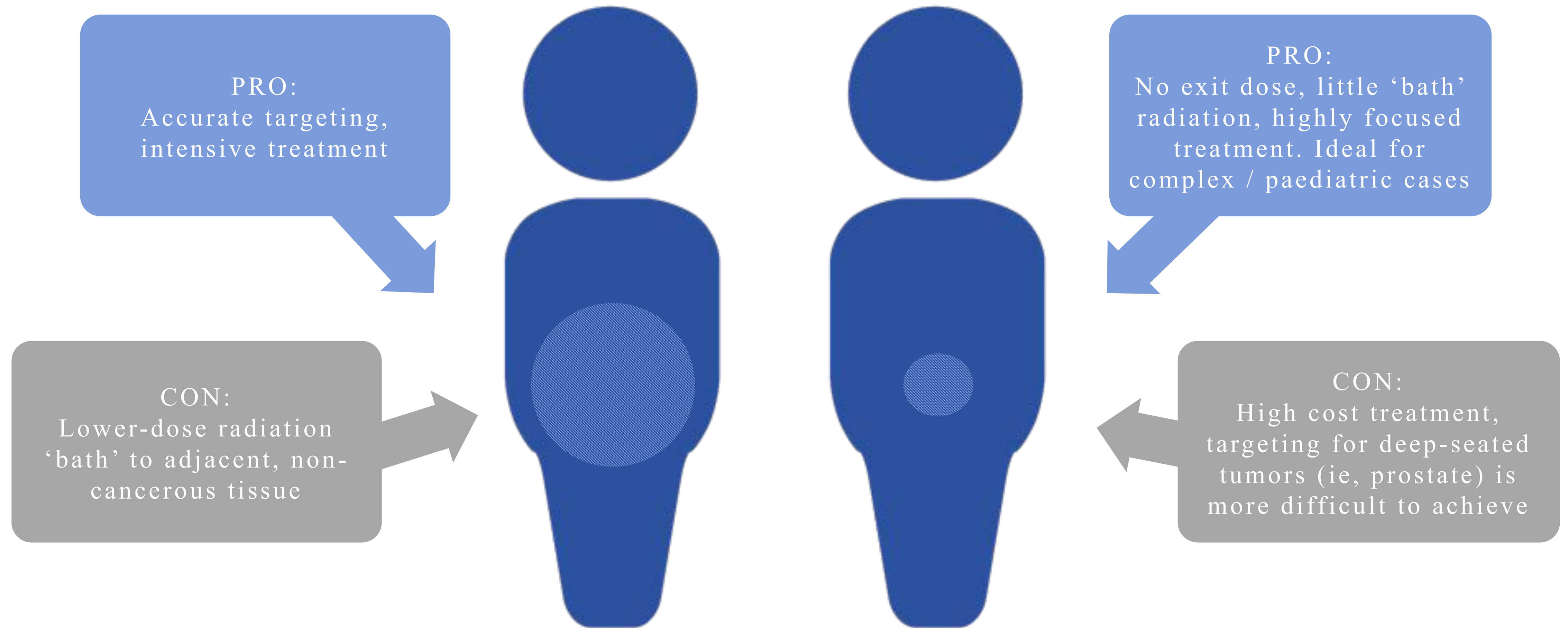
SOURCE: Cancer Research UK

TREATMENT OPTIONS AND PATHWAYS



CENTRE OF EXCELLENCE

SPECIALIST TREATMENT WITHIN PURPOSE BUILT FACILITIES



TRADITIONAL RADIOGRAPHY vs. PROTON BEAM THERAPY



PROTON BEAM THERAPY

PRECISION vs. PROFITS

SOURCE: Peter Tovia, Discover magazine

P R E C I S I O N F A C I L T I E S

THE ACUTE HOSPITAL AS THE CORE OF TECHNICAL, PRECISION
AND SCIENTIFIC PROCEDURES



THE FUTURE...?

“Pre-emptive testing is the way to go”

- Stuart Scott, Mount Sinai Hospital, NYC

FUTURE DEVELOPMENTS WITHIN
PHARMACOGENETICS

“The research isn’t in yet about which genes are important and why”

– Mary Relling, St Judes Hospital, USA



CYSTIC FIBROSIS

10,800 current UK diagnoses
275 new UK cases annually
Average life expectancy 77 yrs



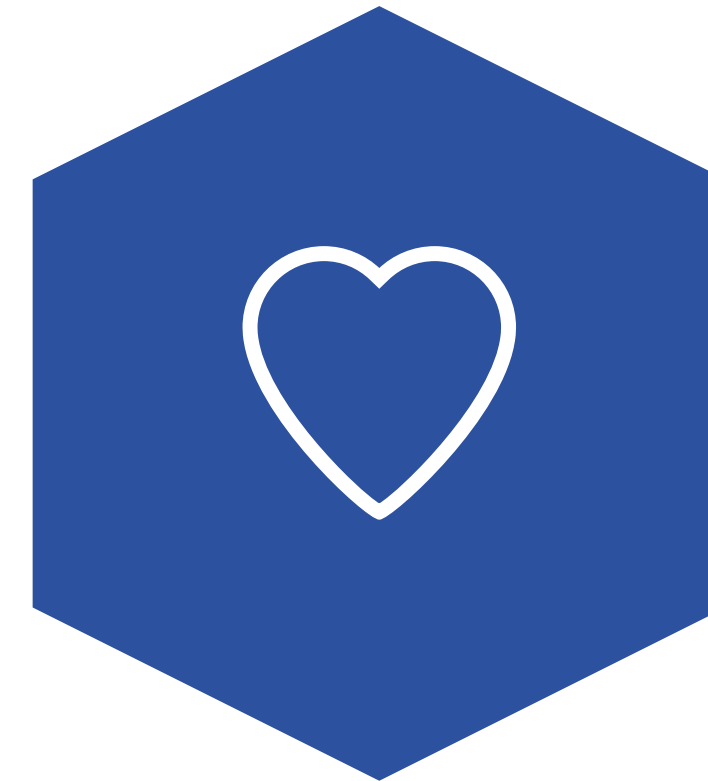
BOWEL CANCER

110 new cases per day
4th most common cancer
12% of all cancer cases



ARTHRITIS

1% of the UK population
Affects 2/3rds more women
Average onset 40-60 yrs



HEART DISEASE

Causes 25% of UK deaths
7 million people affected
Annual cost £9 billion



MENTAL HEALTH

Affects 1 in 4 people
1 year to confirm treatment
1 in 6 attempt suicide

MENTAL HEALTH

“Using Pharmacogenetics to inform mental health treatment is the biggest challenge, but it could also be the most worthwhile”

– Dr Munir Pirmohamed, NHS Chair of Pharmacogenetics for the UK

1 in 4

People in the UK will experience a mental health issue during the course of their lives

1 year

The average length of time it takes to settle onto a medication plan, during which time 2/3rds of patients report that their condition deteriorated

20.6%

Of patients have suicidal thoughts, and 6.7% make a suicide attempt

An example of screening:

MENTAL HEALTH

For the treatment of depression,
bipolar disorder, psychosis and
schizophrenia

1 in 4 people in the UK will experience a mental health
issue during their lives

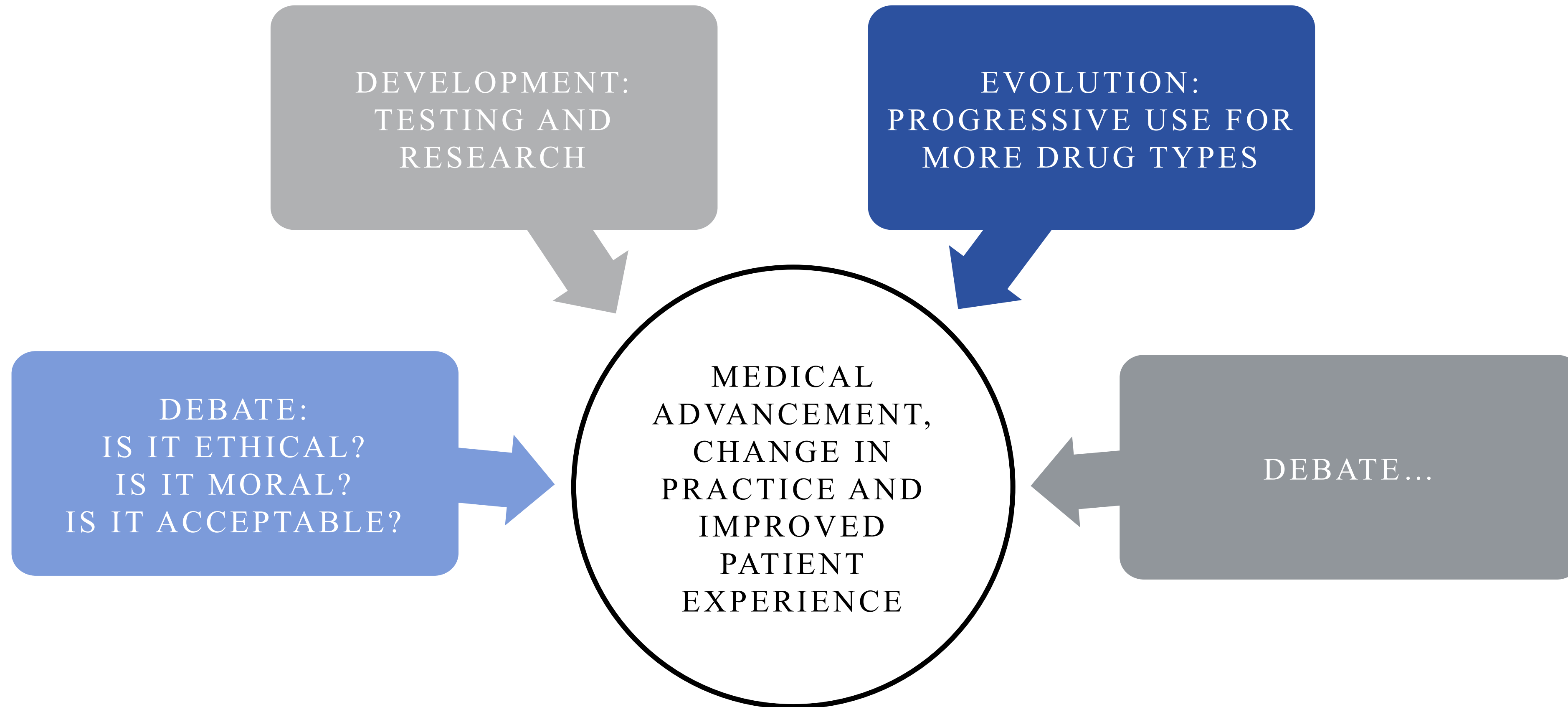
Psychosis = 7 in 1000 people

Bipolar disorder = 20 in 1000 people



DEBATE, DEVELOPMENT, EVOLUTION AND DEBATE

NEXT STEPS



THE ARCHITECTURAL
FUTURE

DEBATE, DEVELOPMENT, EVOLUTION... AND MORE DEBATE



THE ROYAL
ADELAIDE HOSPITAL

SOURCE: Celsus (via Google search)

SILVER THOMAS HANLEY ARCHITECTURE



S O U T H G L A S G O W
U N I V E R S I T Y H O S P I T A L

SOURCE: Steven Sung (via Google search)

I B I G R O U P



CHRIST HOSPITAL
JOINT AND SPINE CENTRE

SOURCE: Tom Rossiter (via ArchDaily)

SOM ARCHITECTS



TELETÓN

INFANT ONCOLOGY CLINIC

SORDO MADALENO ARQUITECTOS

SOURCE: Jamie Nevarro (via ArchDaily)

PHARMACOGENETICS
AND
ARCHITECTURE

DISCUSS



THANK YOU
FOR
LISTENING