NUS National University of Singapore | Saw Swee Hock School of Public Health

National Centre for Infectious Diseases

Singapore Infectious Diseases Initiative – Collaborative ID Research in Singapore

Hsu Li Yang

18th April 2018

Collaboration (Benefits)

Impressing funders

Higher impact publications

Research depth

More techniques

Versatility

Images from Google Search

Collaboration (Costs)

Why SIDI?

"The building blocks in Singapore all exist, the basic sciences are extremely strong and have wanted a strong partner on the clinical side, industry is here and looking for partnerships, the training opportunities are without parallel in the region, and the quality of young graduates is very high.

However there is a sense that the infectious disease research productivity has been less than it could have been and less than its competitors regionally and globally, with a lack of leadership, direction and vision."

Jeremy Farrar, SIDI Proposal, 2012.

"Virtual Singapore ID Institute"

Singapore Institute of Infectious Diseases (S2ID)

Aims and objectives

The overarching aim is to establish a virtual ***"Singapore Institute of Infectious Diseases"*** focused on improving the health and security of Singaporeans and the people of the region.

The **Singapore Institute of Infectious Diseases"** will:

1. Be a nonaligned forum and catalyst to stimulate the broad infectious disease community in Singapore.
2. Promote interdisciplinary and inter-institutional alliances and harness expertise to stimulate innovative solutions to local and regional infectious disease challenges.
3. Strengthen human resources for clinical infectious disease research in Singapore, in particular providing the mentorship and support to allow the next generation of Singaporean Infectious Disease Researchers to develop into world leading clinical scientists.
4. Enhance the clinical research community to ensure the groups working in the basic sciences in Singapore have strong and committed clinical research partners.
5. Deliver a programme of world-leading infectious disease research that has direct relevance and impact on clinical care and health policy with links to industry and all institutions within Singapore.
6. Develop country wide operational readiness to conduct coordinated and essential public health, clinical and basic science research to characterize and respond to new epidemic or pandemic infectious disease threats and to inform and guide evidence-based optimal public health and clinical management.
7. Develop regional linkages to provide a broader context and greater international relevance and profile for infectious disease research in Singapore.
8. Engage with the public about the importance of health related research in infectious diseases through the media, schools, medical students, science cafes and the internet.

MINISTRY OF HEALTH
SINGAPORE

NUHS
National University Health System
NUH NUS

Prof Jeremy Farrar

Prof Peter Horby

Timeline

25th July 2012
Funding Award from MOH (FY2012-FY2014)

1st April 2015
SIDI Extension

1st April 2016
SIDI Extension

1st April 2016
SIDI Bridging Fund

2018
National Centre for Infectious Diseases

2012-2017

- Funded 26 research projects.
- Established Singapore Clinical Research Network.
- Organized/supported 6 regional workshops and conferences.
- Salary support for 1 clinician-investigator (2013-2015)
- Regional bursaries for 11 local and regional delegates for courses.
- 19 Fellowships/visitor-ships (incoming and outgoing)
- Hosted 3 research team visits to Singapore.
- Organized 5 research study trips overseas.

September 2013
Jeremy Farrar left to head Wellcome Trust.

End 2014
Peter Horby returned to Oxford University.

March-June 2018
Winding down of SIDI projects and accounts at YLLSOM

Research Projects Funded

Research Area	Number of Projects	Amount Invested	Primary Institution
Neurological Infections	1	$2,723K	SGH
Antimicrobial Resistance	4	$340K	SGH; CDC; NUH
Tuberculosis	3	$256K	NUH
Klebsiella Liver Abscess	2	$233K	NUH
Gonorrhoea	1	$200K	NSC
Candida/Fungal Infection	1	$200K	CDC
Group B Streptococcus	2	$199K	SGH; TTSH
Emerging Infections (SARI)	1	$148K	CDC
HFMD (EV71)	2	$65K	KKH; Duke-NUS
Hepatitis B	1	$58K	NUH
Pneumococcus	1	$50K	NUH
PK/PD	1	$50K	CDC
HIV	1	$20K	CDC
“Bridging Grants”	6	Various	LKC; SGH; NUH; NUS; Duke-NUS

Research Projects

- Ranged from $20K (HIV) to $2.72M (SNIP).

- Community of SIDI researchers.
  - Cross-propose solutions to roadblocks and share resources.
  - Early termination of failing/under-performing studies:
    - Combination antibiotics for Gram-negative infections trial.
    - MRSA bacteremia trial.

- “Emerging infection/outbreak” grants:
  - H7N9 (SARI): Dr Ng Oon Tek (TTSH).
  - Group B Streptococcus: Dr Shirin Kalimuddin (SGH).

Singapore Clinical Research Network

- Based at CDC/TTSH.
- Complementary to Singapore Clinical Research Institute (SCRI).
- Supported/supporting:
  - 7 clinical trials (2 sponsored in part by SIDI).
  - 5 clinical studies (2 sponsored in part by SIDI).
- Healthcare-associated infection point-prevalence survey (HAI-PPS) team supported by SIDI Bridging Grant (FY2017).
- Overall 12 FTE (research fellows + research associates/assistants).

Regional Workshops/Conferences

Year	Event
2013	ASEAN HFMD Scientific Workshop
	Influenza Seminar: “What and When is the Next Pandemic?”
	ISARIC Singapore Roundtable meeting
	Tackling Infectious Diseases and Zoonoses: The Implications for Myanmar.
2014	ASID & SCRN Symposium
2015	Courage Fund Infectious Diseases Conference

Year	Research Fellowships (outgoing), Visitor-ships (incoming), Bursaries
2014	Vaccinology for Clinical and Public Health Practice Course (Singapore) • 5 regional training bursaries.
	Genomic Epidemiology in Infectious Diseases Workshop (Singapore) • 3 local and 3 regional training bursaries.
2016 (6)	Laboratory of Medical Microbiology, Vaccine and Infectious Disease Institute, University of Antwerp & St George's University, London. • Ms Cai Yiying (SGH)
2017 (13)	University of Melbourne (Genomics) • Ms Nurdyana Abdul Rahman (SGH) & Ms Lean Soo Sum (SSHSPH)
	WHO Collaborating Centre for Reference and Research in Influenza (Melbourne) • Dr Barnaby Young (CDC)
	US CDC (Hanoi Country Office) • Dr Vincent Pang (SSHSPH)
	Institute of Vector-Borne Disease Research (Monash) • Dr Ian Mendenhall (Duke-NUS)
	Monash Bioethics Centre • Dr Voo Tech Chuan (NUS)
	London School of Hygiene & Tropical Medicine (London) • Ms Kiesha Prem (SSHSPH)

Team Visits

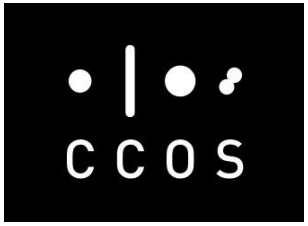

wellcome trust
MORU
Tropical Health Network
UNIVERSITY OF
OXFORD


UNIVERSITY OF
OXFORD


Nuffield Department of Medicine
Medical Sciences Division


NHS
University Hospitals Birmingham
NHS Foundation Trust


STATENS
SERUM
INSTITUT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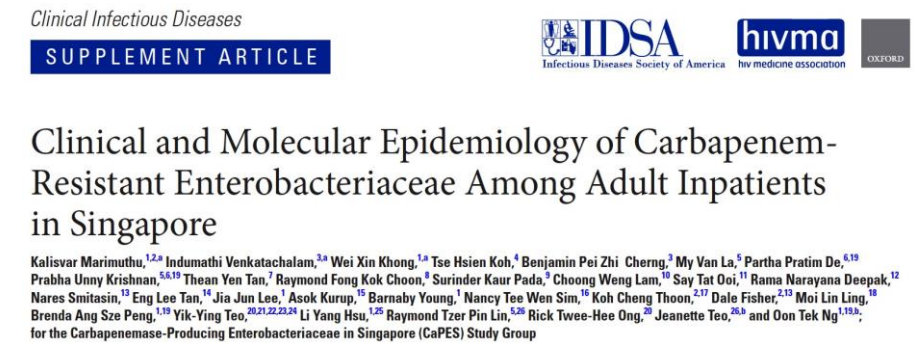
EMBL-EBI


UNIVERSITY OF
OXFORD
Nuffield Department of Medicine
Oxford University
Clinical Research Unit
oucru
wellcome trust


DeepMind

Results - Publications

- Individual projects – publications (at least 14 to date) and presentations.



Clinical Infectious Diseases

SUPPLEMENT ARTICLE

IDSA Infectious Diseases Society of America · hivma hiv medicine association · OXFORD

Clinical and Molecular Epidemiology of Carbapenem-Resistant Enterobacteriaceae Among Adult Inpatients in Singapore

Kalisvar Marimuthu,[1,2,a] Indumathi Venkatachalam,[3,a] Wei Xin Khong,[1,a] Tse Hsien Koh,[4] Benjamin Pei Zhi Cherng,[3] My Van La,[5] Partha Pratim De,[6,19] Prabha Unny Krishnan,[5,6,19] Thean Yen Tan,[7] Raymond Fong Kok Choon,[8] Surinder Kaur Pada,[9] Choong Weng Lam,[10] Say Tat Ooi,[11] Rama Narayana Deepak,[12] Nares Smitasin,[13] Eng Lee Tan,[14] Jia Jun Lee,[1] Asok Kurup,[15] Barnaby Young,[1] Nancy Tee Wen Sim,[16] Koh Cheng Thoon,[2,17] Dale Fisher,[2,13] Moi Lin Ling,[18] Brenda Ang Sze Peng,[1,19] Yik-Ying Teo,[20,21,22,23,24] Li Yang Hsu,[1,25] Raymond Tzer Pin Lin,[5,26] Rick Twee-Hee Ong,[20] Jeanette Teo,[26,b] and Oon Tek Ng[1,19,b]; for the Carbapenemase-Producing Enterobacteriaceae in Singapore (CaPES) Study Group

Clinical Infectious Diseases

SUPPLEMENT ARTICLE

IDSA Infectious Diseases Society of America · hivma hiv medicine association · OXFORD

2015 Epidemic of Severe *Streptococcus agalactiae* Sequence Type 283 Infections in Singapore Associated With the Consumption of Raw Freshwater Fish: A Detailed Analysis of Clinical, Epidemiological, and Bacterial Sequencing Data

Shirin Kalimuddin,[1,a] Swaine L. Chen,[2,3,a] Cindy T. K. Lim,[4,a] Tse Hsien Koh,[5] Thean Yen Tan,[6] Michelle Kam,[7] Christopher W. Wong,[3] Kurosh S. Mehershahi,[2] Man Ling Chau,[8] Lee Ching Ng,[8] Wen Ying Tang,[9] Hishamuddin Badaruddin,[10] Jeanette Teo,[11] Anucha Apisarnthanarak,[12] Nuntra Suwantarat,[12,13] Margaret Ip,[14] Matthew T. G. Holden,[15] Li Yang Hsu,[2,4] and Timothy Barkham[3]; for the Singapore Group B Streptococcus Consortium

AMERICAN SOCIETY FOR MICROBIOLOGY · Clinical Microbiology Reviews®

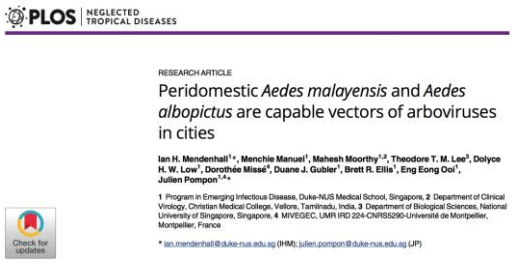
REVIEW

frontiers in Cellular and Infection Microbiology

ORIGINAL RESEARCH

Comparison of Diabetic and Non-diabetic Human Leukocytic Responses to Different Capsule Types of *Klebsiella pneumoniae* Responsible for Causing Pyogenic Liver Abscess

*I. Russel Lee[1], Ethel Sng[1], Kok-Onn Lee[2], James S. Molton[2,3], Monica Chan[4,5], Shirin Kalimuddin[6], Ezlyn Izharuddin[4], David C. Lye[2,4,5], Sophia Archuleta[2,3] and Yunn-Hwen Gan[1]**



PLOS | NEGLECTED TROPICAL DISEASES

RESEARCH ARTICLE

Peridomestic *Aedes malayensis* and *Aedes albopictus* are capable vectors of arboviruses in cities

Ian H. Mendenhall[1]*, Menchie Manuel[1], Mahesh Moorthy[1,2], Theodore T. M. Lee[3], Dolyce H. W. Low[1], Dorothée Missé[4], Duane J. Gubler[1], Brett R. Ellis[1], Eng Eong Ooi[1], Julien Pompon[1,4]*

1 Program in Emerging Infectious Disease, Duke-NUS Medical School, Singapore, 2 Department of Clinical Virology, Christian Medical College, Vellore, Tamilnadu, India, 3 Department of Biological Sciences, National University of Singapore, Singapore, 4 MIVEGEC, UMR IRD 224-CNRS5290-Université de Montpellier, Montpellier, France

* ian.mendenhall@duke-nus.edu.sg (IHM); julien.pompon@duke-nus.edu.sg (JP)

Carbapenem-Resistant *Acinetobacter baumannii* and *Enterobacteriaceae* in South and Southeast Asia

Li-Yang Hsu,[a,b,c] Anucha Apisarnthanarak,[d] Erum Khan,[e] Nuntra Suwantarat,[f] Abdul Ghafur,[g] Paul Anantharajah Tambyah[b]

Saw Swee Hock School of Public Health, National University of Singapore, Singapore[a]; Yong Loo Lin School of Medicine, National University of Singapore, Singapore[b]; Tan Tock Seng Hospital, Singapore[c]; Thammasat University Hospital, Pathum Thani, Thailand[d]; Aga Khan University, Karachi, Pakistan[e]; Chulabhorn International College of Medicine, Thammasat University, Pathum Thani, Thailand[f]; Apollo Hospital, Chennai, India[g]

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Investigation of a cluster of multi-drug resistant tuberculosis in a high-rise apartment block in Singapore

Zheng Jie Marc Ho[a,*], Cynthia Bin Eng Chee[b,c], Rick Twee-Hee Ong[d], Li Hwei Sng[e], Woei Ling Justine Peh[e], Alex R. Cook[d], Li Yang Hsu[c,d], Yee Tang Wang[b,c], Han Fang Koh[a], Vernon Jian Ming Lee[a,d]

[a] Ministry of Health Singapore, College of Medicine Building, 16 College Road, Singapore 169854
[b] Tuberculosis Control Unit Singapore, 142 Moulmein Road, Singapore 308087
[c] Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore 308433
[d] Saw Swee Hock School of Public Health, National University of Singapore and National University Health System; 12 Science Drive 2, Singapore 117549
[e] Singapore General Hospital; Outram Road, Singapore 169608

Results

- Involvement in mapping local ID research funding:
  - MOH ID Research Taskforce.
  - NRF RIE2020 (Infectious Diseases).

Research Area	Year	Follow-on grants
Klebsiella spp.	2014	NUS-SOM Aspiration Fund ($1M)
Clinical Trials	2015	NMRC CTG (CAMERA-2: $2.4M)
	2015	NMRC CTG (Controlled Human Infection Platform Singapore)
Tuberculosis	2016	NUS-SOM Aspiration Fund (Regional TB resistance)
Antimicrobial resistance	2016	BMRC-IAF (XDR-Enterobacteriaceae: $2.99M)
	2017	NMRC Collaborative CG (CoSTAR-HS: $5M)

Tuberculosis NGS

- Switching from MIRU-VNTR/spoligotyping to whole genome sequencing (WGS) for TB universal molecular fingerprinting.
  - Approved by MOH in 2017.
  - Funding pending release in 2018.

MINISTRY OF HEALTH
SINGAPORE

Tan Tock Seng HOSPITAL
National Healthcare Group

Tuberculosis Control Unit (TBCU)

Singapore General Hospital
SingHealth

NUH
National University Hospital

NUS National University of Singapore
Saw Swee Hock School of Public Health

Genome Institute of Singapore
A*STAR

National Supercomputing Centre
SINGAPORE

Persons Funded by SIDI

Limitations

- $11.3M: a lot of money but only goes so far:
  - Dengue: deliberate omission.
  - HIV: minimal interactions/submissions.
  - STIs: main focus on gonorrhoea.

- Others:
  - Paediatric ID: capacity issue.
  - Research jobs: stability issue.
  - Bureaucratic hurdles:
    - Still present with more new ones.
  - Human talent development: limited.

The Humble Research Assistant

- Central to successful clinical research, especially for clinical trials.
- Lowly paid in the public sector.
- No career progression.
- No real job stability.
- Often no intrinsic motivation after a while.
- Likely overworked…

Images from Google Search

Conclusion

- Is ID research in Singapore better off because of SIDI?
  - Opportunity costs of $11.3M…

Conclusion

- Transition to NCID's ID Research & Training Office.
  - Avoid perception of loss of neutrality of SIDI.
  - Continue encouraging cross-disciplinary multi-institutional research, with or without NCID's investigators.
  - Reducing barriers to cross-institutional ID (or general) research.
  - New director: candidate = Prof Paul Tambyah

Acknowledgments

SIDI

- Jeremy Farrar (Wellcome Trust)
- Peter Horby (Oxford)
- Clarinda Lim
- Yeo Tsin Wen (NTU)
- Paul Tambyah (NUS)

MOH

- Derrick Heng
- Jeffery Cutter
- Vernon Lee
- Tiong Wei Wei
- Muhammad Akmal

SIDI Ex-Co

- Sophia Archuleta (NUH)
- Chong Chia Yin (KKH)
- Jenny Low (SGH)
- David Lye (TTSH)
- Ooi Eng Eong (Duke-NUS)
- Tan Thean Yen (CGH)

The End