



MINISTRY OF HEALTH
SINGAPORE

Research Fund Portfolio Management Using HRCs Tool

Experience of NMRC (Singapore) and Future Implications for Its
Grant Framework

SINGAPORE OVERVIEW

☐ Physical

- Land area : 710 sq km
- Limited natural resources
- Superb geographical position

☐ Population

- 1960: 1.6 million
- 2010: 5.08 million
(1.25 million expatriate workers)

☐ Economy (GDP)

- 1960: S\$2.1 billion
- 2010: S\$304 billion

☐ Foreign reserves

- 1963: S\$1.2 billion
- 2010: S\$289 billion



☐ Political

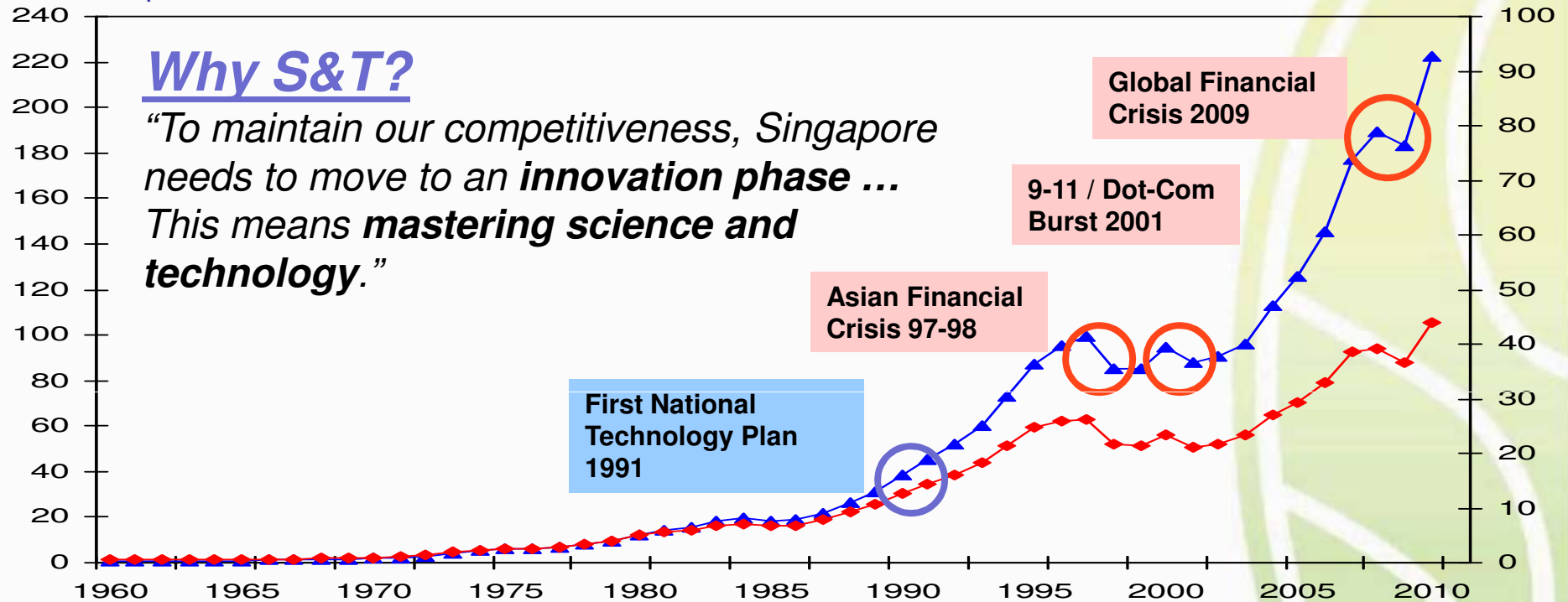
Singapore is a parliamentary democracy

- 1959: Self-government
- 1963: Merger in Federation of Malaysia
- 1965: Independence

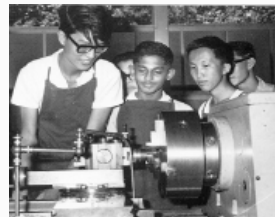
ECONOMY of SINGAPORE

GDP US\$B

Per Capita US\$K



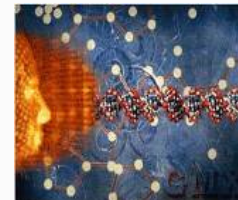
1960 - 1969
Labour intensive



1970 - 1979
Skill intensive



1980 - 1989
Capital intensive



1990 - 1999
Technology Intensive



2000-
Knowledge/ Innovation Economy

Singapore – The Biopolis of Asia

An International Biomedical Sciences Cluster Advancing Human Health
Through the Pursuit of Excellence in
Research & Development, Manufacturing, and Healthcare Delivery



R&D Funding in Singapore

Science & Technology Plans are formulated for a 5-year period

We are here..

		BMS PHASE I	BMS PHASE II	BMS PHASE III
<u>1991 – 1995</u>	<u>1996 – 2000</u>	<u>2001 – 2005</u>	<u>2006 – 2010</u>	<u>2011 – 2015</u>
National Technology Plan	National Science & Technology Plan	Science & Technology Plan 2005	Science & Technology Plan 2010	Research Innovative & Enterprise 2015
S\$2 billion	S\$4 billion	S\$6 billion	S\$13.55 billion	S\$16.1 billion



NATIONAL RESEARCH FOUNDATION
Prime Minister's Office, Republic of Singapore



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Scope

- Background
- Rationale
- Research Fund Mapping
 - Interim analysis
 - Methodology
 - Overview of Singapore BMS health research investment
- Recent improvements & Future Plans



RESEARCH
FOR LIFE



NATIONAL MEDICAL RESEARCH COUNCIL

- Established in 1994
- A funding arm of Ministry of Health (MOH), Singapore

NMRC's role:

- Oversees the development and advancement of medical research in Singapore
- Provides research funding to healthcare institutions
- Awards competitive research funds for individual projects
- Responsible for the development of clinician-scientists through awards and fellowships

NMRC's Vision
Translating Research For Better Health

NMRC's Mission

*Promote excellence in
translational and
clinical research*

*Nurture a vibrant
research community
of clinicians and scientists*

*Enhance knowledge
translation for better
health & economic
outcomes*

Key Areas of Focus

Talent
Development

Competitive
Research
Funding

Infrastructure
Development

Knowledge
Exchange /
Translation

RIE2015 - NMRC GRANTS PORTFOLIO

Talent Development

Healthcare Research Scholarships

Master of Clinical Investigation

NMRC Research Training Fellowships

MBBS/MD-Masters/PhD Scholarships*

Human Capital Awards

STaR Investigator Awards

Clinician Scientist Award (SI, Inv)

Transition Awards*

CS & CI Salary Awards*

Research Grants (Strategic/Investigator-initiated)

NMRC Prog

CG/PPG

Clinical Trial Grant*

TCR Flagships

OCF

IRG for CS

Cooperative Basic Research Grant (CBRG)*

Joint Bench-to-Bedside Fund*

Other MOH Prog

ID Research Grant*

HSR, HQI2F, Health System Grants

Enablers & Infrastructure

SCRI

IMUs (NUHS & SingHealth)

IRBs

Research Space Funding*

On-going Programmes (from S&T2010):

- Animal Research Facilities
- Research Buildings
- CBmE

*New Initiatives in RIE2015

Others

Industry Alignment Fund (IAF)*

TTO Funding*





Agency for
Science, Technology
and Research

Our Mission

Fostering world-class scientific research and talent for a vibrant knowledge-based Singapore

**Chairman A*STAR
Managing Director A*STAR**

**Science &
Engineering
Research
Council**

**Joint
Council
Office**

**Biomedical
Research
Council**

**A*STAR
Graduate
Academy**

**Corporate
Group**

Research Institutes (RIs)

BMRC has 7 RIs and
5 Research Consortia
SERC has 7 RIs.

Other Scientific Services Outfits

- Biopolis Shared Facilities
- Biological Resource Centre
- National Breeding Centre
- Singapore Tissue Network
- National Metrology Centre
- Computational Resource Centre

Commercialization Outfits

- Exploit Technologies
- Industry Development Group (BMRC)

A*STAR RESEARCH INSTITUTES / ENTITIES

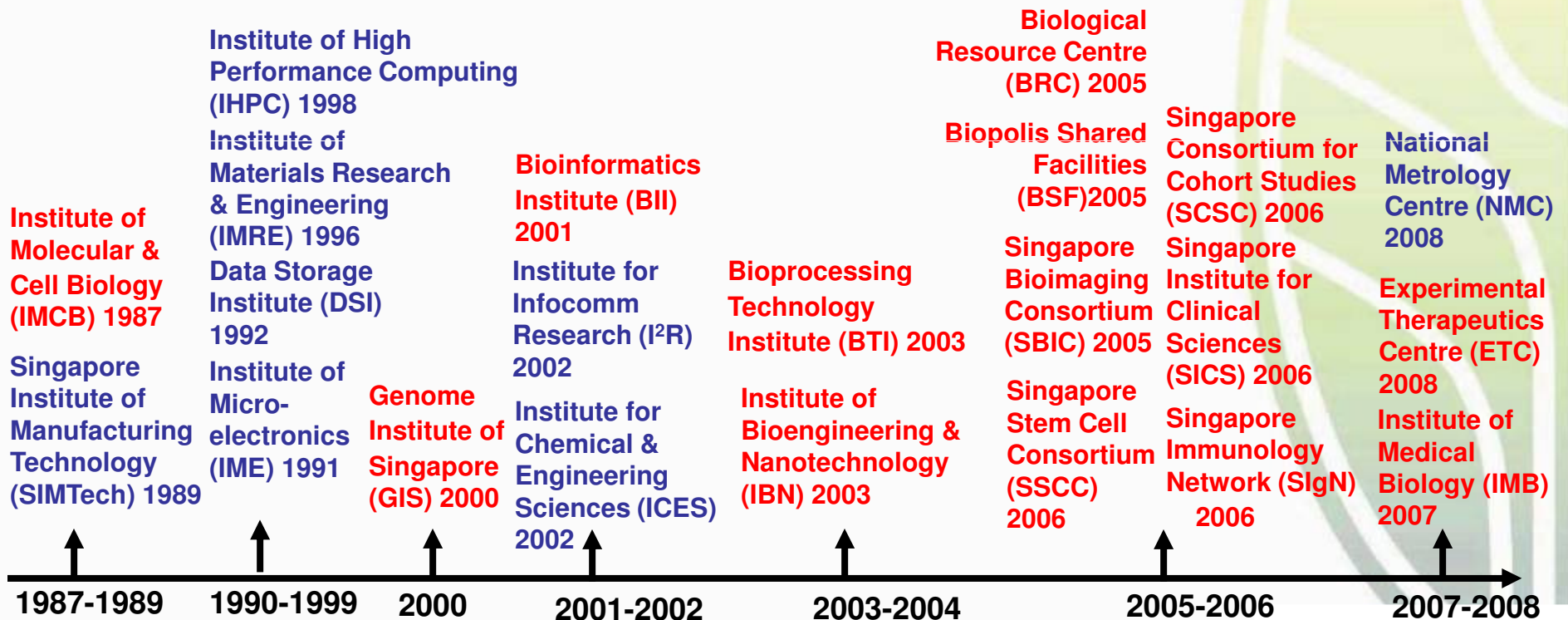
SERC Industry Clusters

- Electronics
- Chemicals
- Infocomm
- Engineering



BMRC Industry Clusters

- Pharmaceuticals
- Biotech & Biologics
- Medical Eng & Tech
- Healthcare Svc & Delivery



A*STAR has more than 2,300 RSEs (>50% are international talent from some 60 countries)

UK Health Research Analysis

- **Health Research Classification System (HRCS)** - used in UKCRC Health Research Analysis to evaluate the research funding in UK
- Key objectives
 - Provide evidence base for strategic planning of research funding
 - to facilitate coordination between funders
- Data from directly funded peer reviewed research awards
- <http://www.hrcsonline.net/>





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Health Research Classification System

Singapore Biomedical Research Mapping Analysis Using HRCS

Rationale

- HRCS provides a more coherent approach:
 - to determine the status of NMRC funding distribution
 - enable a need based funding of health care research in Singapore
- The result of analysis will be used in grant portfolio planning and assessing whether funding follows the burden of disease in Singapore as measured by Disability Adjusted Life Years (DALY) rates.

HRC System

- **Two dimensional system** i.e. Funding by
 - **Research Activity Code** (i.e. type of research undertaken)
 - 48 possible Research Activity Codes
 - **Health Category** (i.e. the health area being studied)
 - 21 possible Health Categories (developed based on International classification of Diseases (ICD) with some modification)
- Funding is compared to the 2 categories to assess the distribution of funding
- Research funding compared to burden of disease as measured by **Disability Adjusted Life Years (DALY)** rates.



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Singapore NMRC Research Fund Mapping Analysis Using HRCS

Interim Analysis

- Pilot study
 - Peer reviewed grant funding data (2002 – 2009), included data from the Biomedical Research Council (BMRC)
 - Identify the need to strengthen the translational & clinical funding
 - Assist in policy making

Methodology for Biomedical Research Mapping

- Initial analysis used extramural grant data from NMRC (2002-09)
- Subsequent analysis included the intramural funding data from NMRC and BMRC for the combined fund analysis
- Only direct costs included
- For the purpose of this presentation:
 - Data comparing 2 phases: BMS Phase I & BMS Phase II (2004-2009)
 - Research funding vs. DALY

Difference Between UK CRC Report & NMRC-HRCS Analysis

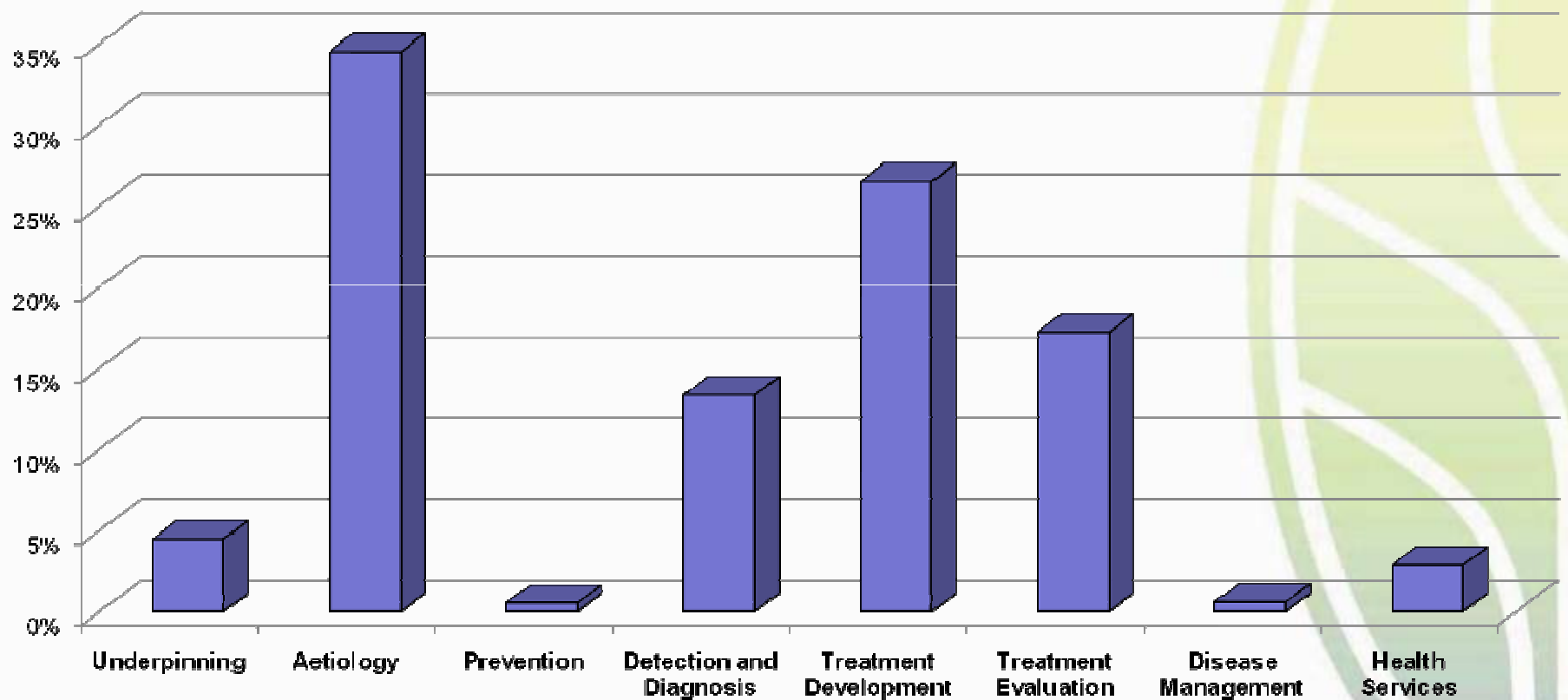
- UK CRC Report
 - *One year cash flow* per project from different organization used as the funding data
- NMRC Analysis
 - Included the *overall commitment* per project as the funding data
 - Data over several years used to assess trend
 - Inclusion of Intramural funding (Block grant data)



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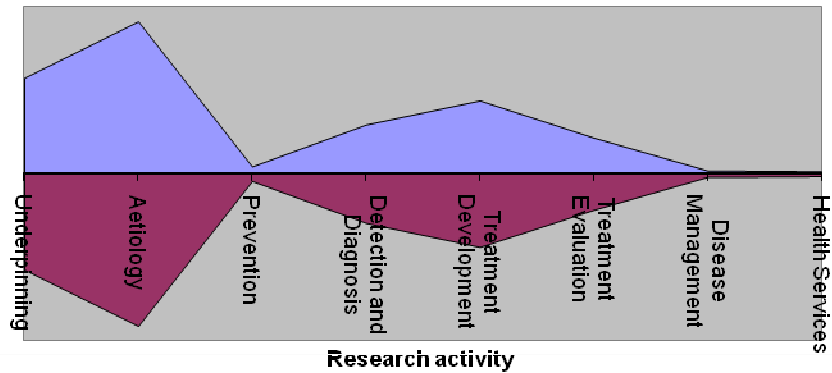
Results

Funding Distribution by Research Activity (2004-2009)

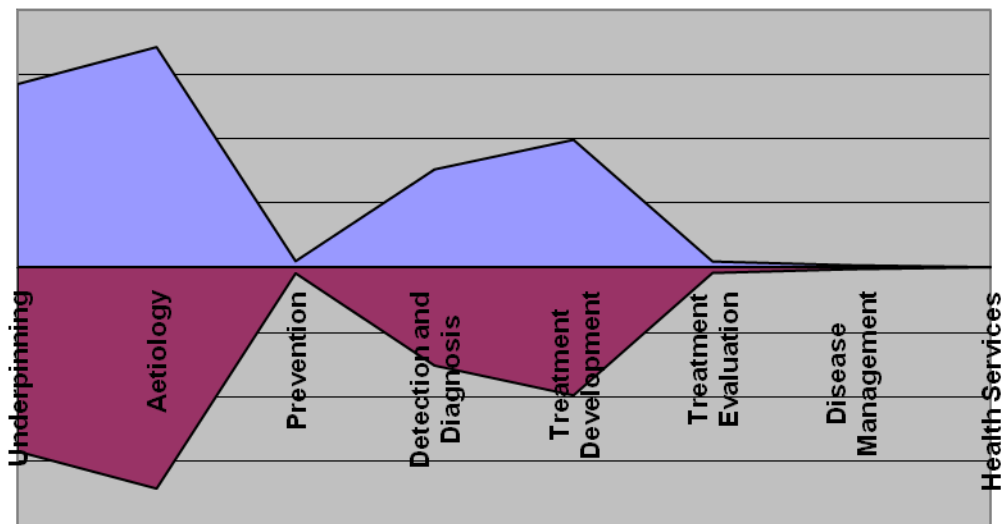


Comparison of Research Activity Distribution Between NMRC and BMRC (2004-09)

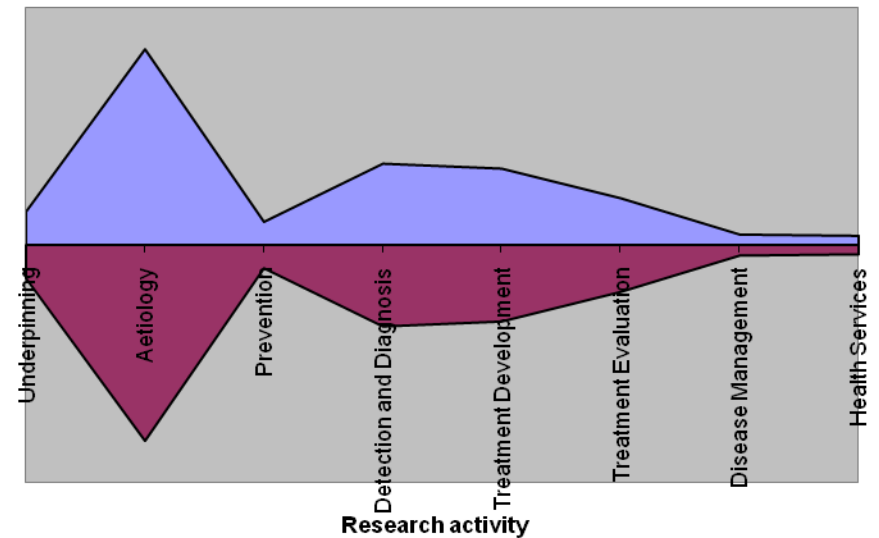
Combined funding of 2004-09 research activity distribution



BMRC Combined funding distribution by Research Activity 2004-2009



NMRC combined funding distribution by research activity 2004-09



Top 5 areas under Singapore DALY Rates (2004) and Combined Research Spend (2004-09) on Health categories

Disease Area	Estimated DALY for Singapore (2004)	Combined Research funding for 2004-09
Cardiovascular diseases	19.7%	6.8%
Cancer	18.7%	36.4%
Mental disorders	11.5%	1.8%
Metabolic and Endocrine disorders	11.3%	3.8%
Neurological and sense disorders(Eye)	10.8%	12.7%

Limitations

- **Multiple codes are equally apportioned**
 - May not reflect correctly the actual percentage as many research projects do have a main focus among multiple aims
- **Indirect cost cannot be attributed to the coding thus not capturing the total research spend**

Results

- Provided an **overview of BMS funding** for the period of analysis
 - **Descriptive map** of research funding by health category and research activity
 - **Track changes in funding** between different areas over time
- 

Applications

- Provided comparison across different funding agencies
- Suggested the case for more directed funding for translational & clinical research
- Showed areas for development
- Tracked the funding distribution trend and served as a portfolio management tool
- New tools using HRCS
 - To identify strengths in specialty areas
 - Able to strategically develop both international and industrial collaborations



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Recent Improvements & Future Plans

Recent Improvements to HRCS Tool

- Modified to analyse block funding (e.g. NMRC Centre Grants & BMRC Research Institutes)
- Coding integrated into new online grant portal and application forms

HRCS Coding Integrated in nGager

GrantTracker External - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites RSS Print Mail

Address http://demo.icsmultimedia.com.au:8082/nGager/Portal/project_application.aspx?id=827&portalview=app&editstep=126&edit=y#128 Go

SIX

6. Health Research Code Scheme

HRCS Research Activity

Research Activity	
1. Underpinning Research	1.1 Normal biological development and functioning
Nothing Selected	1.1 Normal biological development and functioning
Nothing Selected	1.2 Psychological and socioeconomic processes
Nothing Selected	1.3 Chemical and physical sciences
Nothing Selected	1.4 Methodologies and measurements
Nothing Selected	1.5 Resources and infrastructure (underpinning)
Nothing Selected	<none>

+ Add Row

HRCS Health Category

Health Category	
Other	
Nothing Selected	
Nothing Selected	
Nothing Selected	
Nothing Selected	

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HRCS Coding Integrated in nGager

GrantTracker External - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://demo.icsmultimedia.com.au:8082/nGager/Portal/project_application.aspx?id=827&portalview=app&editstep=128&edit=y#128 Go

SIX

6. Health Research Code Scheme

HRCS Research Activity

Research Activity

1. Underpinning Research 1.1 Normal biological development and functioning

1.1 Normal biological development and functioning and socioeconomic processes and measurements

1.1 Normal biological development and functioning and socioeconomic processes and measurements infrastructure (underpinning)

6. Health Research Code Scheme

HRCS Research Activity

Research Activity

Nothing Selected <none>

Nothing Selected <none>

1. Underpinning Research <none>

2. Aetiology <none>

3. Prevention of Disease and Conditions, and Promotion of Well-Being <none>

4. Detection, Screening and Diagnosis <none>

5. Development of Treatments and Therapeutic Interventions <none>

6. Evaluation of Treatments and Therapeutic Interventions

7. Management of Diseases and Conditions

8. Health and Social Care Services Research

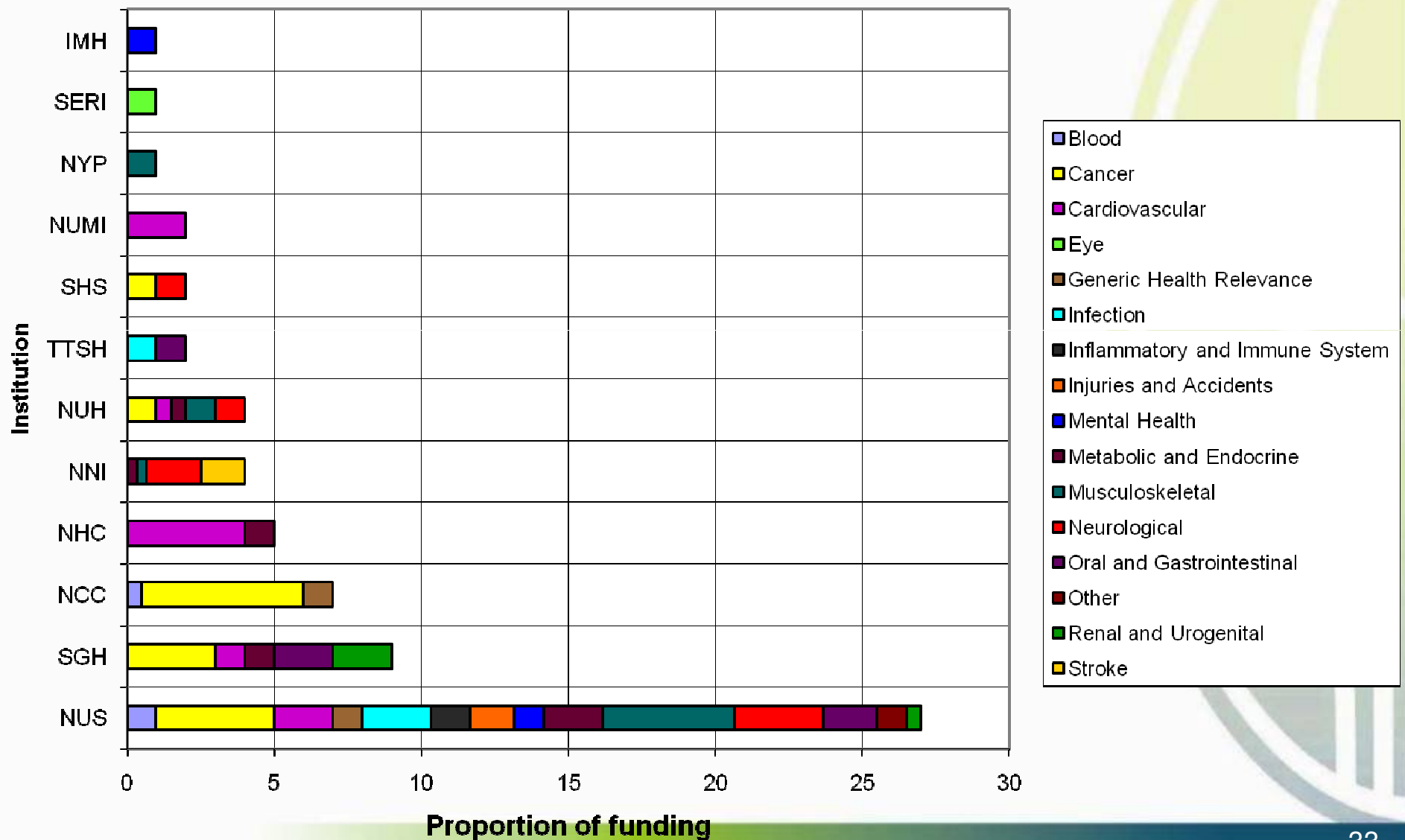
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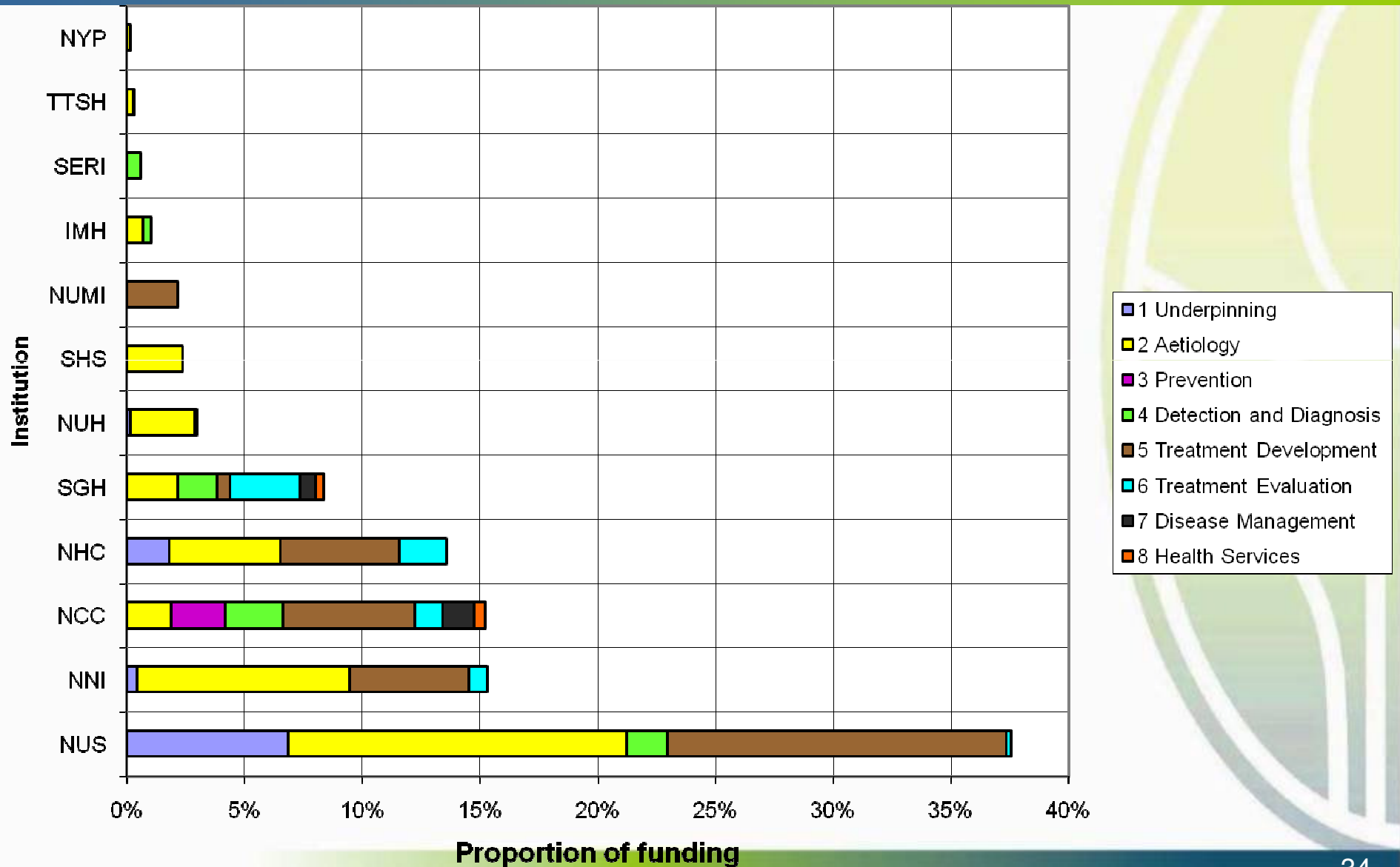
Portfolio Management by Institutions

- Can be **used to profile** an institution based on the competitive grants secured by them
- Assess the **institutional strengths** and identify capabilities in promoting Translational clinical research
- Help to **identify suitable research centres / Potential investigators** for industrial collaborations as well.

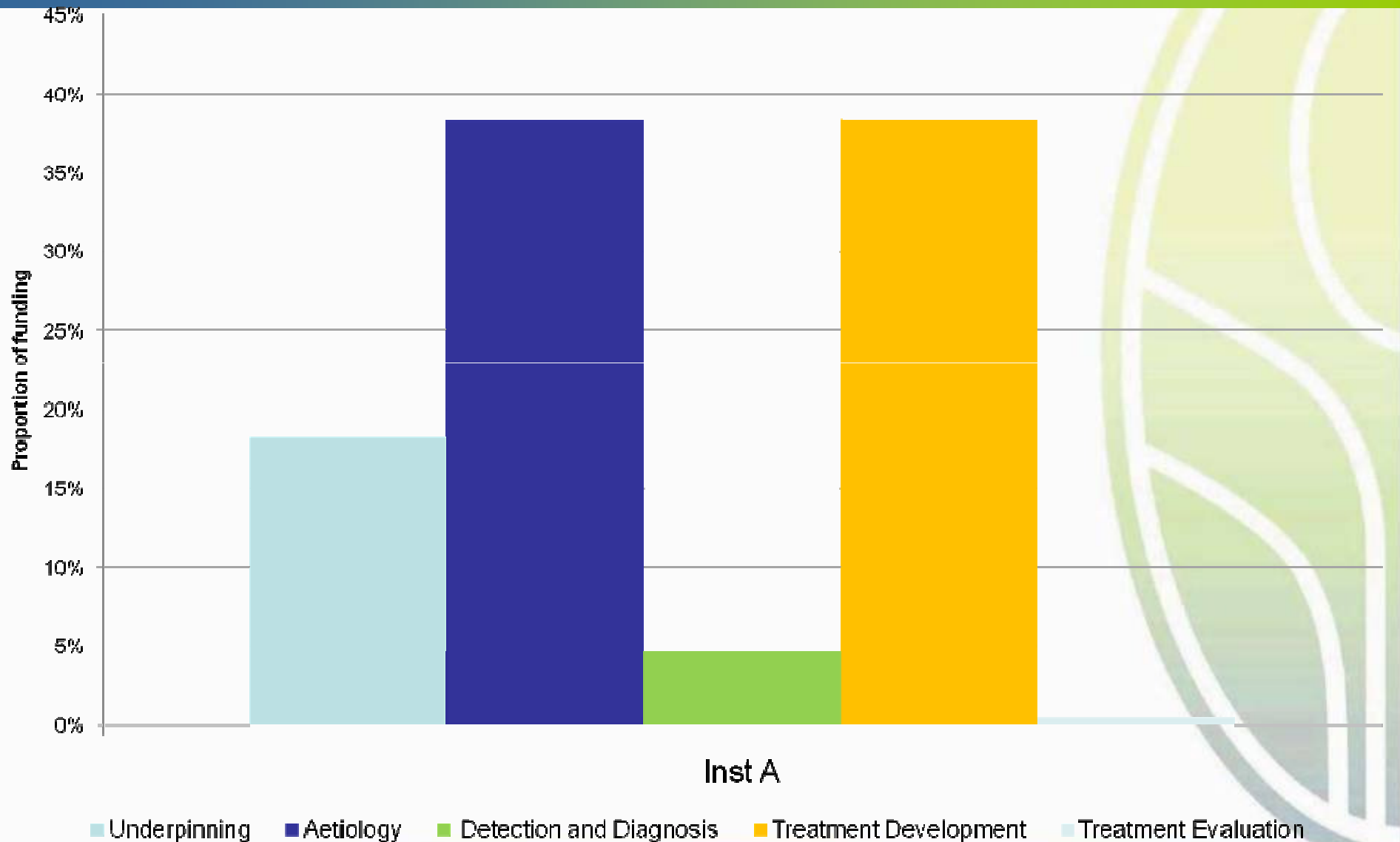
Research Funding to Institutions by Disease Type



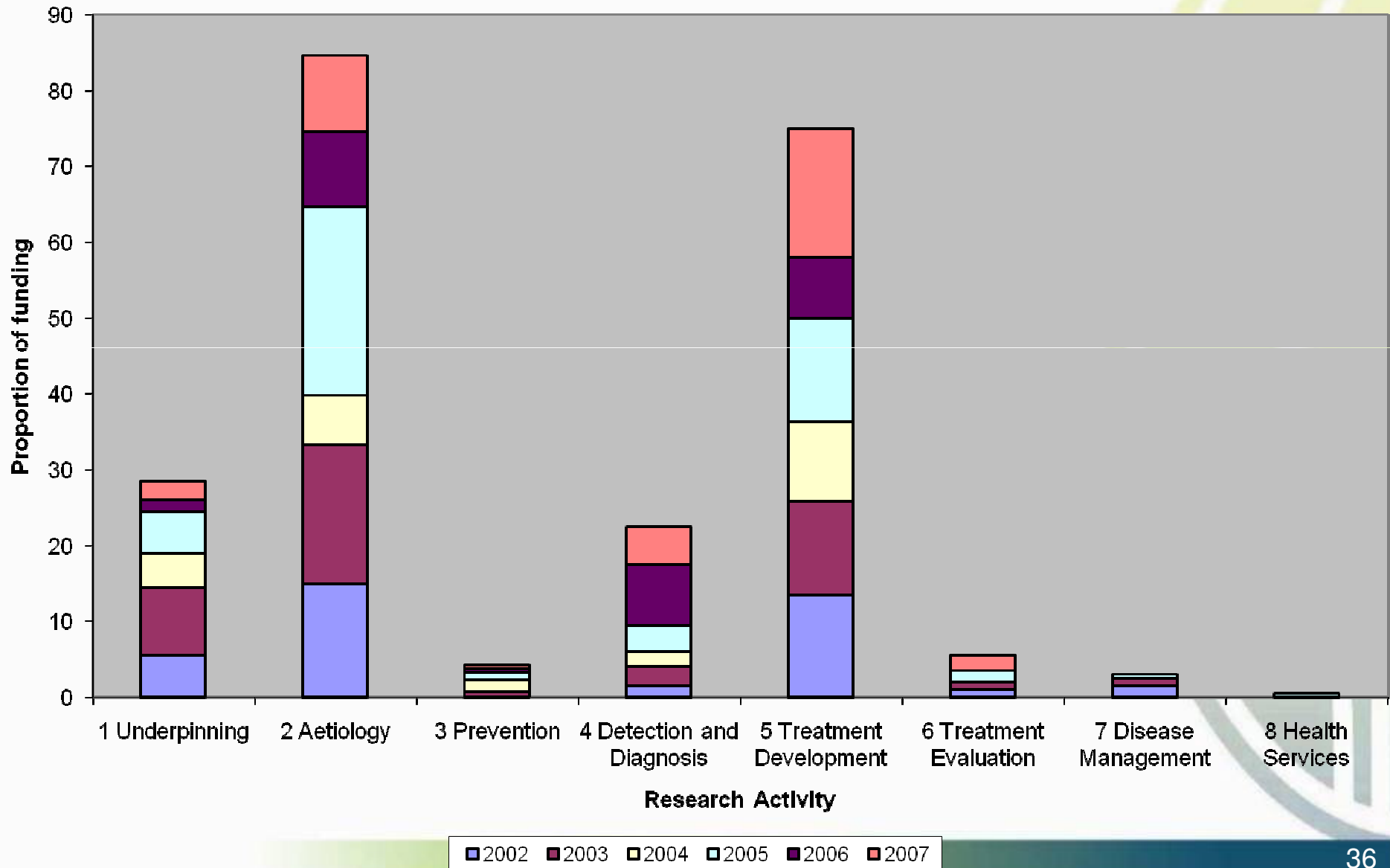
Institutional Research Funding by Type of Research Activity



Research funding Distribution By Research Activity – Institutional level



Research Funding Distribution by Research Activity - Institution A



Other Uses of HRCS Tool

- Possibility of profiling the reviewers by HRCS
 - Assist in **choosing suitable reviewers** for specific grant proposals
- Matching the research proposals coded in HRCS with the HRCS profiling of the reviewers
 - will lead to more specific reviewers which will **improve the review quality**

Peer Reviewer / Researcher Profiling Using HRCS



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NMRC National Medical
Research Council
Singapore

Logged in as **Jing Lin (jinglin)** [logout]

Search / Home

Create a Person

Create an Organisation

Create a Grant Project

Create a Grant Type

Email Repository

Payment Runs

Reports

Task Workbench

Person: Aik Hwang Terence Tan

[Return To List]

Person #7914

Portal user(nmotah@nccs.com.sg)

Contact Info

Details

Categories

Banking

Relationships

Grant Projects

Payments

Notes

Documents

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Roles

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Cancel

Category

HRCS Health Categories

- All
- All
- Blood**
- Cancer
- Cardiovascular
- Congenital Disorders
- Ear
- Eye
- Generic Health Relevance
- Infection
- Inflammatory and Immune System
- Injuries and Accidents

Save

Cancel

Summary

- **Benefits of HRCS**
 - Provide a broad thematic overview of the entire landscape of BMS research funding for strategic analysis
 - Show trends over time by different categories for the strategy development
 - Assist in strategic decisions by identifying gaps and opportunities
 - Compare national level funding for Biomedical sciences across different funding agencies
- **Detailed analysis could help both national and institution level strategic planners**
 - Development of research capabilities through portfolio management



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Thank You