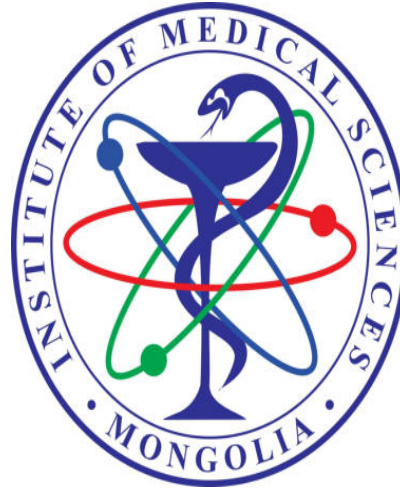




Current status of gastric cancer incidence and actions being implemented in Mongolia

Professor TULGAA LONJID, MD, PhD
Institute of Medical Sciences, Mongolia



INSTITUTE OF MEDICAL SCIENCES named after SHAGDARSUREN T.

On May 16, 1961, by the decree of the leaders of the People's Congress of the Mongolian People's Republic, the Mongolian Academy of Sciences was established with 5 institutes, one of which is the Institute of Medical Sciences.

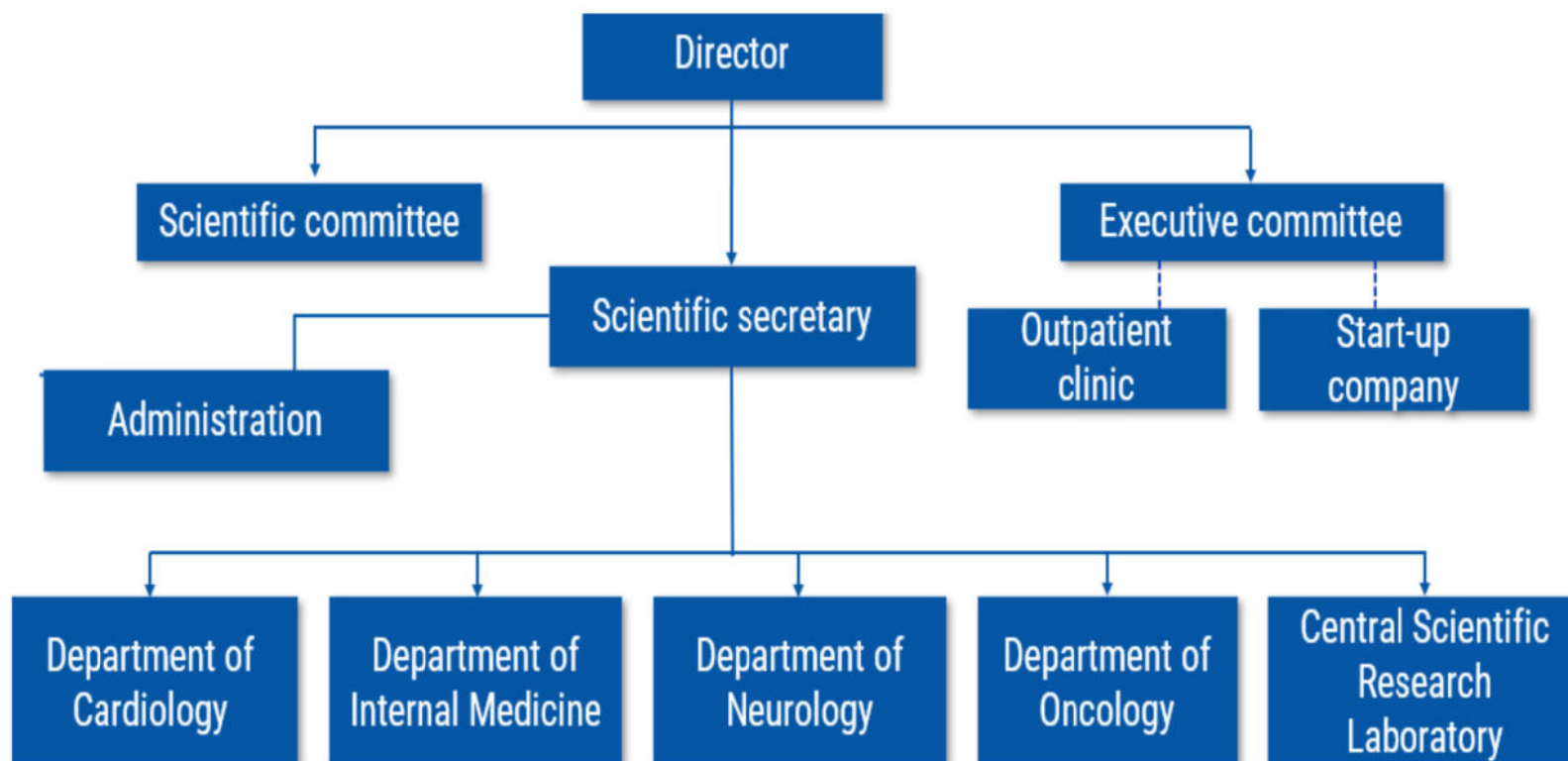
It is the first medical research institution to conduct research and studies based on evidence and to combine teaching and clinical practice based on scientific knowledge.

From 2024, Institute of Medical Sciences is operating under the auspices of the Ministry of Economy and Development by the legislation of the Mongolian government.



ORGANIZATIONAL STRUCTURE

On May 16, 1961, by the decree of the leaders of the People's Congress of the Mongolian People's Republic, the Mongolian Academy of Sciences was established with 5 institutes, one of which is the Institute of Medical Sciences.





THE MAIN DIRECTION OF RESEARCH AND DEVELOPMENT

- **METABOLISM, MOLECULAR BIOLOGY, AND GENETIC PATHOLOGY**
- **CLINICAL TRIALS, DIAGNOSIS, TREATMENT, PREVENTION, AND CONTROL OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES**
- **ONCOLOGY**
- **POPULATION HEALTH EDUCATION AND RESEARCH ON GENDER AND PUBLIC HEALTH**

TRANSLATIONAL AND CLINICAL RESEARCH IN MONGOLIA

Since 2021, TACRIM - International Scientific Conference occurs biennially, attracting researchers from Australia, South Korea, Russia, Taiwan, and Mongolia. They discuss translational research in field of the internal medicine, cardiovascular surgery, neurology, oncology, and biomedicine.





TACRIM 2025

“CARDIOVASCULAR AND METABOLIC DISEASES”

TACRIM 2025

“CARDIOVASCULAR AND METABOLIC DISEASES”

TRANSLATIONAL AND CLINICAL RESEARCH IN MONGOLIA-2025

THE 3rd INTERNATIONAL CONFERENCE

ULAANBAATAR, MONGOLIA

JUNE 28, 2025



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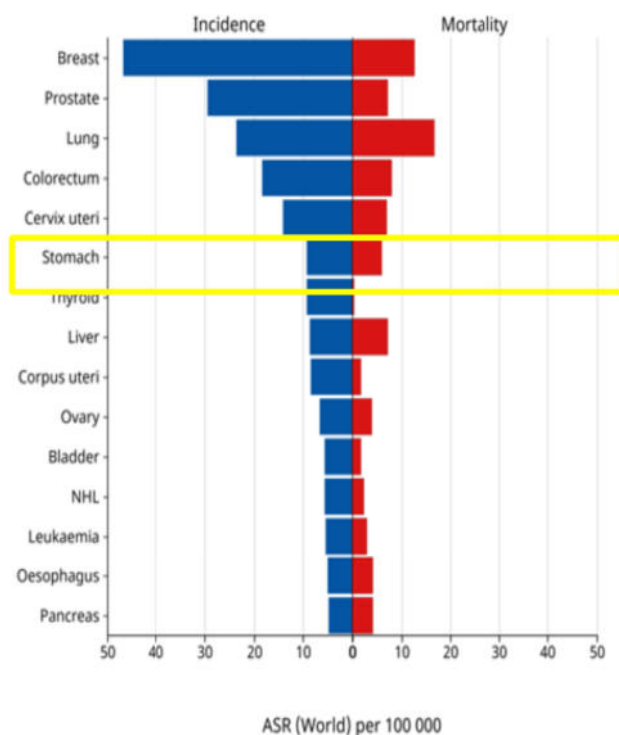
In partnership with

Background

Age-Standardized Rate (World) per 100 000, Incidence and Mortality, Both sexes, in 2022

Continents

(Top 15 cancer sites)



Cancer TODAY | IARC - <https://gco.iarc.who.int/today>
Data source: Globocan 2022 (version 1.1)

Gastric cancer remains a leading cause of cancer death worldwide.

Age-Standardized Rate (World) per 100 000, Incidence and Mortality, Both sexes, in 2022

Stomach

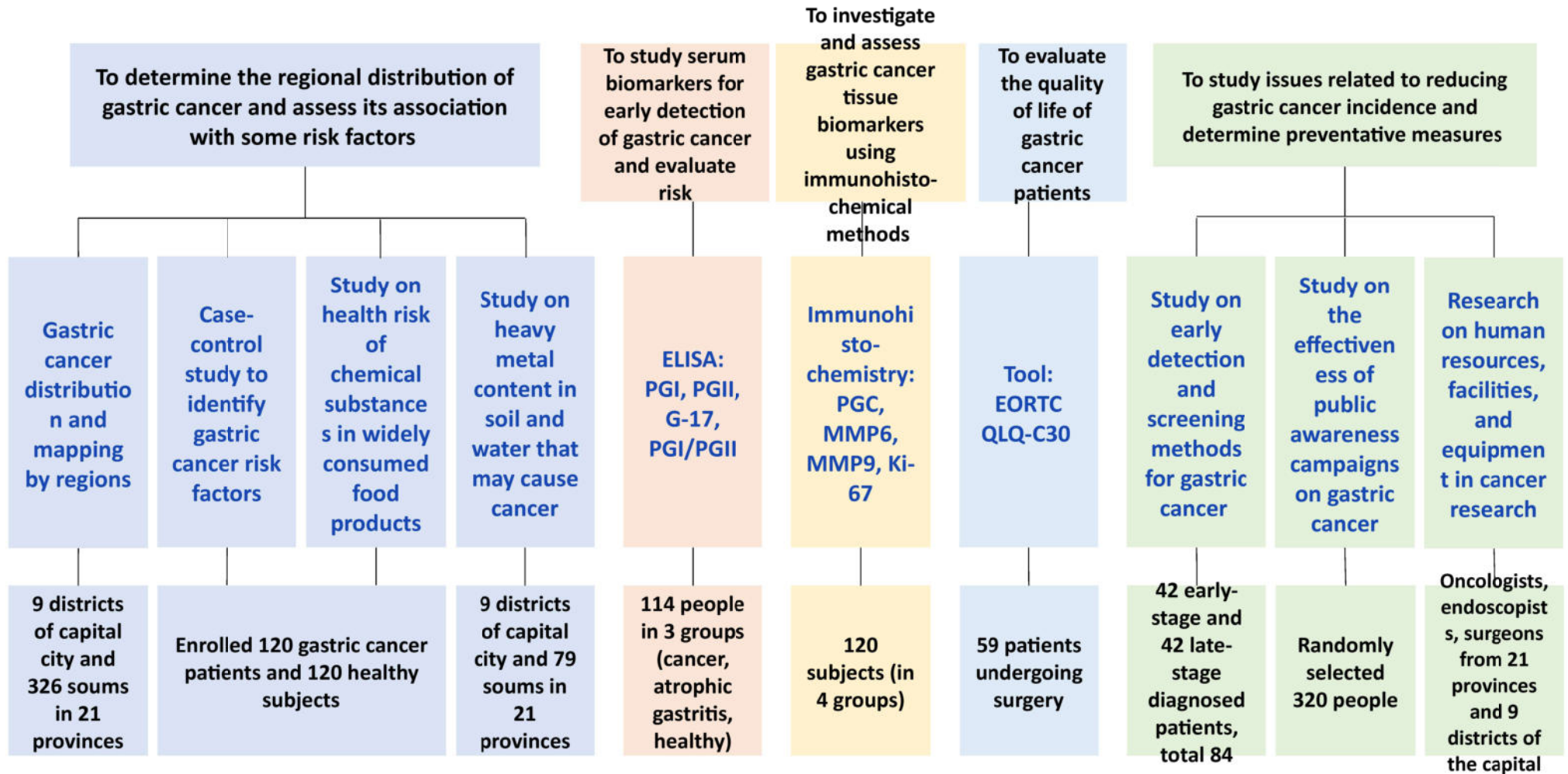
Countries (Top 15)



Улс		Globocan 2018		Globocan 2020	
		ASR	Rank	ASR	Rank
Mongolia	Incidence	33.1	2	32.5	1
	Mortality	25.0	1	24.6	1
Japan	Incidence	27.5	3	31.6	2
	Mortality	9.5	22	8.2	34
South Korea	Incidence	39.6	1	27.9	3
	Mortality	7.0	19	6.1	56

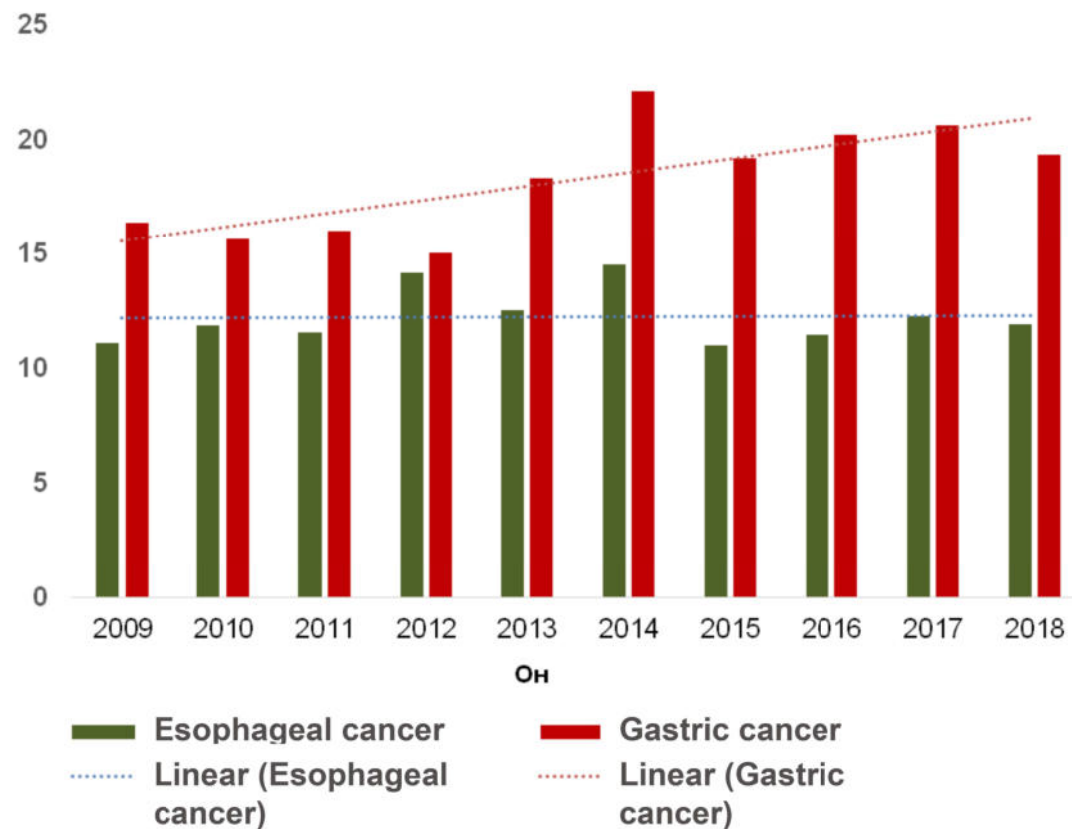
highest incidence and mortality.

Our research in this field



Epidemiology in Mongolia

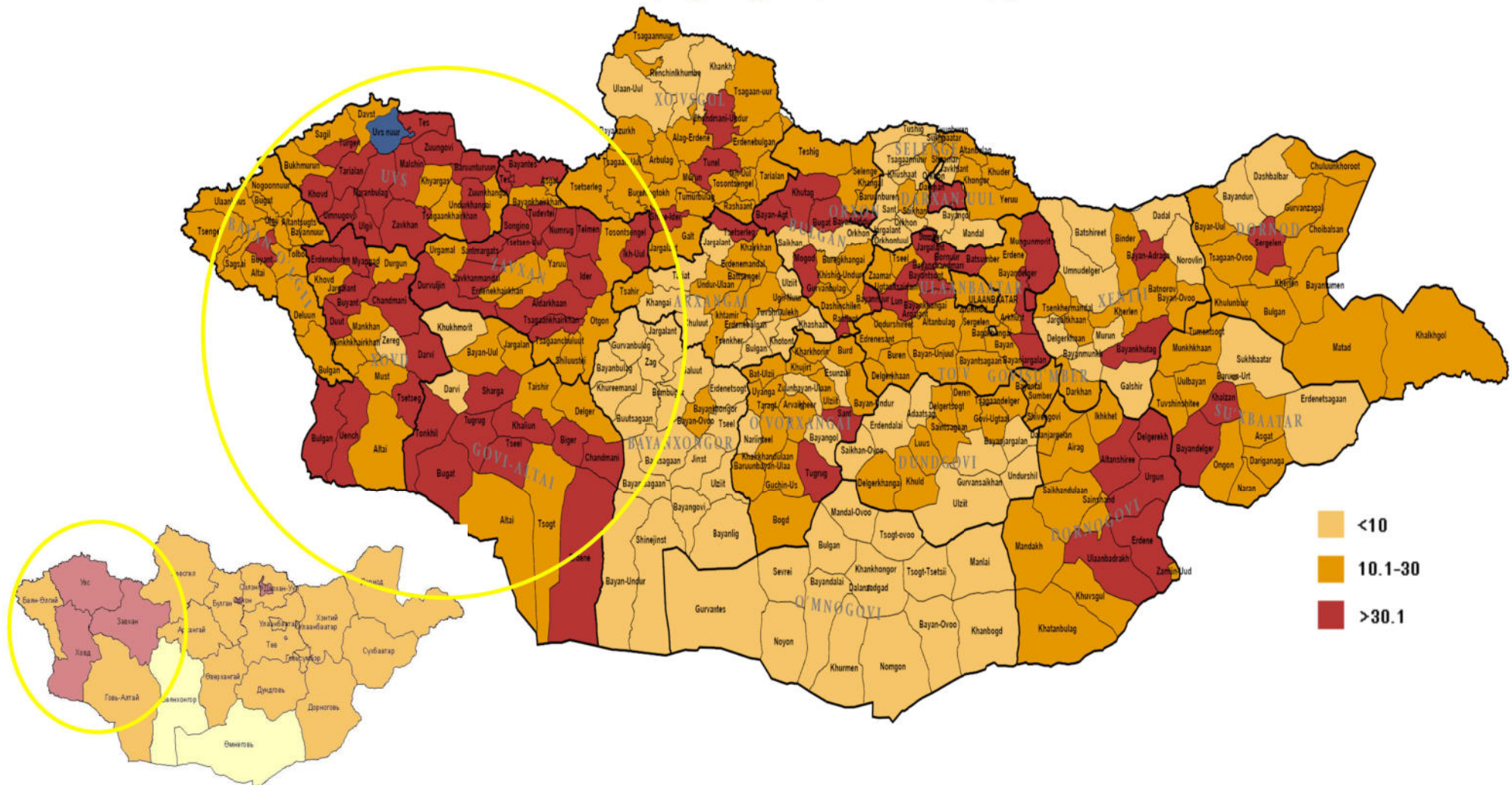
Incidence of gastric cancer in Mongolia, 2009-2018, per 100 000



Source: Prevalence of gastric and esophageal cancers and risk factors in Mongolia, Project report 2020

Epidemiology in Mongolia

Incidence of Gastric cancer, by region, 2009-2018, per 100 000

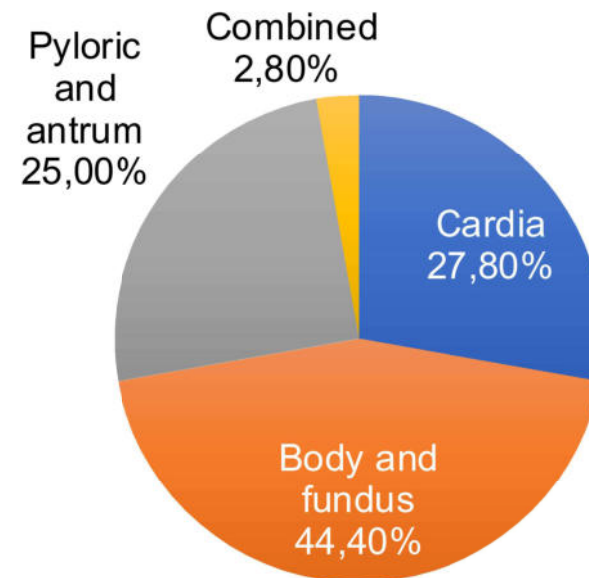


Epidemiology in Mongolia

Pathology:

- Adenocarcinoma 75.0%
- Mucinous carcinoma – 11.1%
- Tubular carcinoma – 2.8%
- Papillary carcinoma – 2.8%
- Poorly cohesive – 8.3%

Anatomical sites of gastric cancer



Major Risk Factors in Mongolia

Risk factor	Impact
H. Pylori infection	Strongest risk, • present in 70-80% of patient with gastric diseases • ≈80% in general population
High salt diet & hot beverages	Damages gastric mucosa; elevates risk, especially with H. pylori
Smoking, alcohol	Lifestyle behaviors that increase cancer risk
Low fruit/veg intake	Lack of protective dietary components
Family history	Significant genetic predisposition
Socioeconomic & geographic factors	Late diagnosis and limited access to care amplify risk

Akbari A, Ashtari S, Tabaiean SP, Mehrdad-Majd H, Farsi F, Shojaee S, et al. Overview of epidemiological characteristics, clinical features, and risk factors of gastric cancer in Asia-Pacific region. *Asia-Pacific Journal of Clinical Oncology*. 2022;18(6):493-505.

D'Elia L, Galletti F, Strazzullo P. Dietary salt intake and risk of gastric cancer. *Cancer treatment and research*. 2014;159:83-95. Epub 2013/10/12.

Choi YJ, Kim N. Gastric cancer and family history. *The Korean journal of internal medicine*. 2016;31(6):1042-53.

Major Risk Factors in Mongolia

Case-control study to identify gastric cancer risk factors

Enrolled 120 gastric cancer patients and 120 healthy subjects

Variables – Eating habits	Healthy subjects	Case groups	OR (95% CI)	p value
	n (%)	n (%)		
Eating at regular times (yes, %)	65 (54.2)	39 (33.6)	0.43 (0.25-0.73)	0.002*
Eating after 6 pm (yes, %)	80 (67.2)	98 (81.7)	1.42 (1.11-1.83)	0.012*
Chewing food slowly (yes, %)	88 (73.9)	63 (52.5)	0.39 (0.23-0.67)	0.001*
Eating meat only after thoroughly cooking (yes,%)	78 (66.1)	73 (60.8)	0.80 (0.47-1.35)	0.422
Consuming leftover food (yes, %)	70 (58.3)	90 (75.6)	2.22 (1.27-3.86)	0.006*
Protective factors (green): Regular meals, chewing slowly, and thoroughly cooking meat. Risk factors (red): Eating after 6 p.m., consuming leftover food, and daily salted tea consumption significantly increase gastric cancer risk.				
Daily salt intake, (дундаж±SD)	12.4±4.7	11.0±5.0		0.963
Drinking salted tea dialy (тийм, %)	48 (40.7)	69 (57.5)	1.97 (1.18-3.30)	0.01*

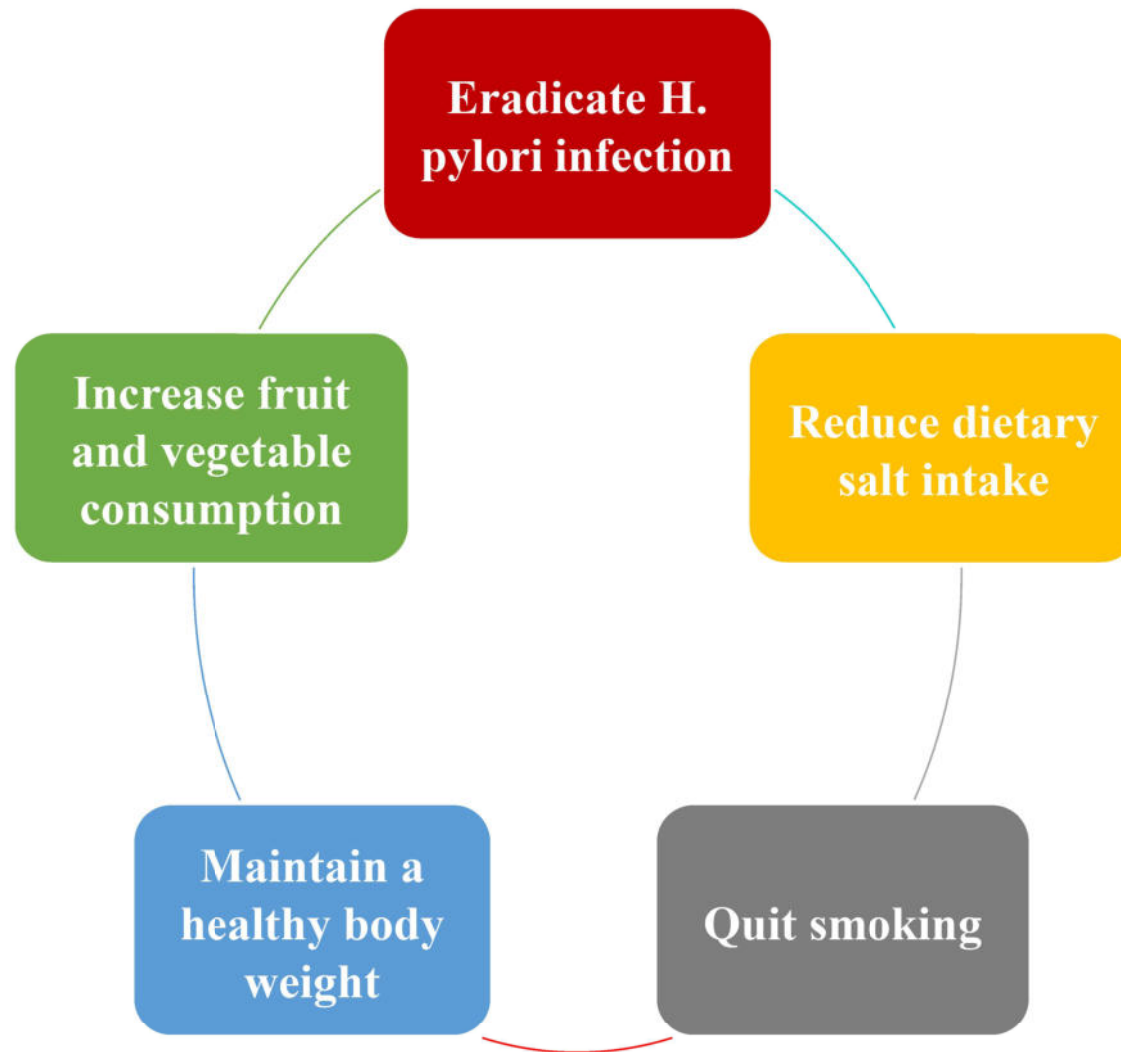
Major Risk Factors in Mongolia

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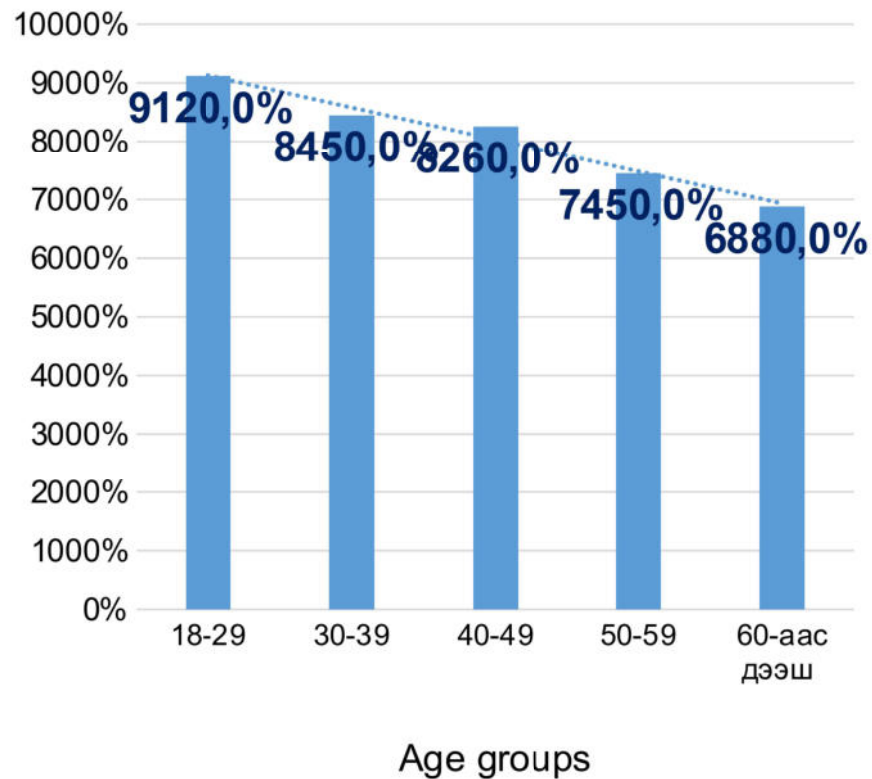
Variables	Healthy subjects n (%)	Case group n (%)	OR (95% CI)
Smoking as soon as wake up in the morning (тийм, %)	16 (33.3)	33 (55.0)	2.44 (1.11-5.37)
Family history (father and mother) of gastric cancer (yes,%)	6 (5.8)	15 (15.2)	2.88 (1.07-7.78)
Family history (sibling) of gastric cancer (yes,%)	5 (5.5)	16 (15.2)	3.09 (1.09-8.81)
History of previous gastric diseases (yes,%)	32 (28.1)	67 (58.8)	3.65 (2.10-6.35)
Risk factors (red) smoking, H. pylori, family history, gastric disease history	16 (34.8)	30 (60.0)	2.81 (1.23-6.45)

Recommendation Prevention



H. pylori testing and eradication in high-risk groups

800 randomly selected subjects in Uvs province



KAP studies



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Biomarkers for Screening Pepsinogen

No. 7]

Proc. Jpn. Acad., Ser. B 87 (2011)

405

Review

Gastric cancer screening by combined assay for serum anti-*Helicobacter pylori* IgG antibody and serum pepsinogen levels—"ABC method"

By Kazumasa MIKI^{1,†}

(Communicated by Takashi SUGIMURA, M.J.A.)

Abstract: The current status of screening for gastric cancer-risk (gastritis A, B, C, D) method using combined assay for serum anti-*Helicobacter pylori* (*Hp*) IgG antibody and serum pepsinogen (PG) levels, "ABC method", was reviewed and the latest results of our ongoing trial are reported. It was performed using the following strategy: Subjects were classified into 1 of 4 risk groups based on the results of the two serologic tests, anti-*Hp* IgG antibody titers and the PG I and II levels: Group A [*Hp*(-)-PG(-)], infection-free subjects; Group B [*Hp*(+)-PG(-)], chronic atrophic gastritis (CAG) free or mild; Group C [*Hp*(+)-PG(+)], CAG; Group D [*Hp*(-)-PG(+)], severe CAG with extensive intestinal metaplasia. Continuous endoscopic follow-up examinations are required to detect early stages of gastric cancer. Asymptomatic Group A, which accounts for 50–80% of all the subjects may be excluded from the secondary endoscopic examination, from the viewpoint of efficiency. *Hp*-infected subjects should be administered eradication treatment aimed at the prevention of gastric cancer.

Keywords: gastric cancer, cancer screening, pepsinogen (PG) I, II, anti-*Helicobacter pylori* (*Hp*) IgG antibody, serum pepsinogen test method (PG method), screening for gastric cancer-risk (gastritis A, B, C, D) method (ABC method)

Miki K. Gastric cancer screening by combined assay for serum anti-*Helicobacter pylori* IgG antibody and serum pepsinogen levels - "ABC method". *Proceedings of the Japan Academy Series B, Physical and biological sciences.* 2011;87(7):405-14.

		H.Pylori IgG	
		Negative	Positive
Pepsinogen*	Negative	A	B
	Positive	D	C

Pepsinogen reference range:

pepsinogen I ≤ 70 ng/ml, pepsinogen I/II ratio > 3.0

Biomarkers for Screening Pepsinogen

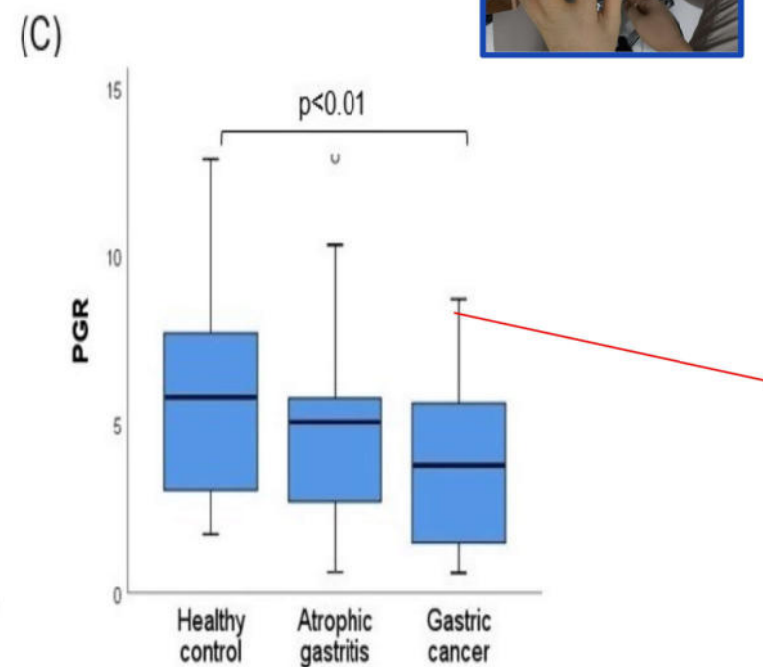
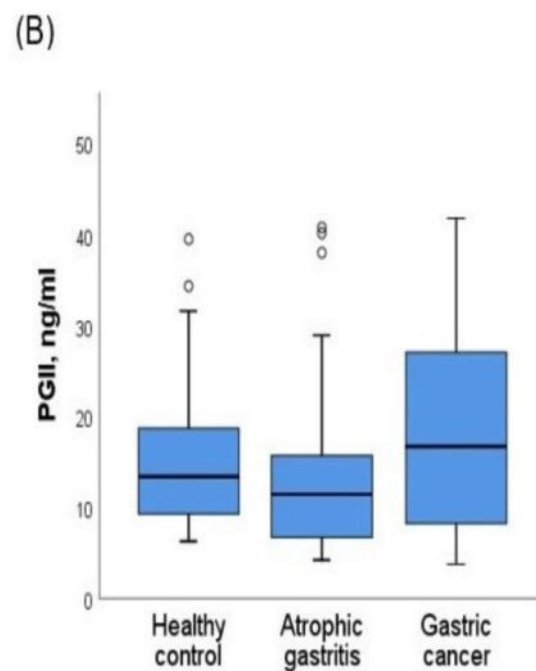
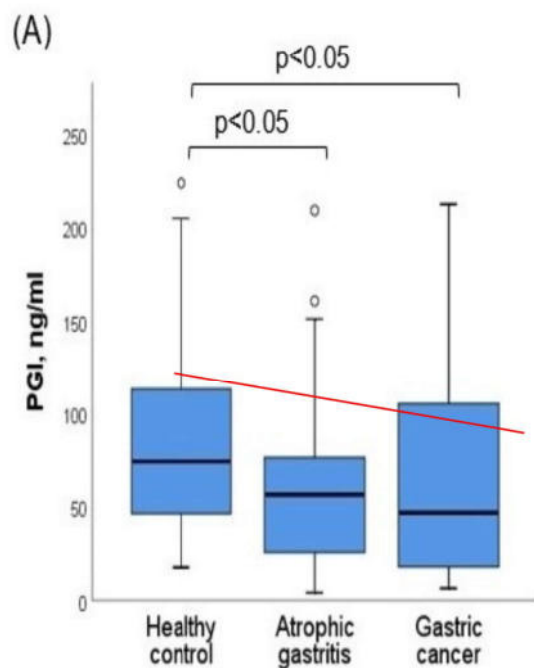
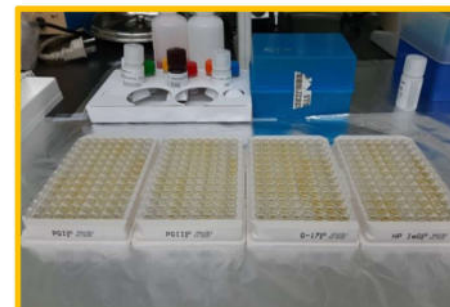


References	Variables	A	B	C	D
Ohata et al. 2004	Study population	967	2341	1316	31
	Gastric cancer	0	19	24	2
	Gastric cancer (per 1000)	-	8.12	18.24	64.52
Watabe et al. 2005	Study population	3324	2134	1082	443
	Gastric cancer	7	6	18	12
	Gastric cancer (per 1000)	2.11	2.81	16.64	27.09
Mizuno et al. 2009	Study population	647	1094	1054	69
	Gastric cancer	2	15	41	3
	Gastric cancer (per 1000)	3.09	13.71	38.9	43.48

Biomarkers for Screening Pepsinogen

ELISA: serum pepsinogen I (PGI), pepsinogen I (PGII), PGI/PGII, gastrin-17 (G-17)

114 subjects in 3 groups (cancer, atrophic gastritis, healthy)



Biomarkers for Screening Pepsinogen

ELISA: serum pepsinogen I (PGI), pepsinogen I (PGII), PGI/PGII, gastrin-17 (G-17)

114 subjects in 3 groups (cancer, atrophic gastritis, healthy)

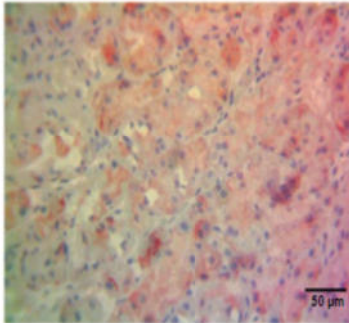
Risk of gastric cancer - ABC(D) method

	A	B	C	D
Pepsinogen	Normal	Normal	PGI $\leq$ 35.25, PGI/II $\leq$ 5.27	PGI $\leq$ 35.25, PGI/II $\leq$ 5.27
<i>H.Pylori</i> IgG	Negative	Positive	Positive	Negative
Healthy subjects	28.9%	57.9%	5.3%	7.9%
Gastric cancer	22.2%	33.3%	25.0%	19.4%
OR (95% CI)	ref	0.75 (0.24-2.37)	6.19 (1.04-36.78)	3.21 (0.63-16.38)
<i>p value</i>	-	0.62	0.04	0.16

Biomarkers for Screening Pepsinogen

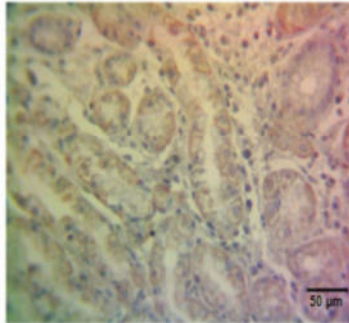
Immunohistochemistry: tissue pepsinogen C (PGC)

120 subjects in 4 groups



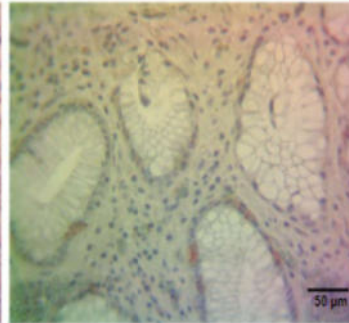
Superficial gastritis

6.20 ± 2.61



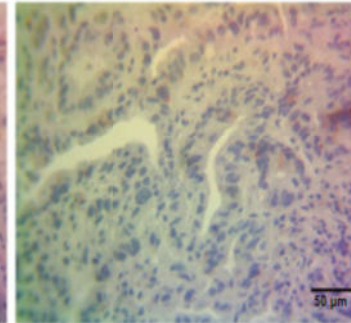
Atrophic gastritis

5.45 ± 2.47



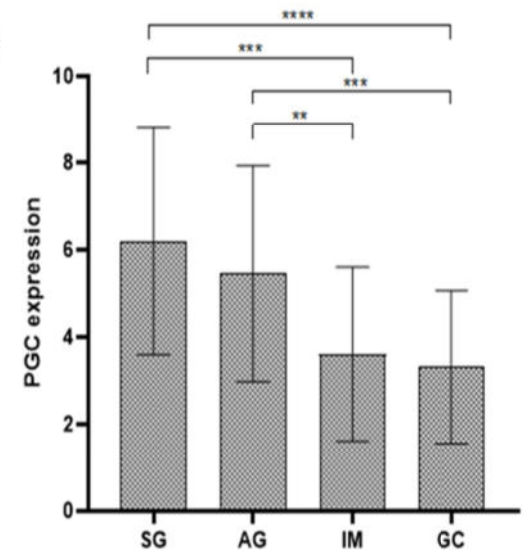
Intestinal metaplasia

3.61 ± 2.0



Gastric cancer

3.31 ± 1.75



Recommendation Screening

BEFORE

100%

Endoscopy +
biopsy

Dyspepsia patients

100%

Pepsinogen

Atrophic and non-
atrophic gastritis

Endoscopy + biopsy

AFTER

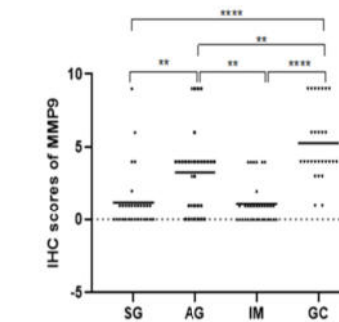
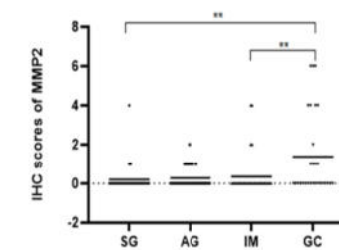
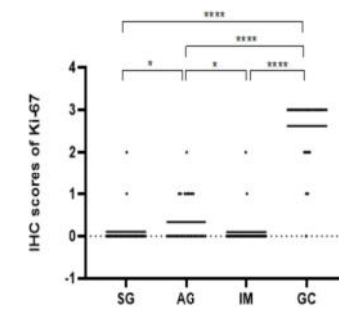
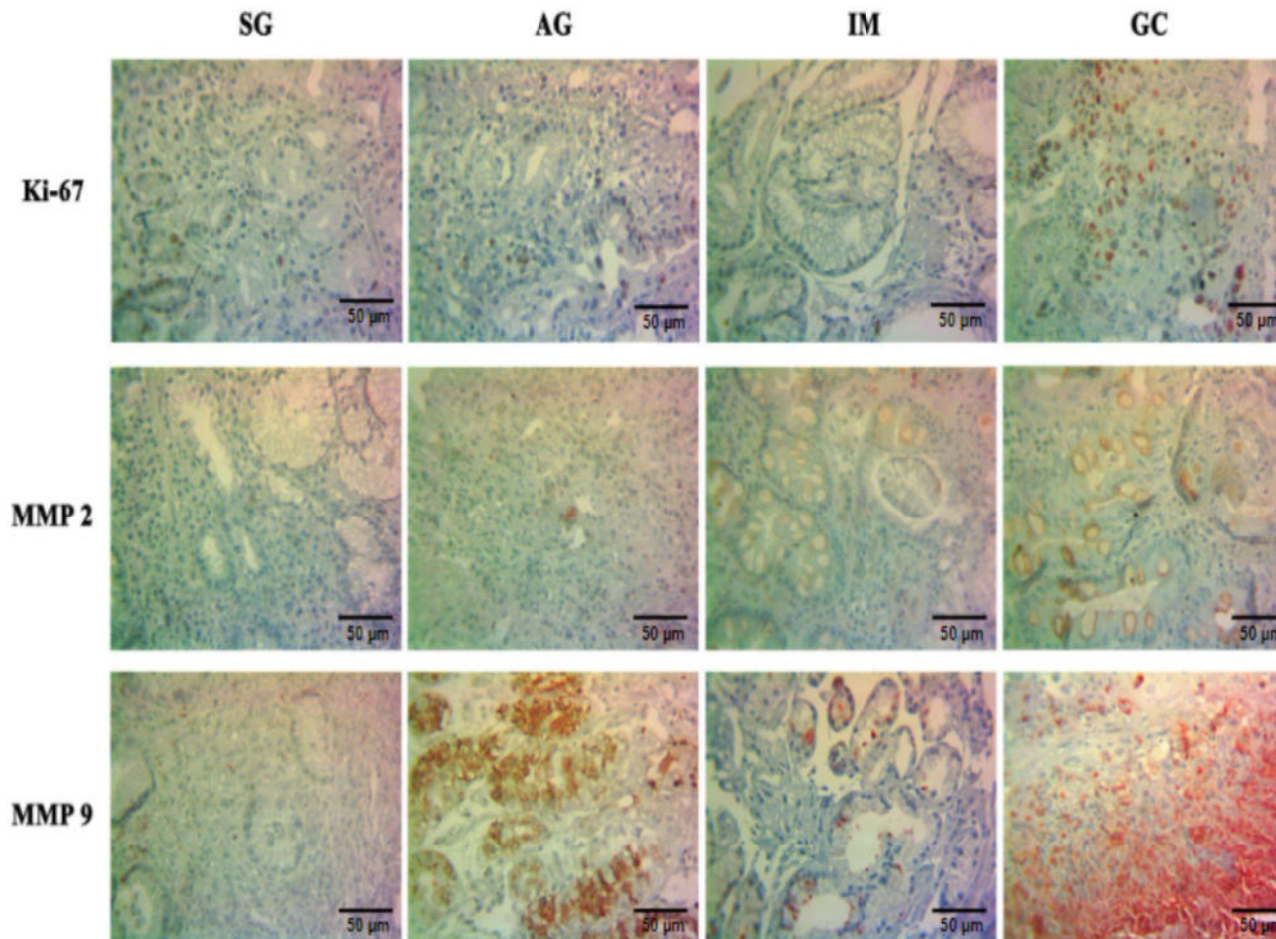
Normal

No need for
endoscopy. GERD
or NERD
conceivable

Biomarkers for Screening Other

Immunohistochemistry: tissue Ki-67, MMP2, MMP9

120 subjects in 4 groups (SG, superficial gastritis; AG, atrophic gastritis; IM, intestinal metaplasia; GC, gastric cancer)

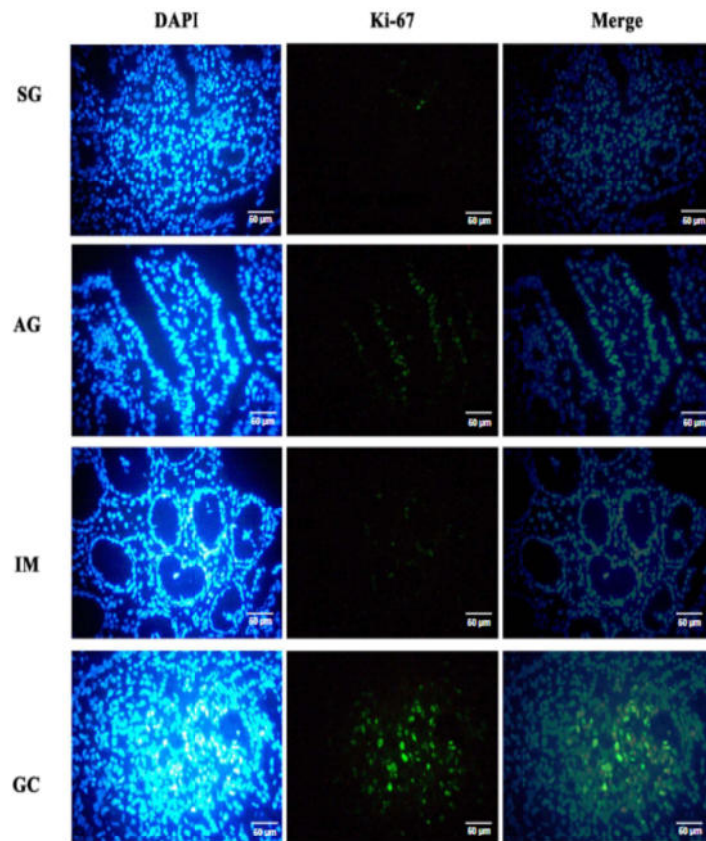


SG - 0.1
±0.4
AG -
0.33±0.55
IM -
0.09±0.39
AG - 0.2
±0.78
AG -
0.28±0.52
IM -
0.35±1.04
SG - 1.2
GC -
±2.04
1.38±2.11
AG -
1.12±1.45
IM -
3.28±2.82
GC -

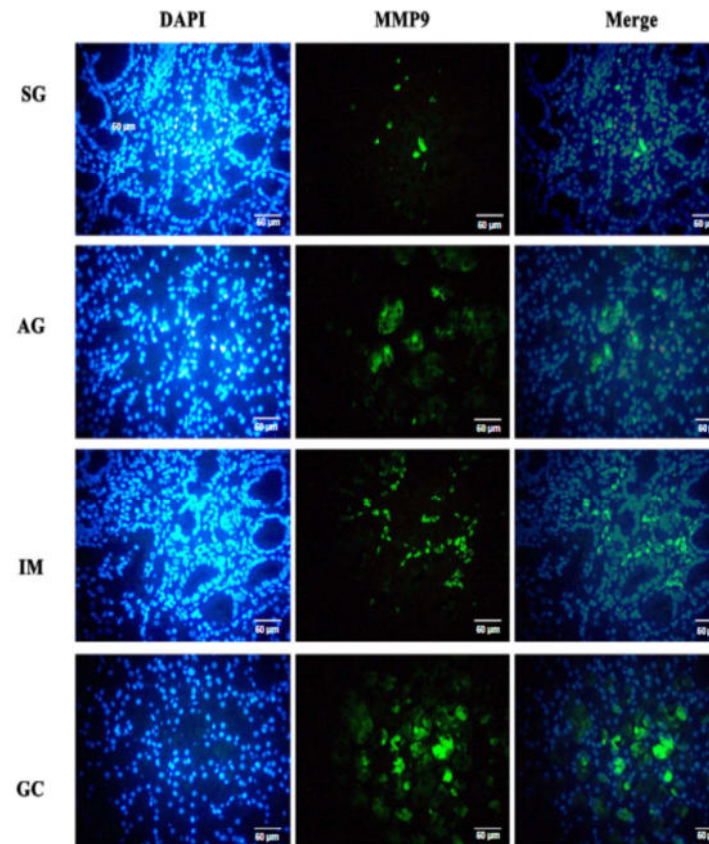
Biomarkers for Screening Other

Immunofluorescence: tissue Ki-67, MMP2, MMP9

120 subjects in 4 groups (SG, superficial gastritis; AG, atrophic gastritis; IM, intestinal metaplasia; GC, gastric cancer)



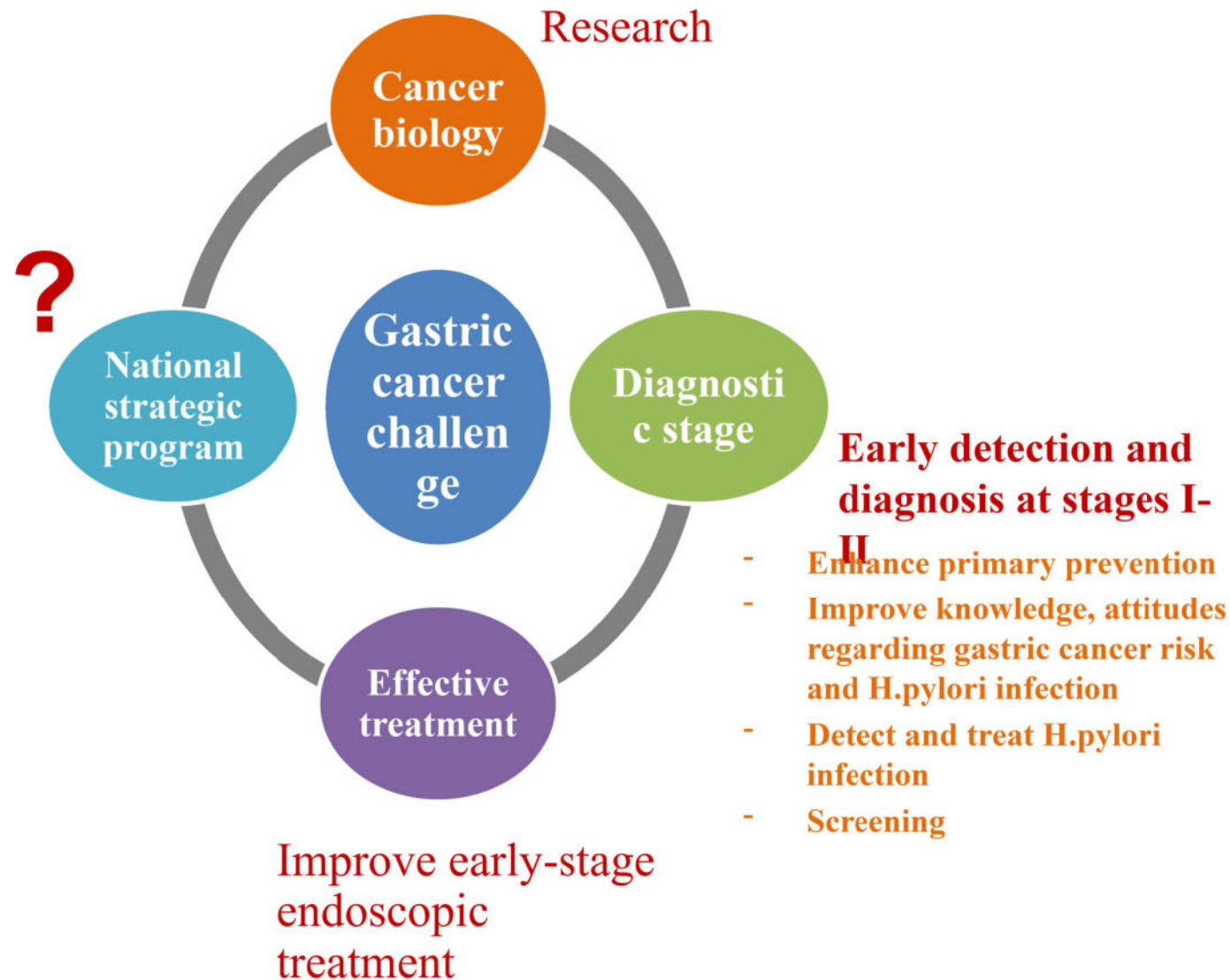
(x400)



(x400)

DAPI-(4',6-diamidino -2-phenylindole)

Current challenges





FUTURE COLLABORATION

Expand joint project and joint publications

Increase student exchange activities

**Expand joint international conference organizing
activities**

Establish academic exchange activities

INSTITUTE OF MEDICAL SCIENCES NAMED AFTER SHAGDARSUREN T.

