



Vision

Reduce cancer burden through earlier detection

Mission

Provide real time early GI cancer detection

Quantitative Raman Spectral Analysis • Real Time Feedback • Improve Early Cancer Detection Rate

Investment Highlights

- **First company globally with the ability to utilize Raman Spectroscopy with real time feedback for medical applications within the body**
 - 4 granted patents in CN; pursuing coverage in EU KR CA US JP and SG
 - Strong technical barrier to entry due to deep know-how in optical design and probe miniaturization

Ability to scale across different clinical applications and to build product portfolio
- **Early gastric cancer detection is the first indication for use with near term expansion into colorectal cancer and oesophageal cancer**
 - Key markets in China and Asia – China is a key market with projected SOM of 150M upper GI endoscopic procedures driven by early gastric cancer screening program
 - Currently driving go-to-market strategy; product has sufficient profit margin to incentivize all stakeholders along value chain
- **Seeking US\$5M series A investment for clinical trials, regulatory clearance, and pre-market access (2020 – 2021)**

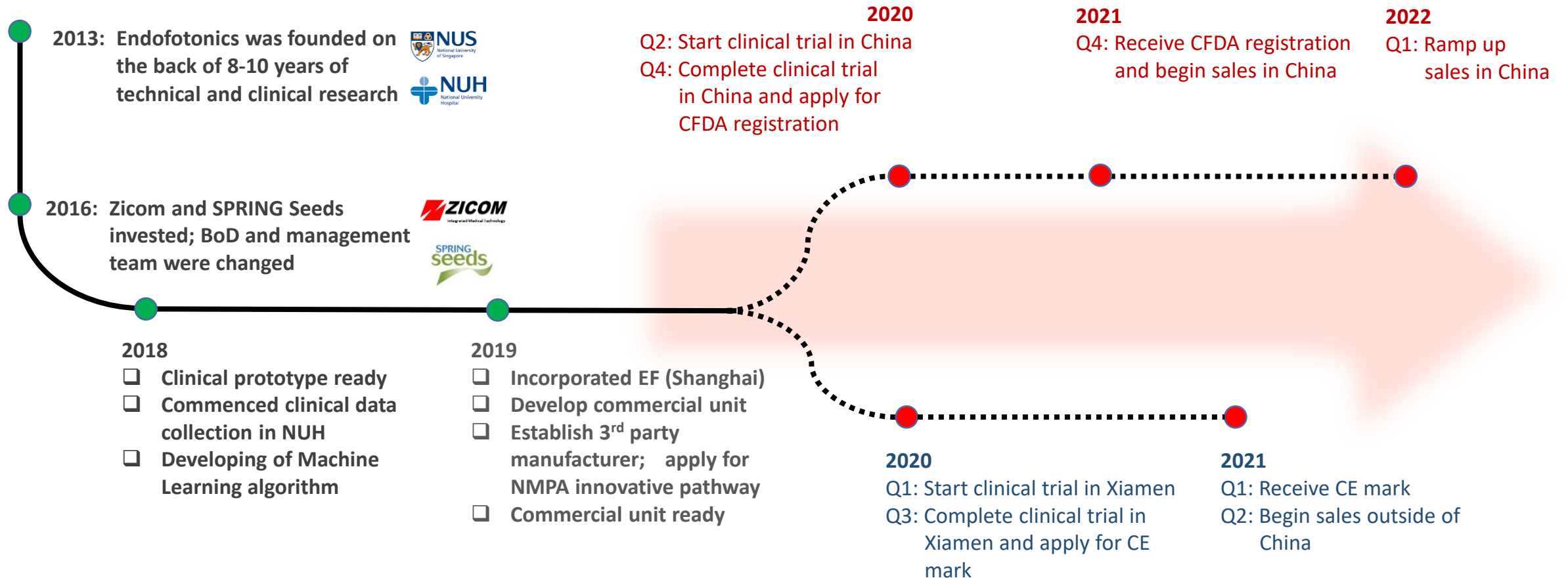
Introduction

- **Core Team**
- **Technology Platform – Working principle of Raman Spectroscopy in biomedical applications**
- **Product – Clinical need in the early gastric cancer space and our solution**
- **Market analysis – Macro trends, market numbers, and sales strategy**

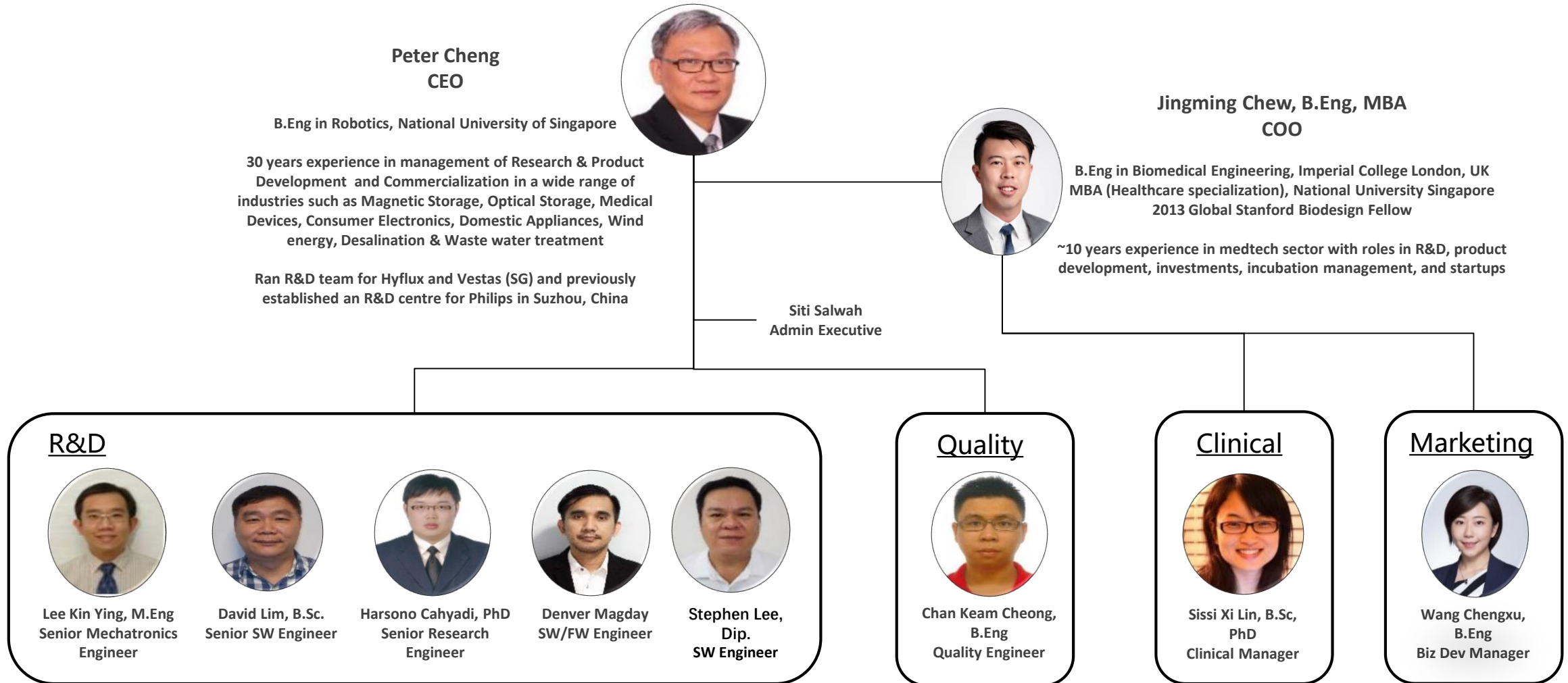
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Endofotonics History



The Team



Board of Directors

BoD



Prof Lawrence Ho
CMO / Founder



Sim Giok Lak
Chairman, Zicom
Group Ltd



Prof Lui Pao Chuen
Advisor to National
Research Foundation,
Singapore



Sim Kok Hwee
Director, Zicom
Group Ltd



Jen Kwong Hwa
Venture Partner,
Get2Volume Accelerator

Prof Lawrence Ho
CMO / Founder

Sim Giok Lak
Chairman, Zicom Group Ltd

Prof Lui Pao Chuen
Advisor to National Research Foundation, Singapore

Prof Ho is an accomplished endoscopist who has been invited to perform live case demonstrations in multiple international endoscopy workshops. He chairs the Asian Endoscopic Ultrasound Group, which is a platform for leading EUS experts in the Asian region. He was the President of Gastroenterological Society of Singapore in 2005-6.

He has published more than 180 peer-reviewed papers, more than 10 book chapters, co-edited 2 books, and held 15 patents in translational products. Prof Ho received the President's Technology Award, the highest honour bestowed on exceptional research scientists and engineers in Singapore

Mr Sim founded Zicom Group in 1978 and is its Group Chairman and Managing Director.

He is an experienced entrepreneur and knowledgeable business executive with expertise in public accounting, corporate development, financial and industrial management and international trade. He was the recipient of the EY Entrepreneur of the Year 2008.

Zicom Group was the lead investor for pre-Series A round that closed Q4 2016.

Prof Lui is currently Advisor to the National Research Foundation, Prime Minister's Office and to six other Ministries. He is also a member of the board of trustees of SUTD. He retired in 2008 and last served as Chief Defence Strategist in MINDEF.

Prof Lui is also a board member at Tropical Marine Science Institute and the Centre for Remote Imaging, Sensing and Processing (CRISP) in NUS; NUS High School Board of Governors; and the Centre of Quantum Technologies. He was also Chairman of Singapore Technologies Dynamics and Sembcorp Design and Construction and board member of ST Kinetics and ST Electronics.

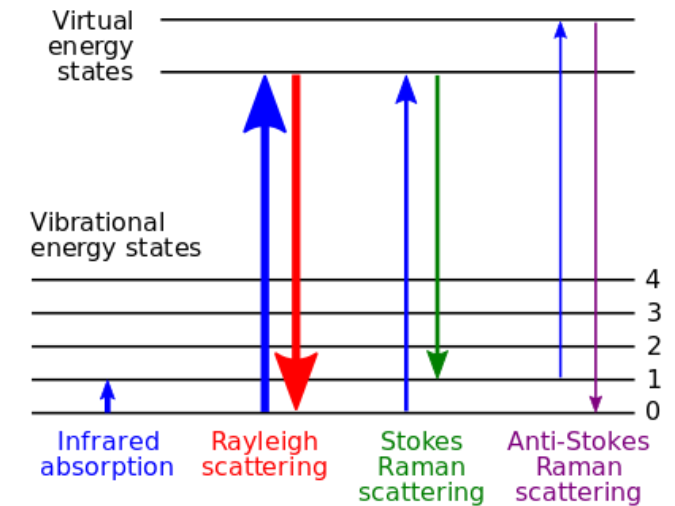
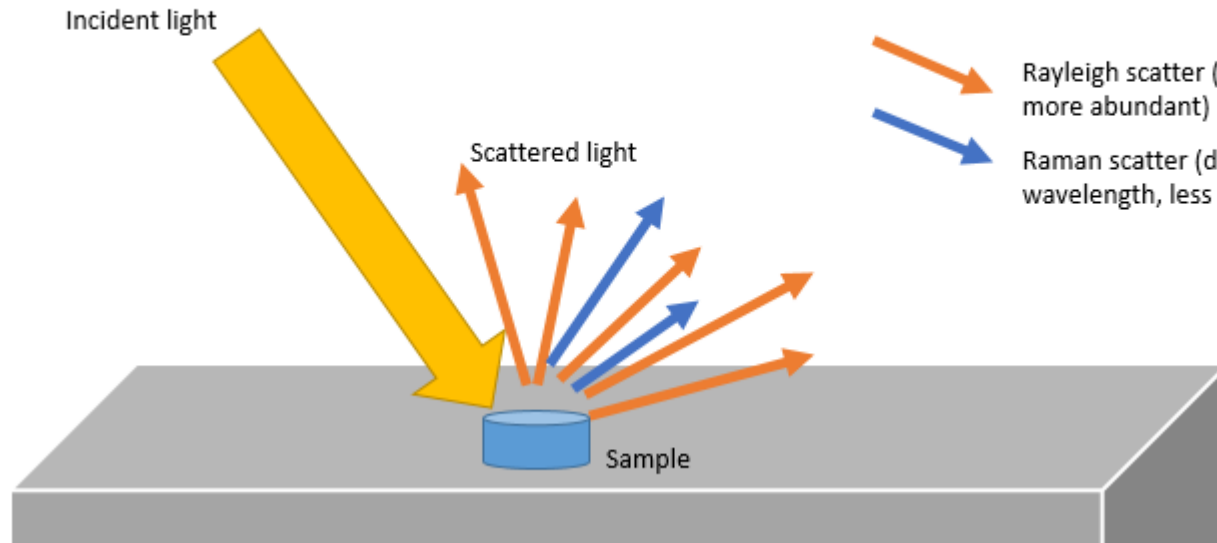
In 2015, Prof Lui received the inaugural Defence Technology Medal (Outstanding Service) from the Minister for Defence. He had previously received the Public Administration Gold Medal in 1992 and the Long Service Award in 1997 and the National Science & Technology Medal in 2002

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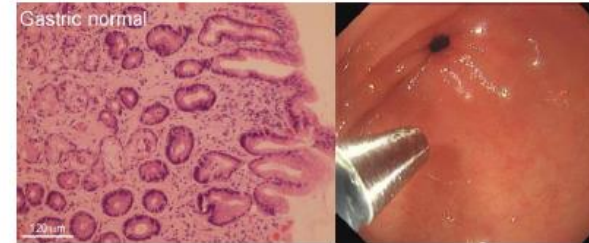
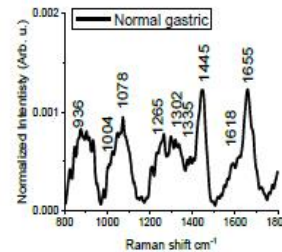
Raman Spectroscopy is a well-established technology

- Nobel-winning technology (1930)
- When light shines on a sample, the light is absorbed and then scattered both elastically and inelastically
- Inelastic scattering, also known as Raman scattering, only accounts for less than 0.0000001% (1 in 10^{10}) of all light scattered. Yet, the obtained Raman spectrum may be used for qualitative analysis

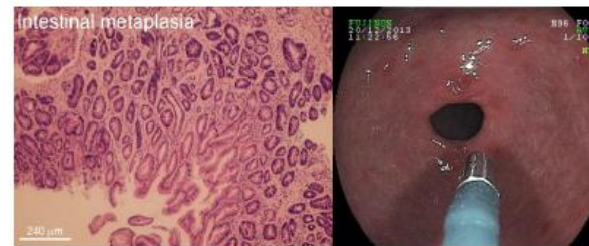
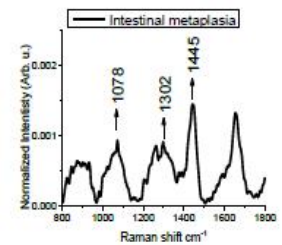


Raman spectral analysis in medical application

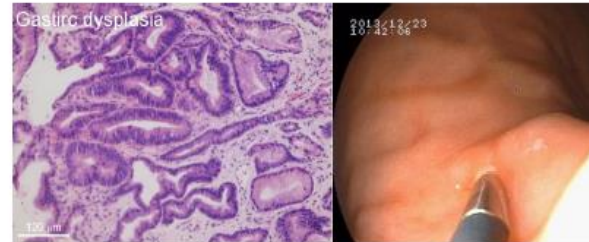
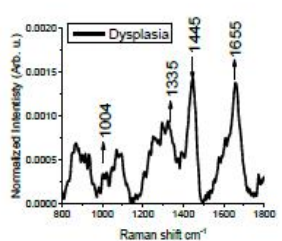
- Typically used in chemistry to identify molecules and study chemical bonding and intramolecular bonds
- Due to difference in metabolic activity and hence metabolic constituents in normal and cancerous cells, they present different Raman spectrum
- Raman spectrum for tissue provides a fingerprint for unique identification that can be instantaneously classified using machine learning/ AI
- Endofotonics is the world first company that is able to perform real time in-vivo molecular analysis using Raman spectroscopy



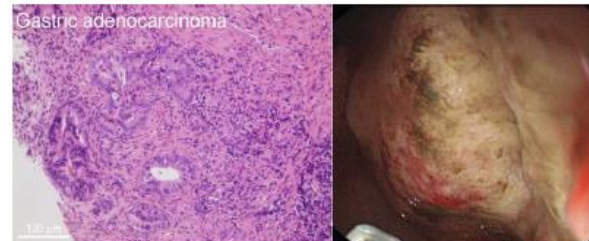
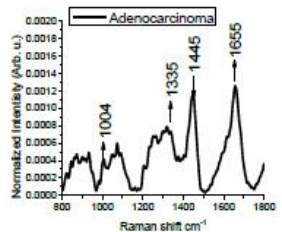
In vivo Raman spectrum of normal gastric tissue. Peaks are observed at 936 cm^{-1} ($\nu(\text{C-C})$ proteins), 1004 cm^{-1} ($\nu_s(\text{C-C})$ ring breathing of phenylalanine), 1078 cm^{-1} ($\nu(\text{C-C})$ of lipids), 1265 cm^{-1} (amide III $\nu(\text{C-N})$ and $\delta(\text{N-H})$ of proteins), 1302 cm^{-1} (CH_2 twisting and wagging of lipids), 1335 cm^{-1} (adenine, guanine), 1445 cm^{-1} ($\delta(\text{CH}_2)$ deformation of proteins and lipids), 1618 cm^{-1} ($\nu(\text{C=C})$ of porphyrins), 1650 cm^{-1} ($\nu(\text{C=C})$ of lipids), and 1655 cm^{-1} (amide I $\nu(\text{C=O})$ of proteins)



In vivo Raman spectrum of gastric Intestinal metaplasia. Intestinal metaplasia shows relative increase lipid content (1078 cm^{-1} ($\nu(\text{C-C})$ of lipids), 1302 cm^{-1} (CH_2 twisting and wagging of lipids), 1445 cm^{-1} ($\delta(\text{CH}_2)$ deformation of lipids),).



In vivo Raman spectrum of gastric dysplasia. Dysplastic tissue shows relative increase protein (1004 cm^{-1} ($\nu_s(\text{C-C})$ ring breathing of phenylalanine) 1655 cm^{-1} (amide I $\nu(\text{C=O})$ of proteins)) and DNA content (1335 cm^{-1} (adenine, guanine)) and decreased lipid content (1445 cm^{-1} ($\delta(\text{CH}_2)$ deformation of lipids),).



In vivo Raman spectrum of gastric adenocarcinoma. The neoplastic tissue shows progressive increase protein (1004 cm^{-1} ($\nu_s(\text{C-C})$ ring breathing of phenylalanine) 1655 cm^{-1} (amide I $\nu(\text{C=O})$ of proteins)) and DNA content (1335 cm^{-1} (adenine, guanine)) and decreased lipid content (1445 cm^{-1} ($\delta(\text{CH}_2)$ deformation of lipids),).

Strong IP position as a basis for market positioning and future development

In-Vivo Molecular diagnostic Platform

Know how

- Low SNR in Raman spectrum (<1% of all scattered energy)
- Good enough resolution for actionable information

ML Database

- Gastric
- Esophagus
- Colon

Patent 1

Probe Construction

Patent 2

Spectroscopy
Scaling

Patent 3

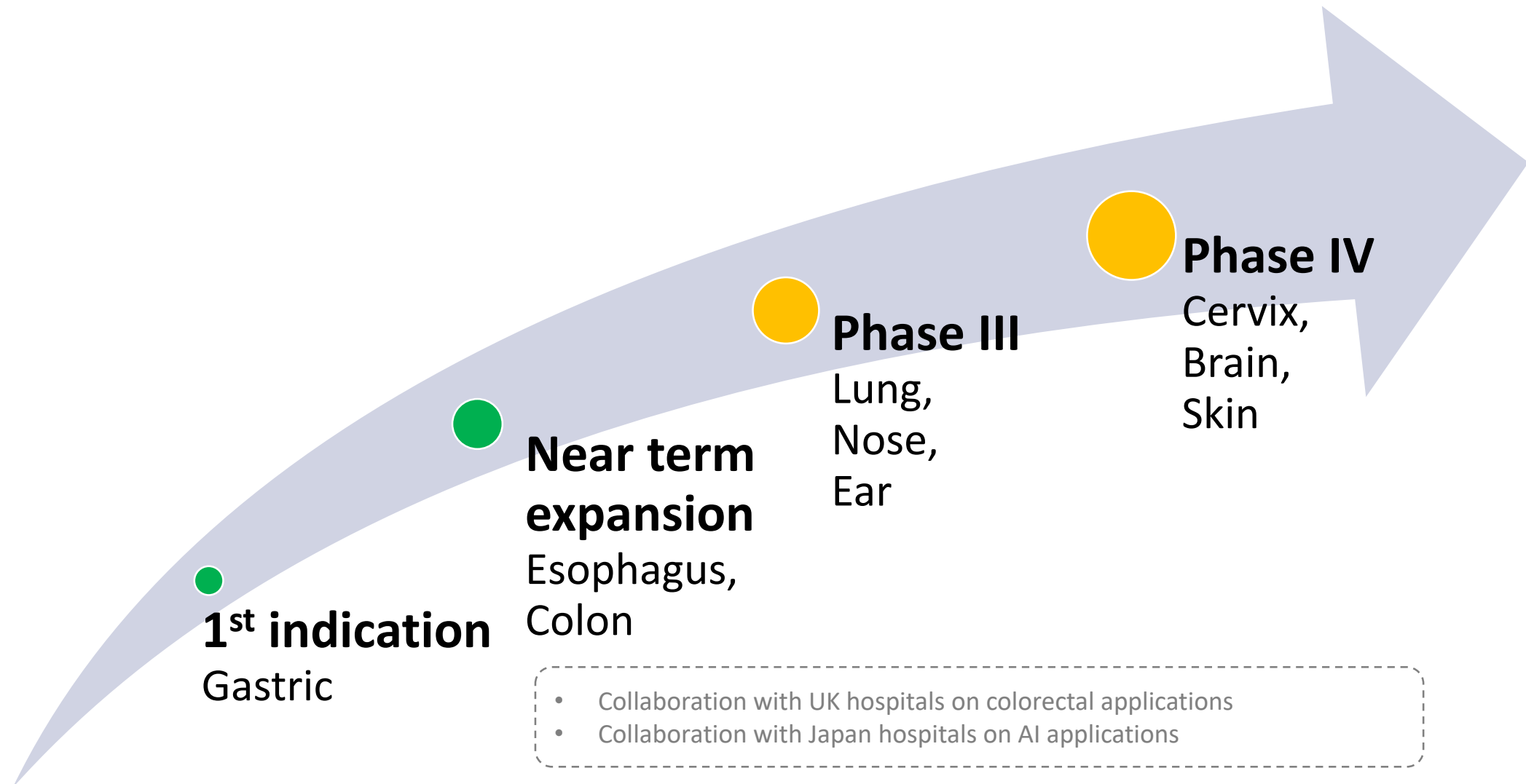
Specialised
Spectrograph

Patent 4

Integration with
Endoscope System

- All patents are already granted in China
- Applications in CN, US, EU, JP, KR, CA, SG
- 4th patent is key for trade sale to endoscopy players

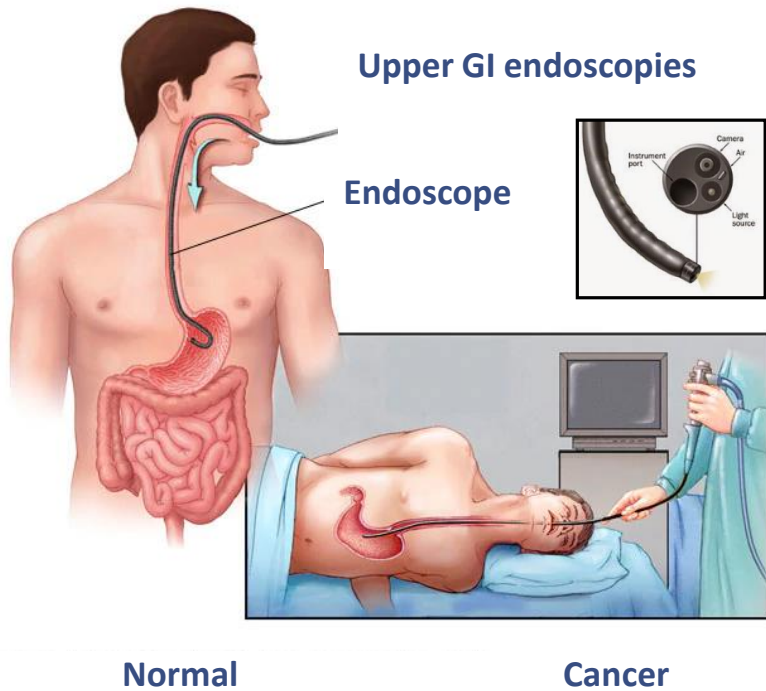
Expansion of indication does not need any changes in hardware



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Early Gastric Cancers are difficult to detect visually



Common tools

m-NBI (Olympus)



- Physicians identify cancer tissue through visual pattern recognition
- Physicians require intensive training
- Physicians need background in pathology

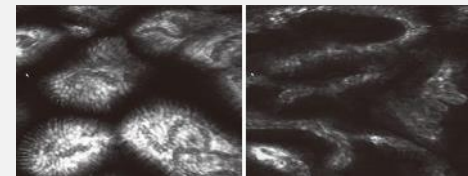
Magnetic capsule endoscopy (Ankon)



- Expensive capital equipment
- Physicians are unable to obtain biopsies (gold standard)
- Physicians have to refer for endoscopies

Other tools

Confocal Laser Endomicroscopy (Cellvizio)



Chromoendoscopy



Blue Laser Imaging (Fujinon)



Confocal Raman endoscopy for in vivo diagnosis

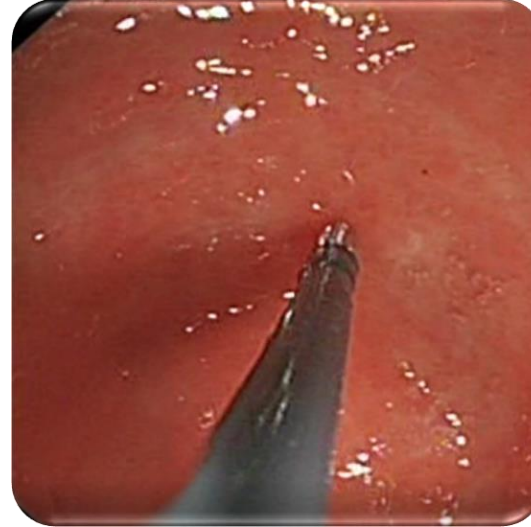
Endoscopy Centre



IMDx System provides real time actionable feedback for clinicians



1 Insert the probe through the instrument channel after endoscope is in the stomach



2 Touch suspected lesions with the distal end of the probe



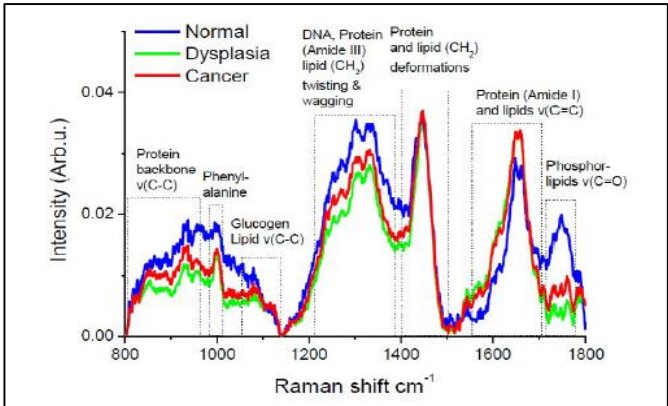
3 System provides real time feedback relating to the probability of the lesion being cancerous

Raman spectral analysis enables earlier diagnosis through molecular analysis

IMDx System



Raman Spectrum (cancer vs non-cancer)



Probe



Distal End

Proximal End



USP

- 1. Real time feedback provide physicians with actionable information
- 2. Provide molecular information for earlier diagnosis
- 3. No need for long hours of training

Cancer vs non-Cancer

Dysplasia + Adenocarcinoma vs intestinal metaplasia + normal

IMDx	Sensitivity = 86.5%	Specificity = 87.3%
WLe	Sensitivity = 48%	Specificity = 67%

*In EGC screening, it is more important to minimize false negatives (sensitivity)

Spectra IMDx G9000 Series built and sent for external testing



Clinical Evidence and Trial Sites within China



**National University Hospital,
Singapore**

Clinical Study – 58 patients

**Sensitivity = 88%; Specificity = 98%
0 adverse events reported**



**Xiamen University Zhongshan Hospital
厦门大学附属中山医院**

Clinical Study – 85 patients

**0 adverse events reported
Results yet to be out**



**Chinese PLA General Hospital (301)
中国人民解放军总医院 (301医院)**

Clinical Study ready to start

**Research collaboration agreement signed
Unit ready to be placed**

- **Positive feedback from more than 10 top hospitals that are keen to collaborate**
- **13 key publications in early gastric cancer detection space; 500+ patient data collected to date**

Competitive analysis against current products in the market

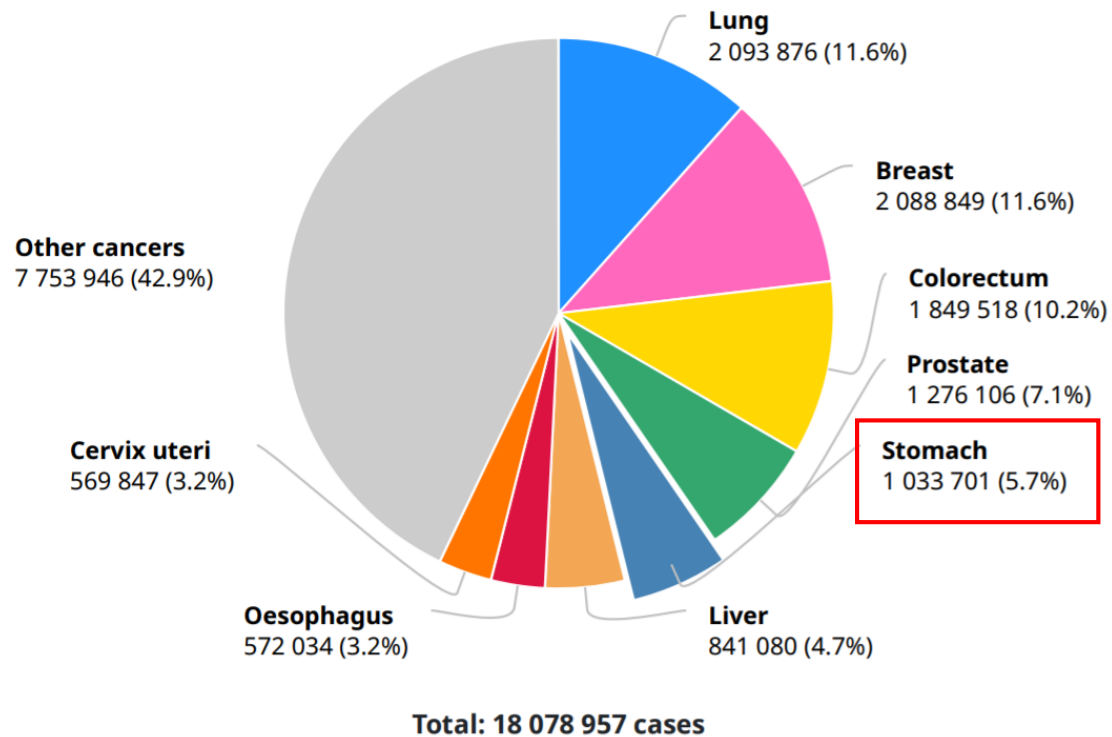
	Macro Optical Imaging		Micro Optical Imaging	
	WLE White Light Endoscopy (Benchmark)	m-NBI Magnified Narrow Band Imaging	CLE Confocal Laser Endomicroscopy	Spectra IMDx
Clinical Information provided	Images	Magnified Images	Cellular Images	Molecular Information
Realtime Feedback	No	No	No	Yes
Quantitative Information	No	No	No	Yes
Objective Results	No	No	No	Yes
Training Required	Yes	Yes	Yes	No
Diagnostic Value - Sensitivity	↓	↑	↑	↑↑↑
Diagnostic Value - Specificity	↓	↑↑	↑↑	↑↑↑
Diagnostic Value - Accuracy	↓	↑	↑	↑

Agenda

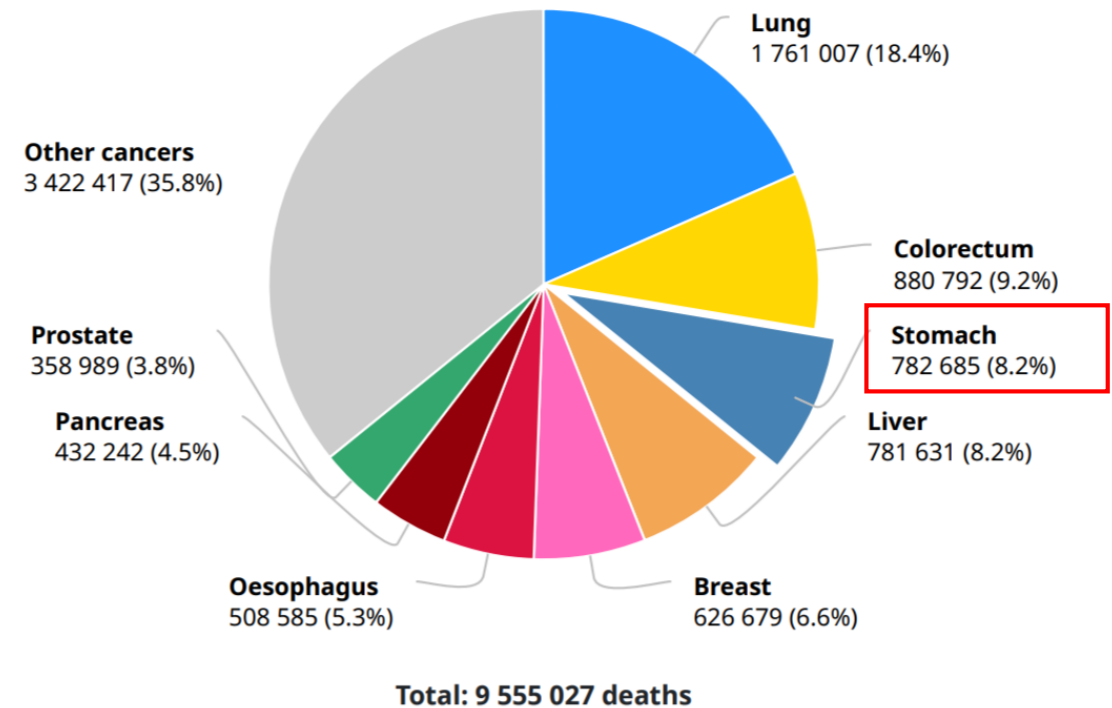
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Gastric Cancer is one of the top 5 cancers in the world

Number of new cases in 2018, both sexes, all ages

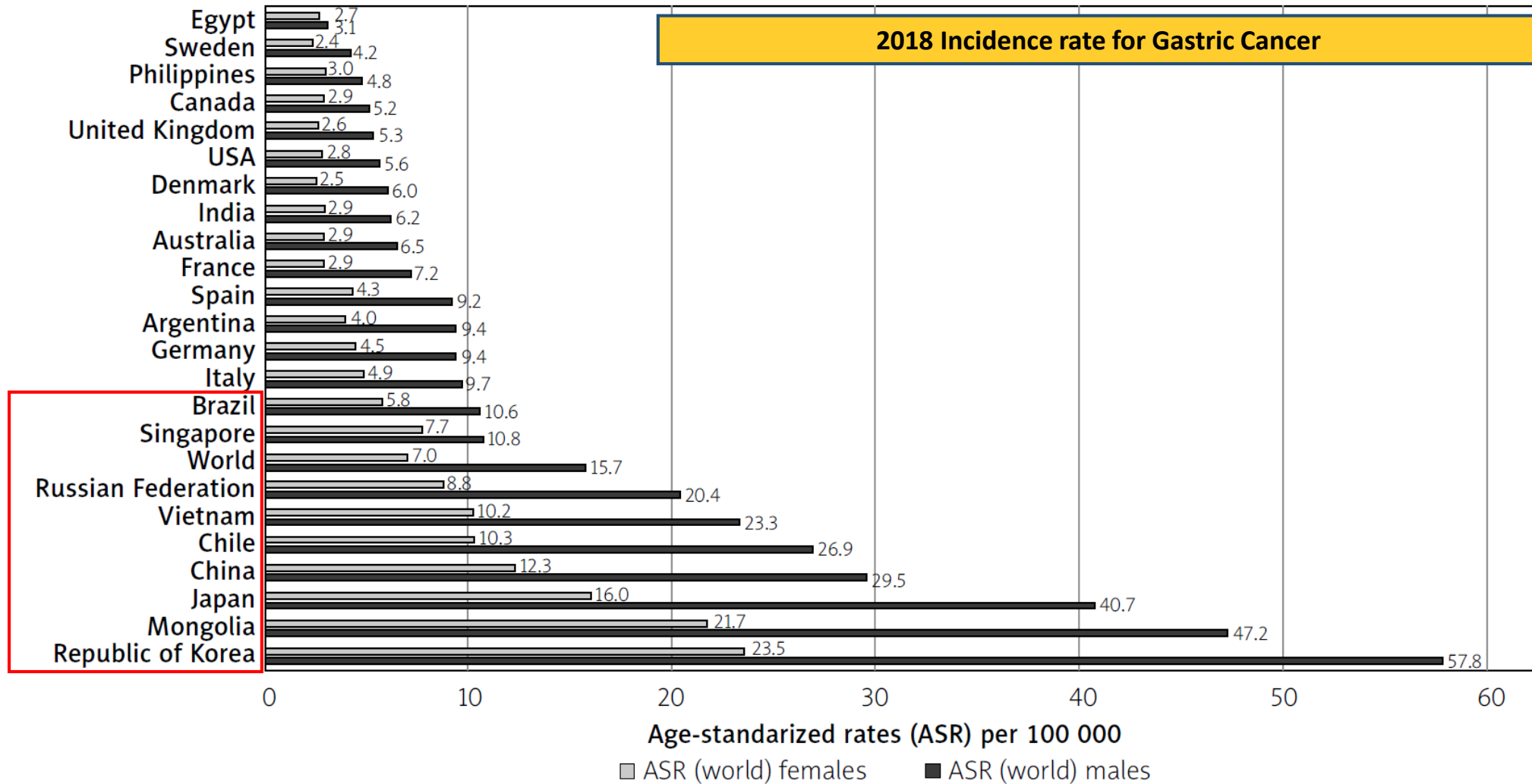


Number of deaths in 2018, both sexes, all ages



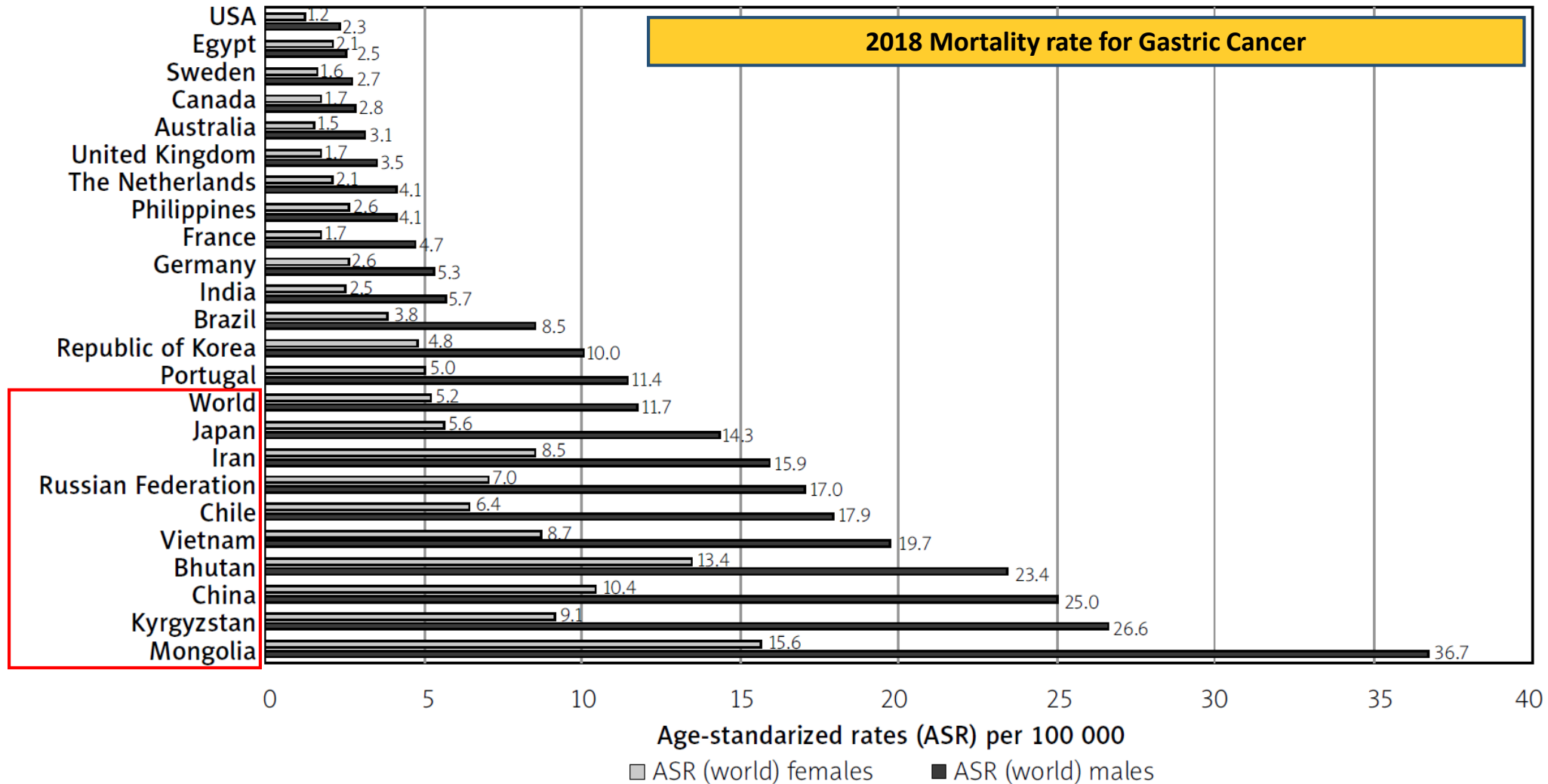
<https://gco.iarc.fr/today/data/factsheets/cancers/7-Stomach-fact-sheet.pdf>

Gastric Cancer is a predominantly Asian disease



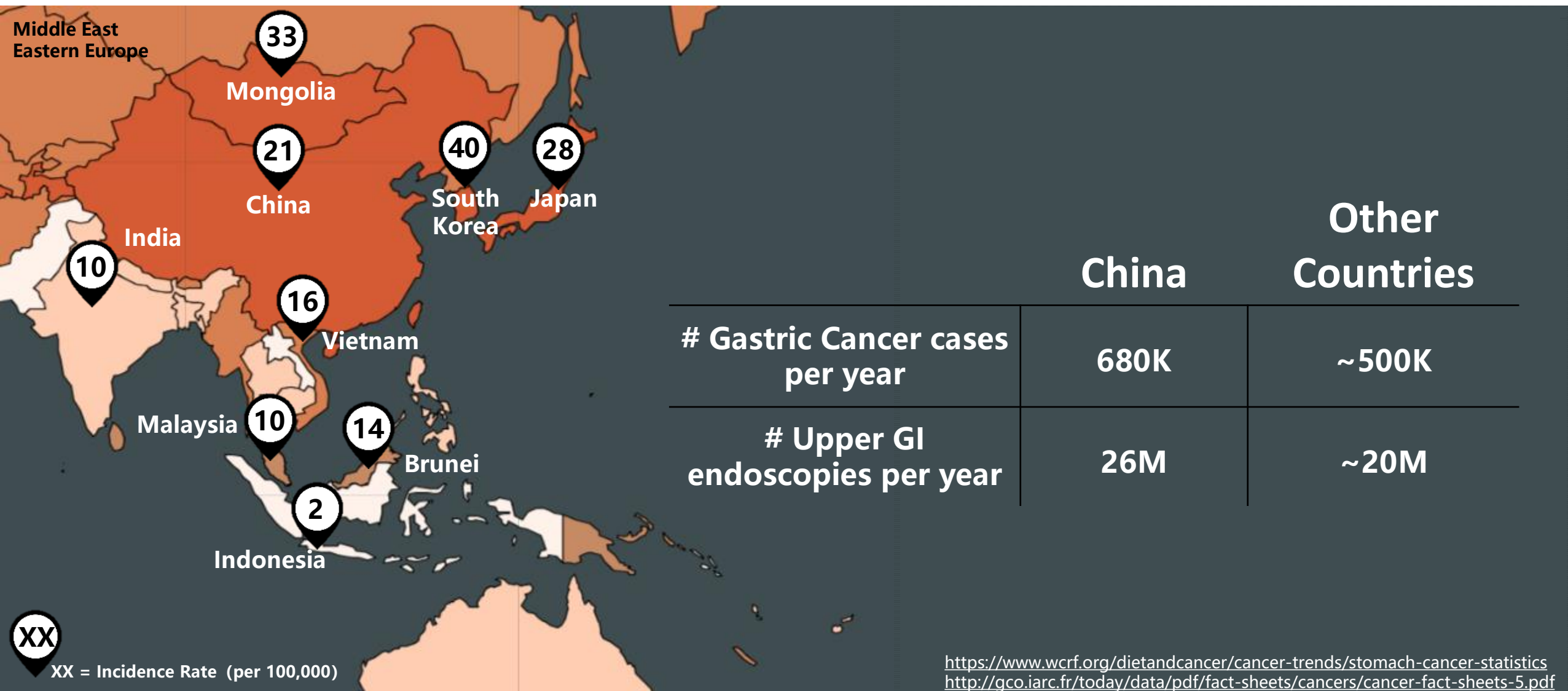
<https://gco.iarc.fr/today/data/factsheets/cancers/7-Stomach-fact-sheet.pdf>

Predominantly high mortality rate except for Japan and Korea



<https://gco.iarc.fr/today/data/factsheets/cancers/7-Stomach-fact-sheet.pdf>

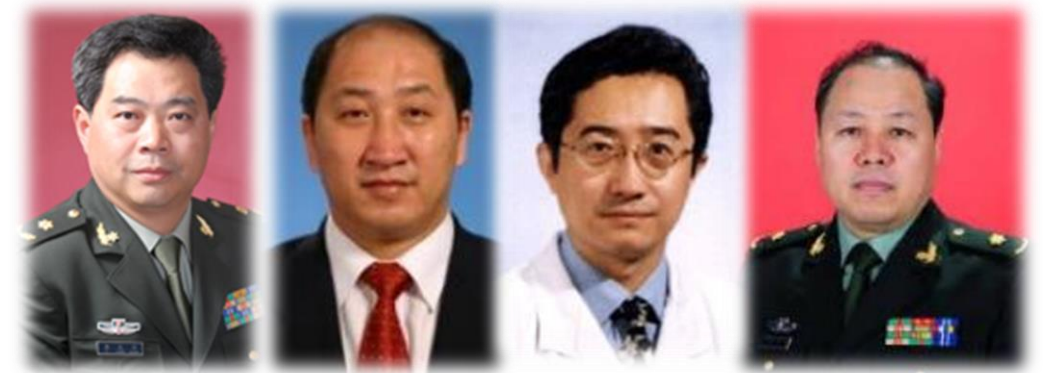
East Asia and South East Asia as key markets



Current available options are inadequate for early gastric cancer detection

“我国发现的胃癌约90%属于进展期，而胃癌的预后与诊治时机密切相关，进展期胃癌即使接受了外科手术，5年生存率仍低于30%，而早期胃癌治疗后5年生存率可超过90%，甚至达到治愈效果。”

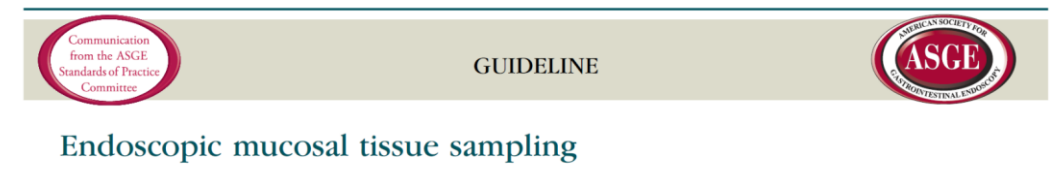
Translation: 90% of all gastric cancer cases are discovered in the intermediate to late stage and 5 year survival rates are less than 30% despite interventions. On the other hand, 5 year survival rates of early gastric cancer is more than 90%



Li Zhao-Sen Wang Guiqi Zhang Shu-Tian Linghu Enqiang


China Experts consensus on the protocol of early gastric cancer screening (2017, Shanghai)
Chin J Health Manage, February 2018, Vol. 12, No. 1

“...the updated Sydney protocol detected 90% of cases of known EMAG, but also failed to identify 50% of patients with dysplasia or gastric cancer”




Endoscopic mucosal tissue sampling, Guideline from American Society for Gastrointestinal Endoscopy (ASGE)
Gastrointestinal Endoscopy, Vol. 78, No. 2: 2013

Japan and Korea has implemented Early Gastric Cancer Screening 20yrs ago



Gastroenterology

Volume 152, Issue 6, May 2017, Pages 1319-1328.e7



Original Research

Full Report: Clinical—Alimentary Tract

Effectiveness of the Korean National Cancer Screening Program in Reducing Gastric Cancer Mortality

Jae Kwan Jun^{1,2}, Kui Son Choi^{1,2}✉, Hoo-Yeon Lee³, Mina Suh¹, Boyoung Park^{1,2}, Seung Hoon Song¹, Kyu Won Jung¹, Chan Wha Lee⁴, Il Ju Choi⁵, Eun-Cheol Park⁶✉, Dukhyoung Lee^{1,2}

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<https://doi.org/10.1053/j.gastro.2017.01.029>

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Background & Aims

It is not clear whether screening for gastric cancer by upper endoscopy or upper gastrointestinal (UGI) series examinations (looking at the upper and middle sections of the gastrointestinal tract by imaging techniques) reduces mortality. Nevertheless, the Korean National Cancer Screening Program for gastric cancer was launched in 1999 to screen individuals 40 years and older for gastric cancer using these techniques. We evaluated the effectiveness of these techniques in gastric cancer detection and compared their effects on mortality in the Korean population.

Benefits and Harms of Gastric Cancer Screening and Prevention in Japan: A Microsimulation Modeling Analysis

C.Y. Leung^{1*}✉, H.L. Huang¹, E. Saito², S. Nomura¹, K. Katanoda², T. Matsuda², ...

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Abstract

Background: In 2016, gastric cancer is the second leading cause of cancer mortality worldwide. Globally, Japan and Korea are the only two countries implementing national screening program for gastric cancer. South Korea launched a biennial national -endoscopic screening program in 1999, which demonstrated a 47% reduction in gastric cancer mortality compared with no screening. In 2015, endoscopic screening was recommended by the Japanese Guideline for Gastric Cancer Screening. Currently, Japan's screening policy recommends endoscopic screening every 2 to 3 years for individuals aged 50 or above. **Aim:** This study aims

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Annual Percent Change, % (95% CI)
No. of people invited	9,586,636	9,769,848	10,307,841	10,519,431	12,409,695	12,180,367	13,336,515	13,083,242	12,703,485	12,985,842	
No. of participants	709,580	1,024,669	1,218,030	1,861,805	2,854,893	3,341,847	4,242,954	4,715,073	5,038,088	5,895,113	
Participation rate, %											
Total	7.40	10.49	11.82	17.70	23.01	27.44	31.81	36.04	39.66	45.40	4.33 (4.02–4.63)
Gender											
Men	6.42	8.94	10.41	15.30	19.99	24.26	28.25	31.80	35.12	41.97	3.96 (3.63–4.29)
Women	8.42	11.97	13.25	20.02	26.07	30.53	35.40	40.17	44.21	48.50	4.68 (4.35–5.00)
Age, y											
40–49	6.41	9.46	10.02	14.47	18.15	22.00	26.55	30.36	34.18	40.24	3.75 (3.37–4.14)
50–59	8.72	12.31	14.34	21.45	26.37	29.82	34.40	38.56	42.05	47.66	4.37 (4.12–4.63)
60–69	9.72	13.18	15.60	23.61	31.97	37.65	42.49	47.65	51.96	56.93	5.57 (5.11–6.03)
70–79	5.86	8.11	9.54	15.62	24.46	30.82	34.53	38.97	42.98	47.76	5.04 (4.49–5.59)
80+	1.54	2.41	2.69	4.86	7.77	11.79	13.09	15.13	16.36	19.15	2.10 (1.83–2.38)
Socioeconomic status											
NHI (high)	5.39	8.26	9.97	14.99	25.12	30.58	34.93	38.25	42.39	46.34	4.93 (4.35–5.51)
NHI (low)	11.39	14.41	16.63	21.02	22.34	26.22	30.70	35.71	39.20	45.63	3.70 (3.28–4.11)
MAP	8.97	9.30	9.42	13.69	14.43	16.79	18.38	23.28	24.06	33.06	2.46 (1.83–3.09)

CI = confidence interval, MAP = Medical Aids Program, NHI = National Health Insurance.

Participation Rates of Gastric Cancer Screening Via the National Cancer Screening Program in Korea From 2002 to 2011

China is now implementing the National Early Gastric Cancer Screening

Workflow for Early Gastric Cancer Screening

· 8 · 中华健康管理学杂志 2018 年 2 月第 12 卷第 1 期 Chin J Health Manage, February 2018, Vol. 12, No. 1

中国早期胃癌筛查流程专家共识意见 (草案)(2017 年,上海)

国家消化系统疾病临床医学研究中心 中华医学会消化内镜学分会 中华医学会健康管理学分会 中国医师协会内镜医师分会消化内镜专业委员会 中国医师协会内镜医师分会消化内镜健康管理及体检专业委员会 国家消化内镜质控中心 中国抗癌协会肿瘤内镜专业委员会

通信作者:李兆申,200433 上海,海军军医大学(第二军医大学)长海医院消化科,Email:zhaoshenli@hotmail.com;王贵齐,100021 北京,中国医学科学院肿瘤医院内科,Email:wanguiq@126.com;张澍田,100050 北京,首都医科大学附属北京友谊医院消化科,Email:zhangst@bdc-bfh.com.cn;令狐恩强,100853 北京,解放军总医院消化科,Email:linghuenqiang@vip.sina.com

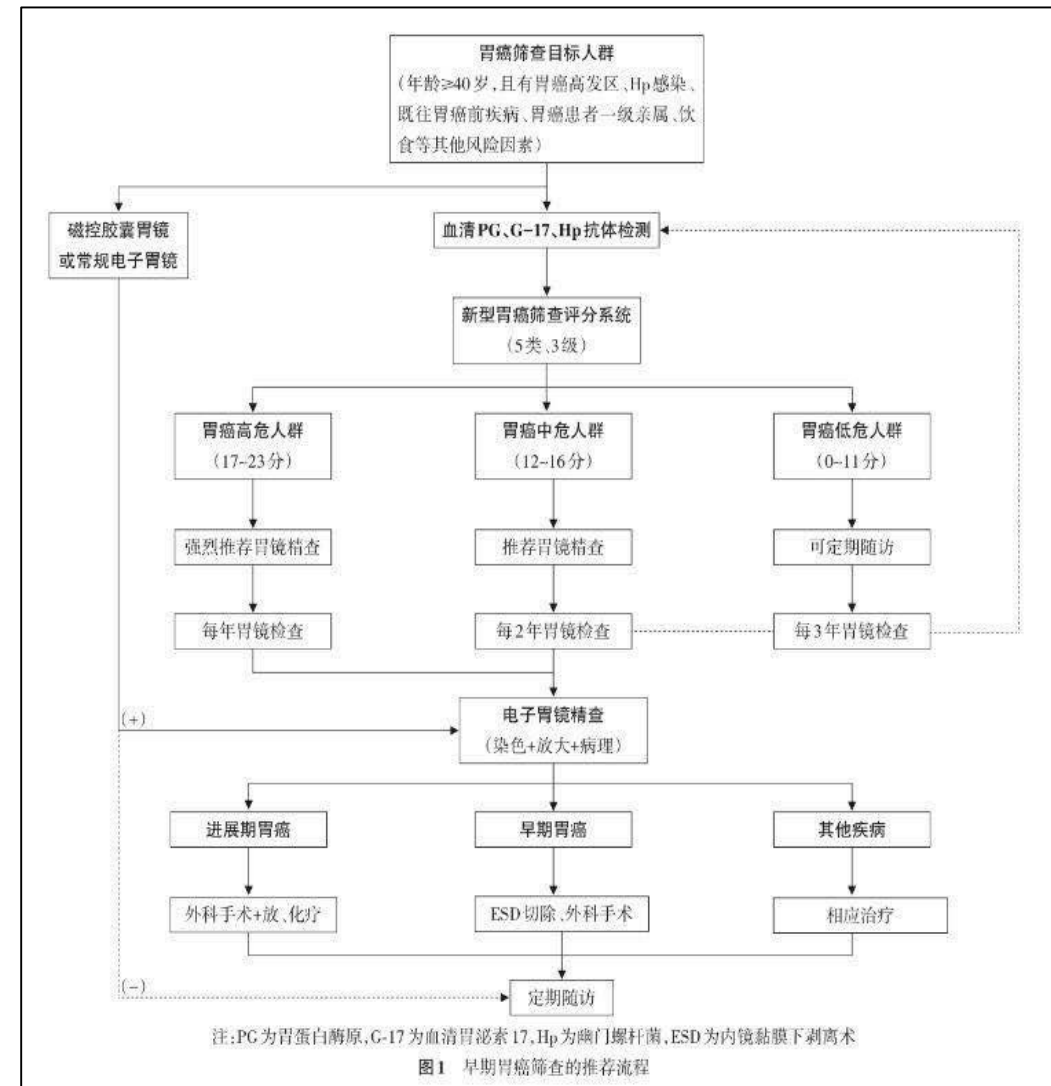
DOI:10.3760/cma.j.issn.1674-0815.2018.01.003

·标准与规范·

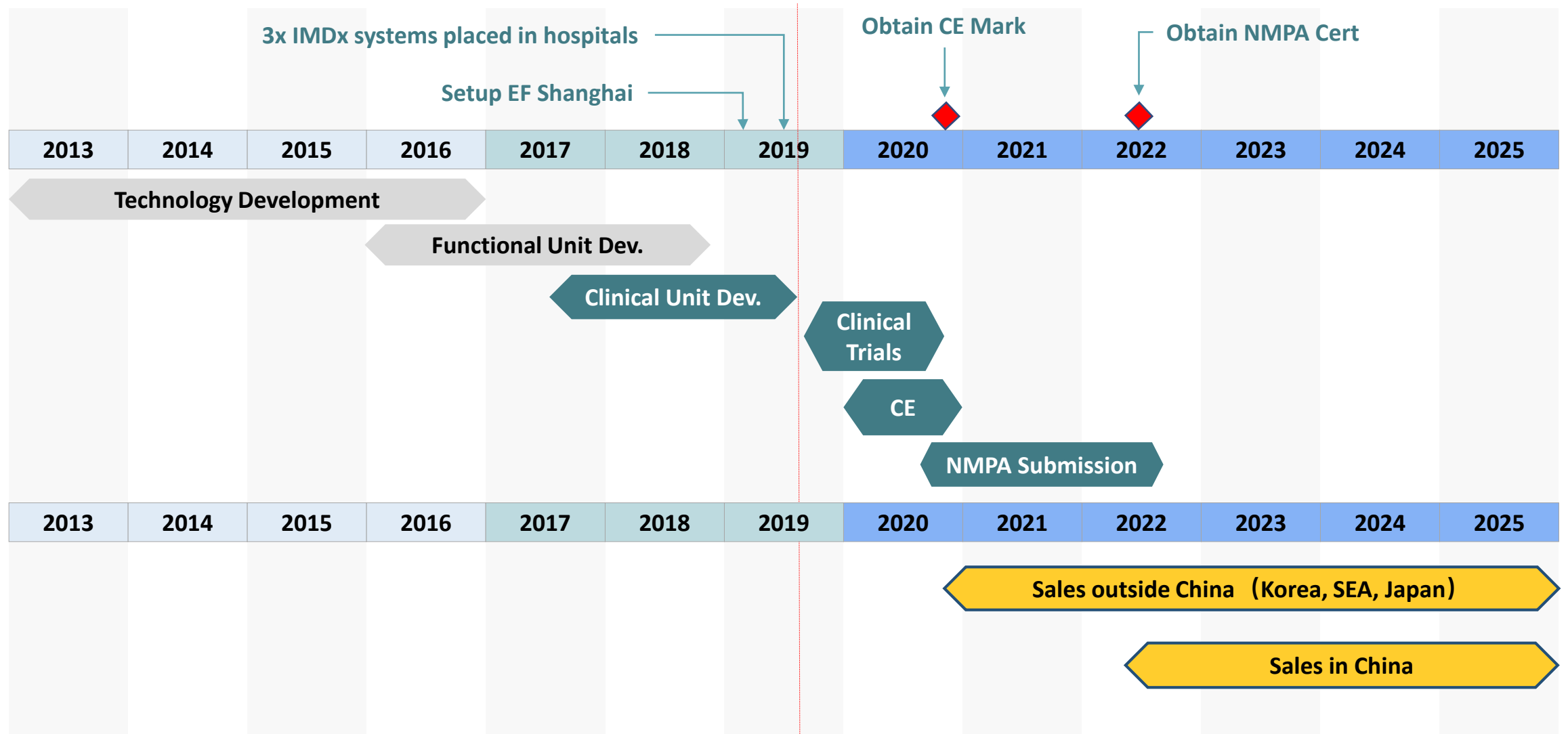


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Already implemented in high incidence zones; more cities are expected to implement



Company's plan moving forward



Go-to-Market Strategy (Outside China)

South East Asia

- Master distributorship from SG; partnership with local distributors in other countries
- Intent to purchase from Malaysia Medical Centre
 - Private Medical Centre with endoscopy suites; relatively large number of endoscopic procedures performed annually
 - Currently serving mid to high tier clientele
- Interest to distribute from distributors in Indonesia and Taiwan

Korea and Japan

- Developing Research Collaboration Agreements to initiate sale of Research-Use Only units
 - Hanyang University Medical Center, Seoul
 - Osaka University (Handai), Osaka
 - Osaka International Cancer Institute, Osaka
- Develop channels through clinical marketing

Sales Model

- Sale of Capital Equipment and consumables
- Rental Model

Dr Ong Kee Liang
CEO, Life Care Diagnostic Medical Centre Sdn Bhd
1st Floor, Wisma Life Care
No. 5, Jalan Kerinchi, Bangsar South
59200 Kuala Lumpur, Malaysia

23rd April 2019

Mr Peter Cheng Tim Kum
CEO, Endofotonics Private Limited
79 Ayer Rajah Crescent #04-05
Singapore 139955

Dear Mr Cheng,

RE: Letter of Intent to Purchase and Use the IMDx System

In recognition of the clinical utility and value proposition of the IMDx System, I wish to state my intent to acquire 1 unit of the IMDx System in Malaysia for trial use at Life Care Diagnostic Medical Centre. Life Care Diagnostic Medical Centre offers professional services in Medical Check Up, Specialist Clinic, and Day Care Surgery in the same outfit. In particular, the centre performs a significant volume of upper GI endoscopic procedures annually.

This intent to acquire the IMDx System in Life Care Diagnostic Medical Centre is subject to Endofotonics Pte Ltd obtaining relevant regulatory clearances in Malaysia in 2021 and satisfactory trial use of the IMDx System at Life Care Diagnostic Medical Centre. I am aware that the indicative MSRP is US\$300,000 per IMDx System and US\$3,000 per probe.

For avoidance of doubt, this is not an official offer and all details would need to be negotiated and executed through a formal Purchase Agreement.

Respectfully Yours,

Dr Ong Kee Liang
CEO, Life Care Diagnostic Medical Centre Sdn Bhd

Market Numbers and Market Entry Strategy in China

Key market in China (~50% of global market)

- 26 million gastric cancer screening procedures annually that we can immediately be a part of
- Poised to grow to 150 million procedures annually with the introduction of Early Gastric Screening Program

Product comprises IMDx System (MSRP = RMB 2M) and IMDx Probe (MSRP = RMB 20K)

# Hospitals in China	# System per hospital	# system placed	Top down market size	# Probes sold (50 per system)	Top down annual sales
Tier 3 = 2,267	6	13,602	37,845 x US\$300K = US\$11B	680,100	1,892,250 x US\$3K = US\$5.6B
Tier 2 = 8,081	3	24,243		1,212,150	
Tier 1 = 19,130	0	0		0	

Market penetration comparison – Ankon Capsule Endoscopy

- 600+ systems sold to date

	EF IMDx System	Ankon Capsule Endoscopy
System Price	RMB 2M	RMB 3 – 4M
Price to Patient	RMB 400 – 600	RMB 4000 – 5000
Space Requirement	Can be used in existing endoscopy suite	Requires a 3m by 4m by 2.5m space; needs to be away from magnetic fields

Why will an endoscopy department purchase the IMDx System?

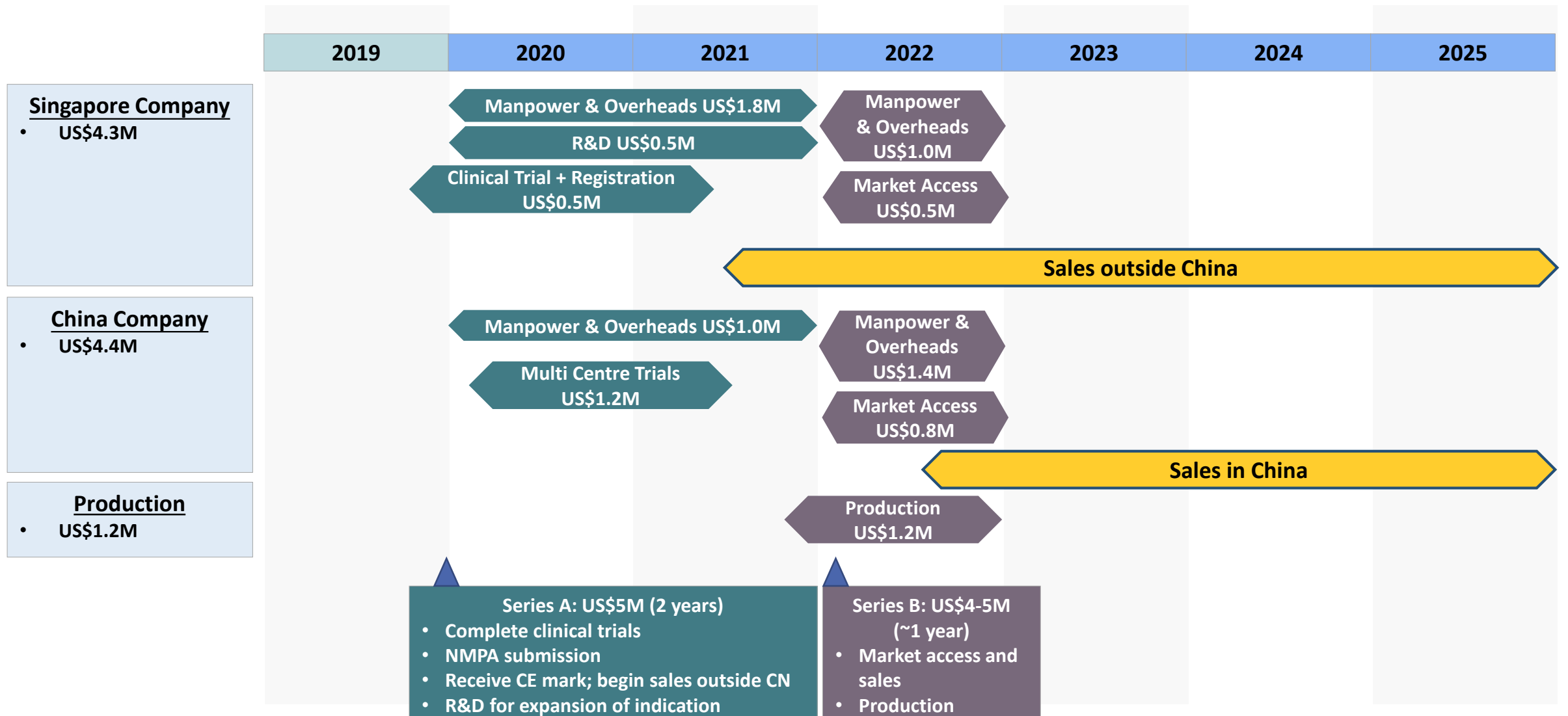
1. Early gastric cancer detection opens up revenue stream from endoscopic treatment

- Patients are referred for surgery (gastrectomy) if they are diagnosed with late stage cancer
- Should patients are diagnosed early, endoscopic department can intervene using EMR/ESD

2. Reasonable per use add-on price can drive breakeven within 2 years

	Price to Hospital (¥)	
Investment on System	1,820,000	
Yearly investment on probes	1,050,000	
First year investment	2,870,000	
Investment thereafter	1,050,000	
Total investment over 2 years	3,920,000	
Revenue breakdown	Revenue to Hospital(¥)	
# patients per endoscopy suite:	5720	70% utility
Charge per patient	500	
Total revenue over 2 years	5,720,000	
Gross profit per system within 2 years	1,800,000	

Use of Proceeds



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Vision

Reduce cancer burden through earlier detection

Mission

Provide real time early GI cancer detection

Quantitative Raman Spectral Analysis • Real Time Feedback • Improve Early Cancer Detection Rate

IMDx System supported by strong clinical data

#	Title	Year	# Patients	# Tissue sites	# Spectra	Accuracy >90%	Sensitivity >90%	Specificity > 90%	Comments
1	Comparative study of the endoscope-based bevelled and volume fiber-optic Raman probes for optical diagnosis of gastric dysplasia in vivo at endoscopy	2015	164		2963	✓	✓	✓	
2	Fiber-optic Raman spectroscopy probes gastric carcinogenesis in vivo at endoscopy	2013	83		1277			✓	
3	Real-time Raman Spectroscopy for in vivo, online gastric cancer diagnosis during clinical endoscopic examination	2012	305		2748	80.00%	90.00%	73.30%	Prospectively applied to 10 patients
4	Combining near-infrared-excited autofluorescence and Raman spectroscopy improves in vivo diagnosis of gastric cancer	2011	81		1238	✓	✓	✓	
5	In vivo diagnosis of gastric cancer using Raman endoscopy and ant colony optimization techniques	2011	67		1063		✓	✓	
6	Raman endoscopy for in vivo differentiation between benign and malignant ulcers in the stomach	2010	71		1102		✓	✓	
7	In vivo detection of epithelial neoplasia in the stomach using image-guided Raman endoscopy	2010	67	238	1063	✓	✓	✓	
8	In vivo early diagnosis of gastric dysplasia using narrow-band image-guided Raman endoscopy	2010	30	72		✓	✓	✓	
9	Near-infrared Raman spectroscopy for early diagnosis and typing of adenocarcinoma in the stomach	2010	62	238		✓			
10	Near-infrared Raman spectroscopy for optical diagnosis in the stomach: identification of Helicobacter-pylori infection and intestinal metaplasia	2010	56	88					
11	Near-infrared Raman spectroscopy for gastric precancer diagnosis	2009	35	65			✓	✓	
12	Diagnostic potential of near-infrared Raman spectroscopy in the stomach: differentiating dysplasia from normal tissue	2008	44	76			✓	✓	
13	Diagnosis of gastric cancer using near-infrared Raman spectroscopy and classification and regression tree techniques	2008	53	73			✓	✓	

Sensitivity and Specificity - Definition

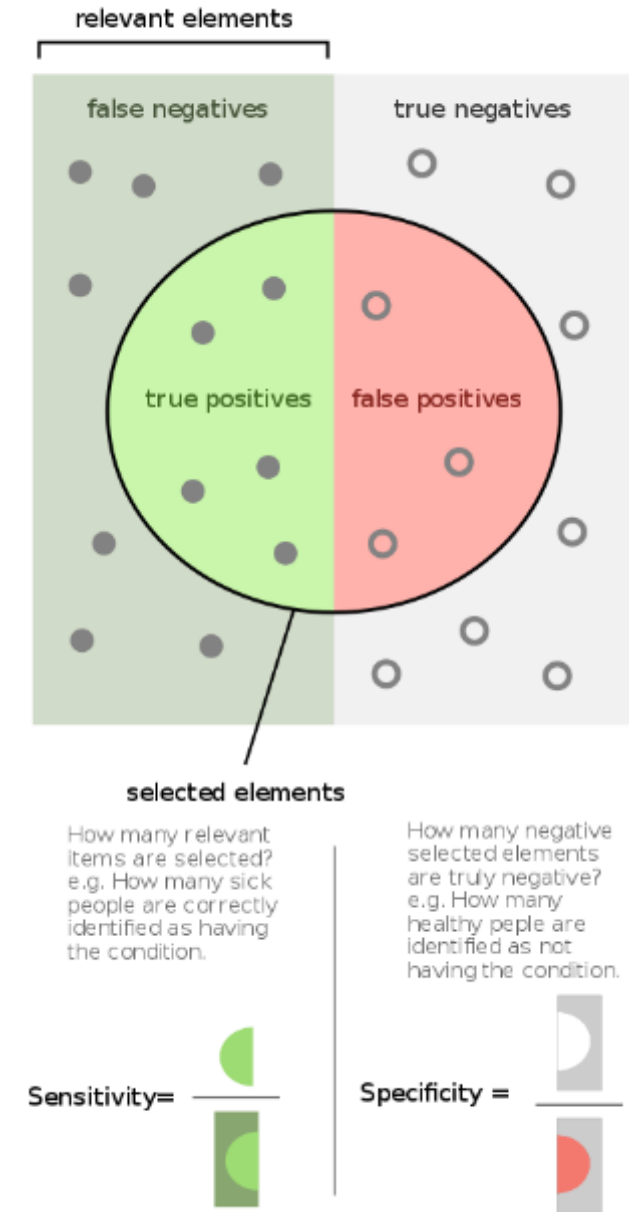
$$\text{sensitivity} = \frac{\text{number of true positives}}{\text{number of true positives} + \text{number of false negatives}}$$

$$= \frac{\text{number of true positives}}{\text{total number of sick individuals in population}}$$

$$\text{specificity} = \frac{\text{number of true negatives}}{\text{number of true negatives} + \text{number of false positives}}$$

$$= \frac{\text{number of true negatives}}{\text{total number of well individuals in population}}$$

= probability of a negative test given that the patient is well



Clinical KOL Network within China



李兆申
上海长海医院

Li Zhao-sen
Changhai Hospital,
Shanghai



令狐恩强
中国人民解放军总医院 (301医院)

Linghu Enqiang
301 Military Hospital,
Beijing



王贵齐
中国医学科学院肿瘤医院

Wang Guiqi
Cancer Hospital, Beijing



李汛
兰州大学第一医院

Li Xun
Lanzhou Uni Hospital



任建林
厦门大学医学院

Ren Jianlin
Xiamen Uni Hospital



马颖才
青海省人民医院

Ma Yingcai
Qinghai People's Hospital



范志宁
江苏省人民医院

Fan Zhining
Jiangsu People's Hospital



Intellectual Property

	1	2	3	4
Title	Methods relating to real time cancer diagnostics at endoscopy utilizing fibre optic raman spectroscopy	Diagnostic instrument and methods relating to raman spectroscopy	Diagnostic instrument and method	Raman spectroscopy system, apparatus, and method for analyzing, characterizing, and/or diagnosing a type or nature of a sample or a tissue such as an abnormal growth
PCT #	PCT/SG2013/000273	PCT/SG2013/000351	PCT/SG2014/000063	PCT/SG2015/050195
Description	Method of use of Raman system in conjunction with an endoscopic system	Probe design	Method of use of a spectrometer for biomedical related applications	Integration of raman spectroscopy system and endoscopy system
China status	ZL201380035488.5 granted 5 Dec 2017	ZL201380043982.6 granted 22 Aug 2017	ZL201480009125.9 granted 3 Jul 2018	Responded to 1st office action in Jul 2018; awaiting examination report
Other countries	Granted in US, JP, SG Pursuing in KR, EU, Canada	Granted in SG Pursuing in US, EU, JP, KR, Canada	Granted in SG Pursuing in US, EU, JP	Pursuing in SG, US, EU, JP, KR, Australia

- 1. Probe miniaturization** - Know-how in maintaining optical pathways within a small real estate space
- 2. ML data analytics** - Raman spectral library across entire GI tract and other bodily organs
- 3. Customized spectrometer for biomedical applications** - Know-how in specifications and data acquisition parameters

Companies utilizing Raman Spectroscopy



	Verisante Technology Inc. (prev T-Ray Science Inc.)	ODS Medical
Country	Canada	Canada
Key Events	2006 – Company Incorporation 2013 – Listed on TSX Venture Exchange 2015 – Launch Aura™ 2018 – Reverse takeover	2016 – Company Incorporation 2017 – Seed Investment
Clinical Indication	Melanoma	Brain cancer
Size of Company	11 – 50	17
Comment	The product Core™, indicated for use for lung cancer, GI cancer, and cervical cancer, was never launched	

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