

HEALTH CARE AUTOMATION AT ASIAN INSTITUTE OF GASTROENTEROLOGY

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D Nageshwar Reddy MD, DM, Dsc, FAMS, FRCP.



About AIG

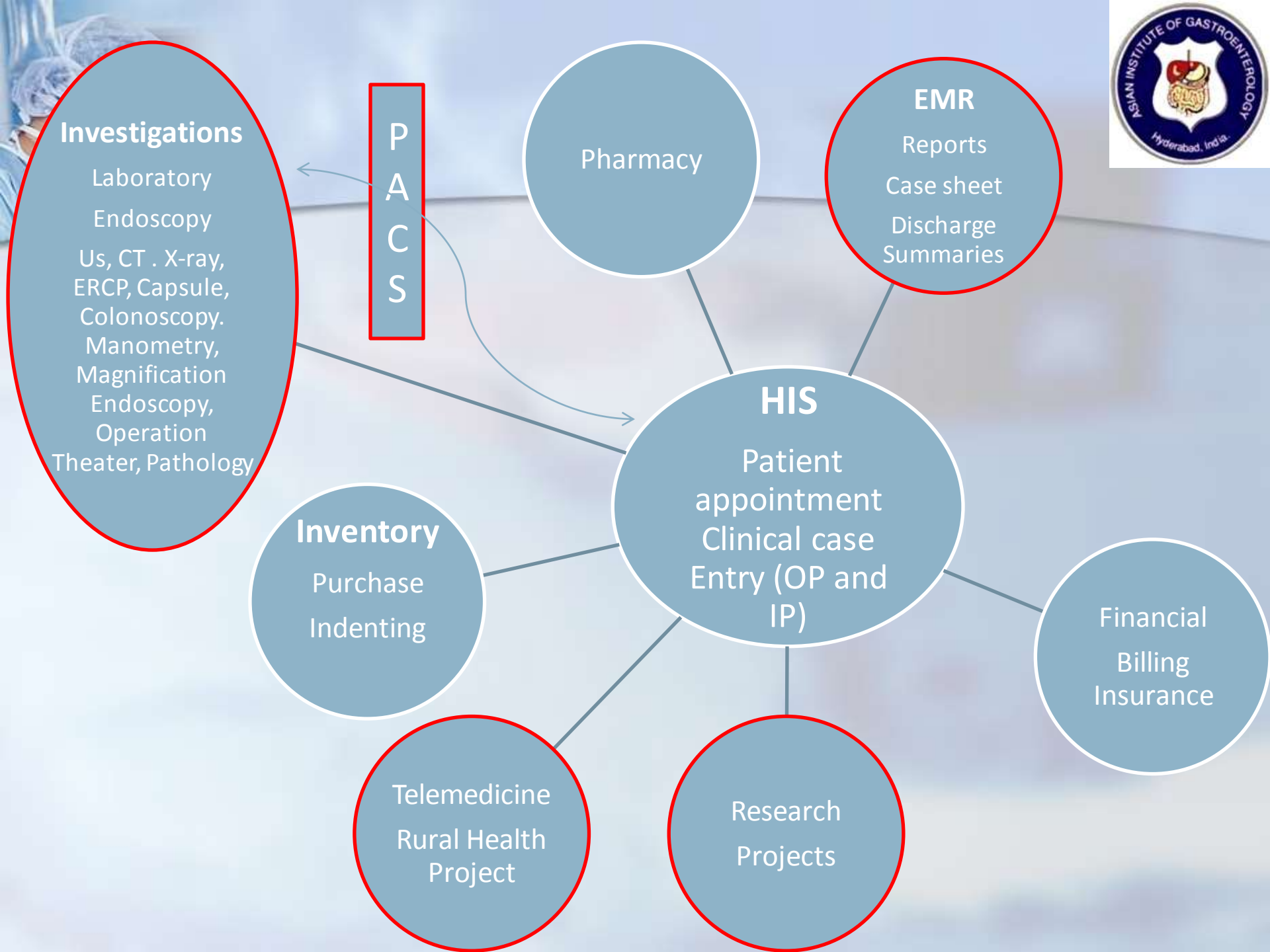
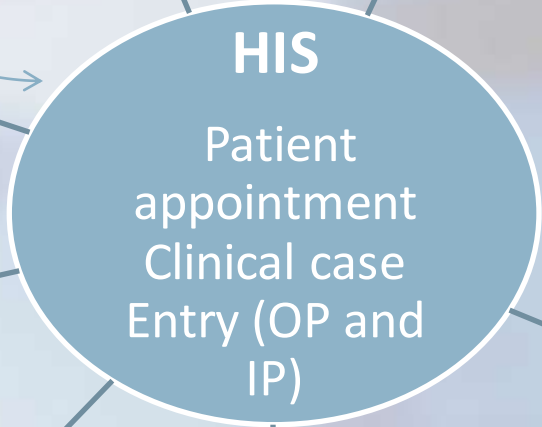


- Tertiary care single specialty referral center for Gastrointestinal (GI) diseases
- Offers GI services to national and international patients
- Trains specialists in the field of Gastroenterology
- Exclusive research wing - research in various areas of GI
- Telemedicine project to cover GI healthcare to rural areas



Magnitude of problem

- Increasing health care costs, patient demands, need for improving health care standards is a must
- Possible only by IT and Automating processes
- Integrating the various technologies – Major problem
- Health care personnel acceptance ?
 - Fear
 - Refusal to learn and change

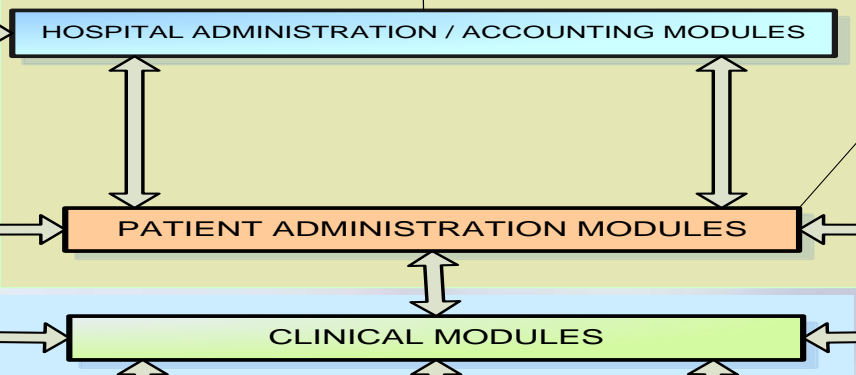




- * Pharmacy
- * Materials Management
- * Kitchen/Diet
- * Linen/Laundry
- * CSSD
- * Finance
- * Doctor Honorarium
- * MIS
- * Equipment Maintenance

- * Appointment Scheduling
- * Out Patient Registration
- * Out Patient Billing
- * Casualty Registration
- * Casualty Billing
- * Indoor Patient Regn
- * Indoor Patient Billing
- * A D T
- * Wards Management
- * OT Management
- * MIS

INTERFACE TO Health and Hospital Information Network



Management Information Systems
Business intelligence

Health and Hospital Information Network Backbone

Health and Hospital Information Network

EMR

- Medical Gastroenterology
- Surgical Gastroenterology

LIS

- * Biochemistry
- * Haematology
- * Microbiology
- * Clinical Pathology
- * Immunoassay
- * Histopathology
- * Serology

IMAGING

- Gastroscopy
- Colonoscopy
- EUS
- Capsule
- Enteroscopy
- ERCP
- C Arm
- Cath Lab
- ESWL
- US
- CT
- ECG
- Magnification Endoscopy
- Elastography
- OT
- Scanner
- Pathology

Output Templates: Document

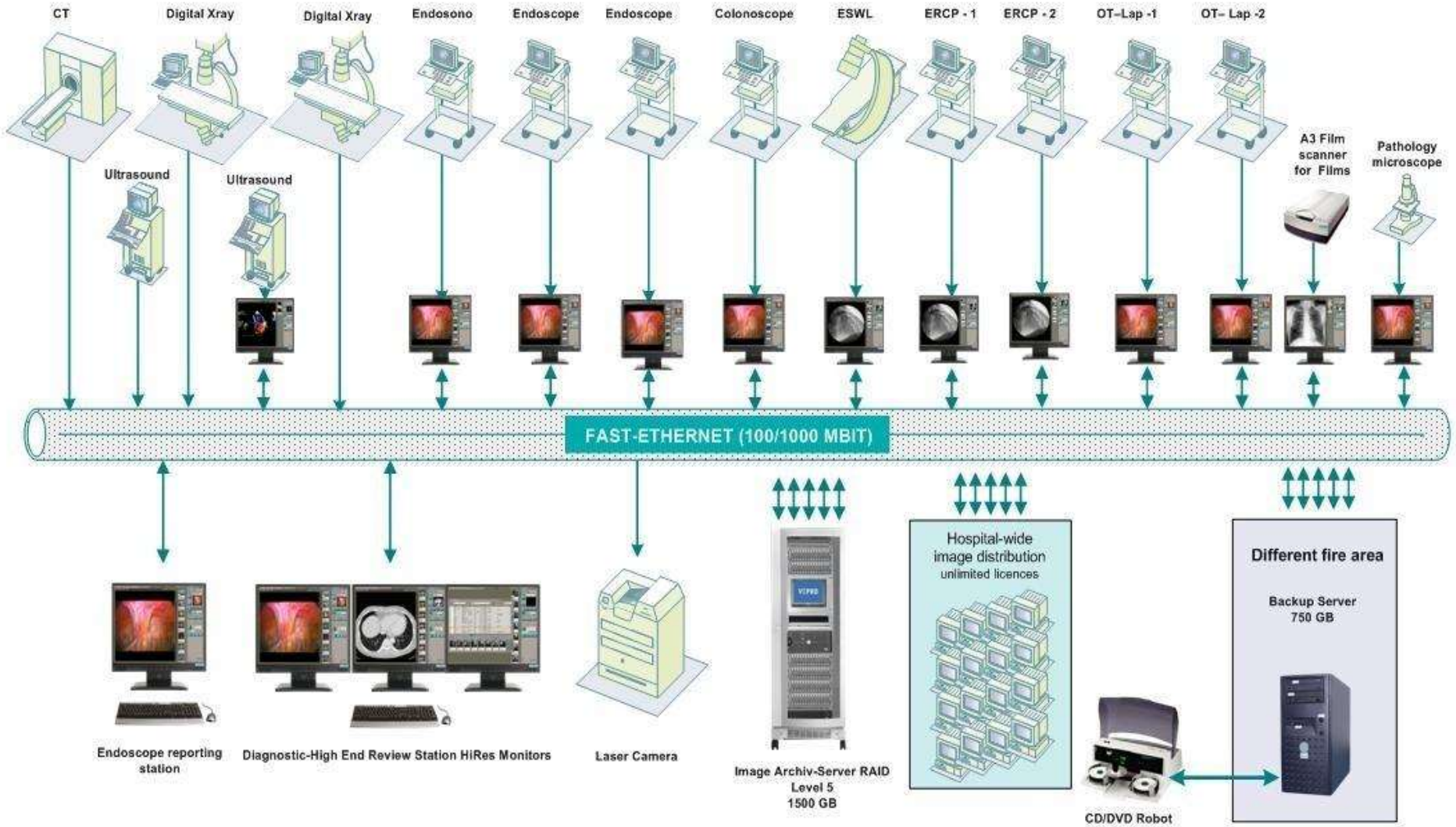
- * Consultation Summary
- * Surgeon Notes
- * Anaesthetist Notes
- * Discharge Summary
- * Referral letters
- * Certificates

Spreadsheet

- * Pathology Reports

Imaging Reports

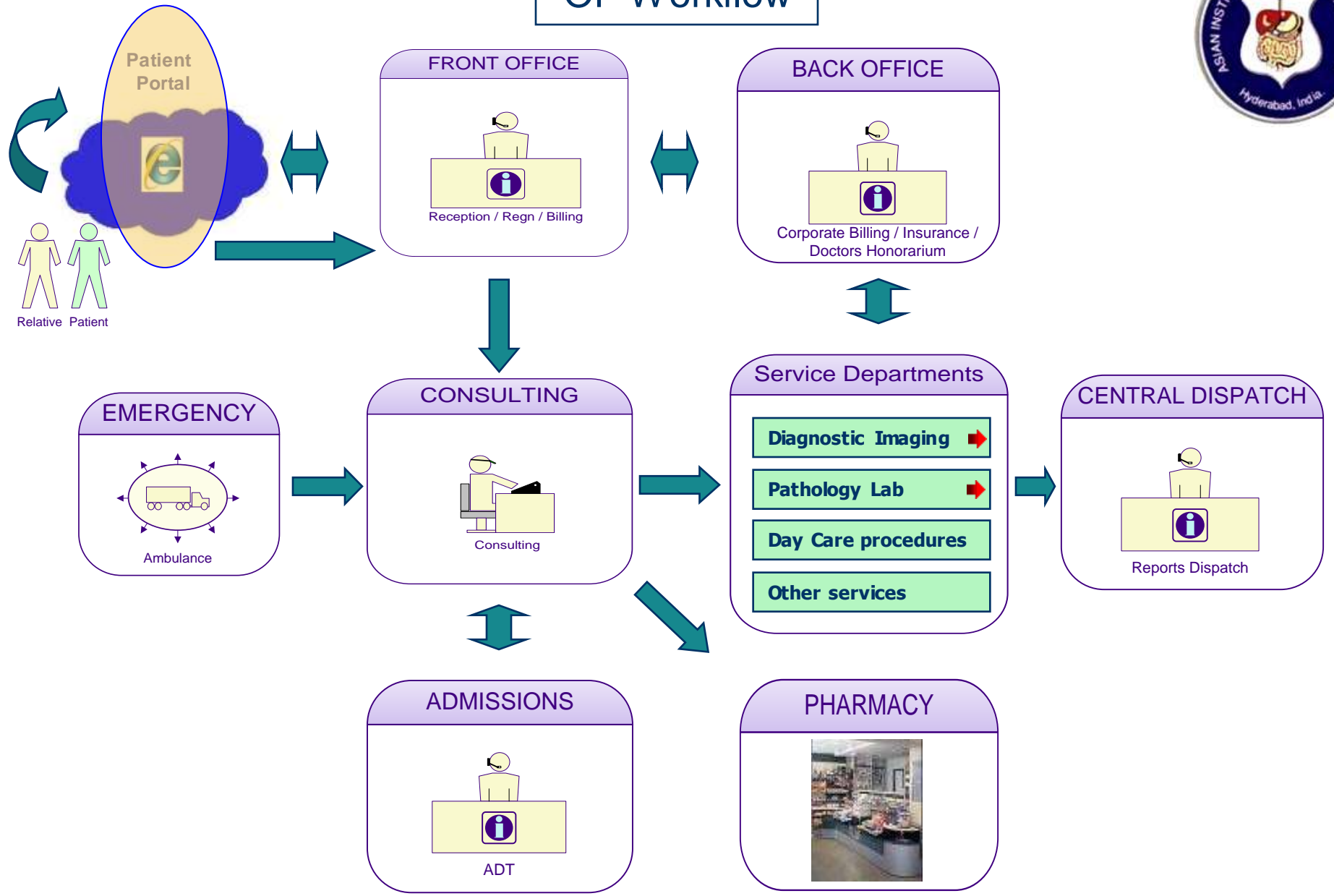
- Endoscopy Reports
- CT Reports
- US Reports
- ERCP Reports
- Capsule Endoscopy Reports



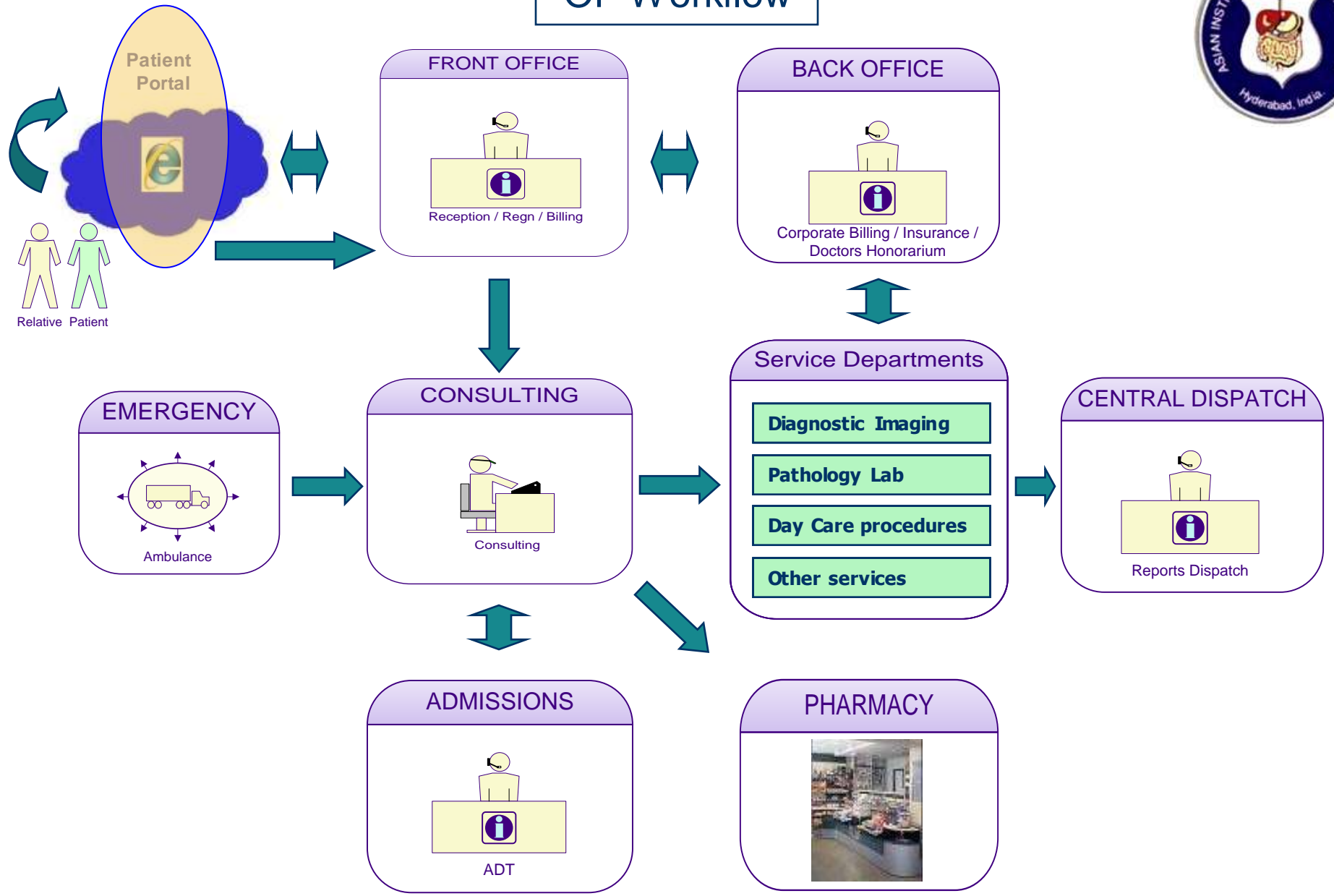


OUT PATIENT

OP Workflow



OP Workflow

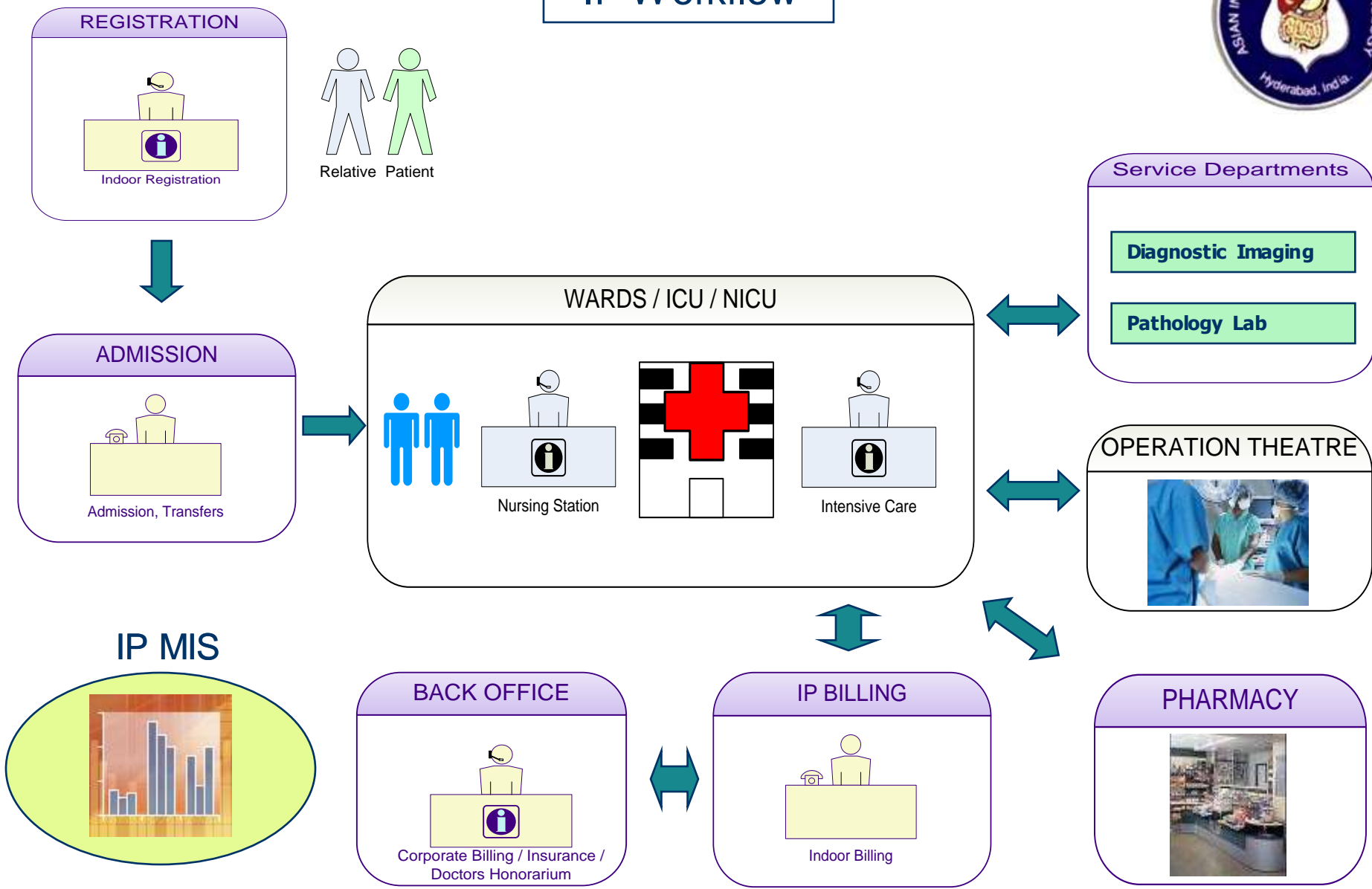




IN PATIENT

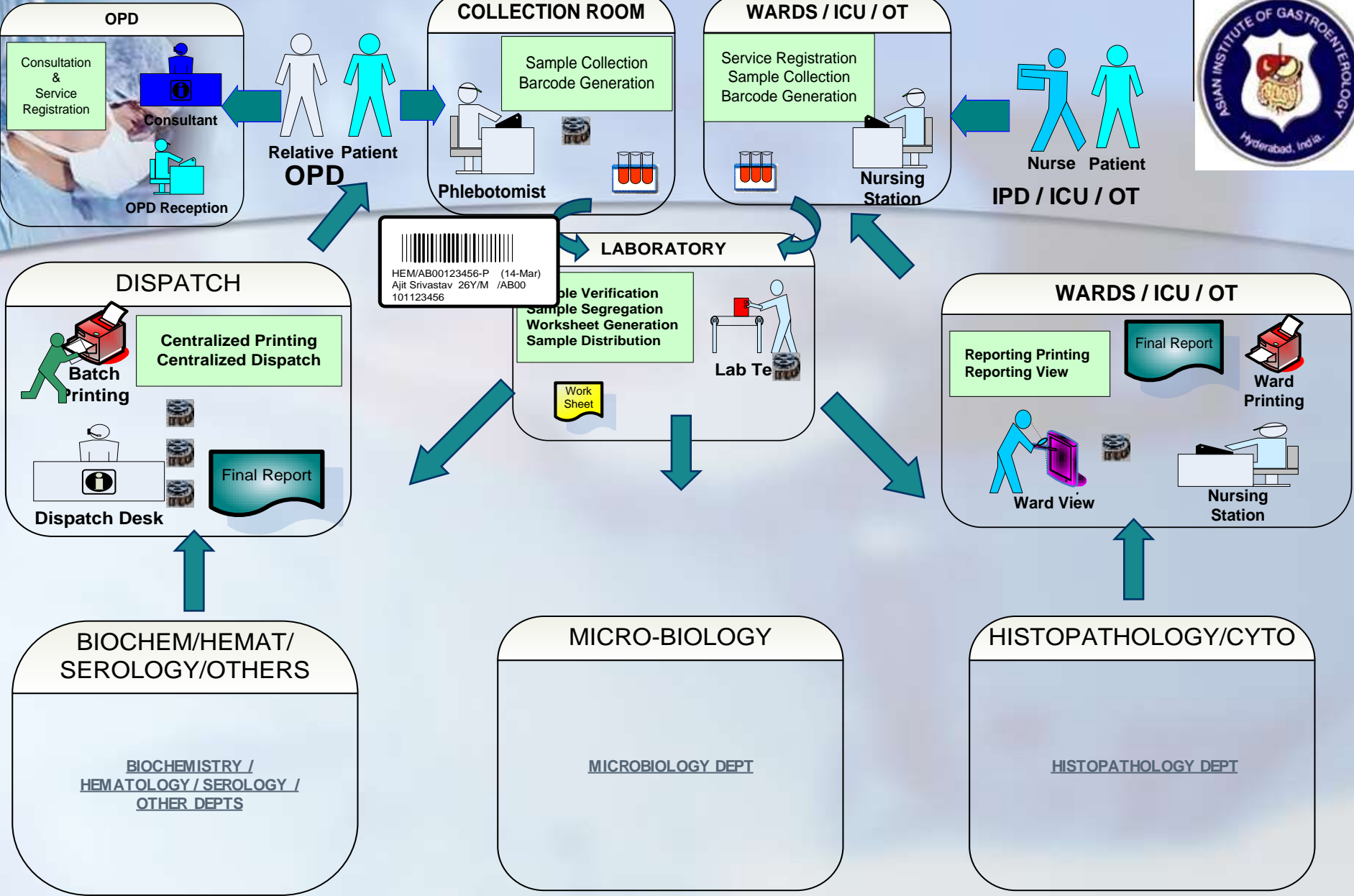


IP Workflow





LABORATORY INFORMATION SYSTEM





ELECTRONIC MEDICAL RECORDS



Holistic EMR

Sources of data capture

Clinical aspects of data capture

INPUT DEVICES



MOBILE PHONES



POCKET PCS



E-PENS



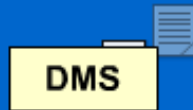
SMART CARD



BARCODE



INSURANCE CARDS



DMS

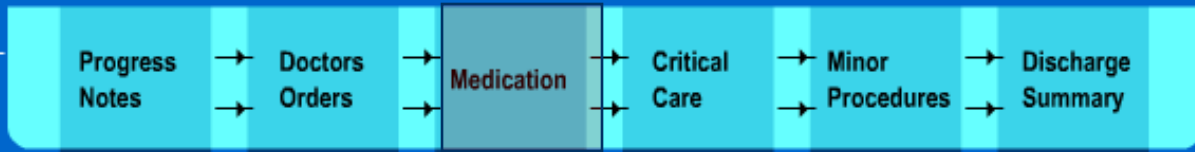


INTERNET

OPD /CASUALTY



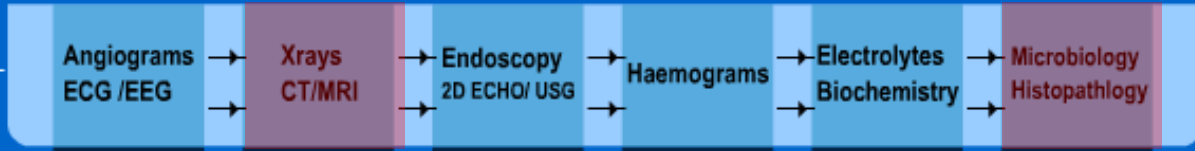
WARDS / ICU/ ICCU/ NICU



OT COMPLEX / CATHLAB



DIAGNOSTICS



IMAGING

Pathology

MRD



ICD-10 CPT

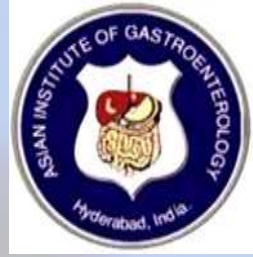
ELECTRONIC MEDICAL RECORDS

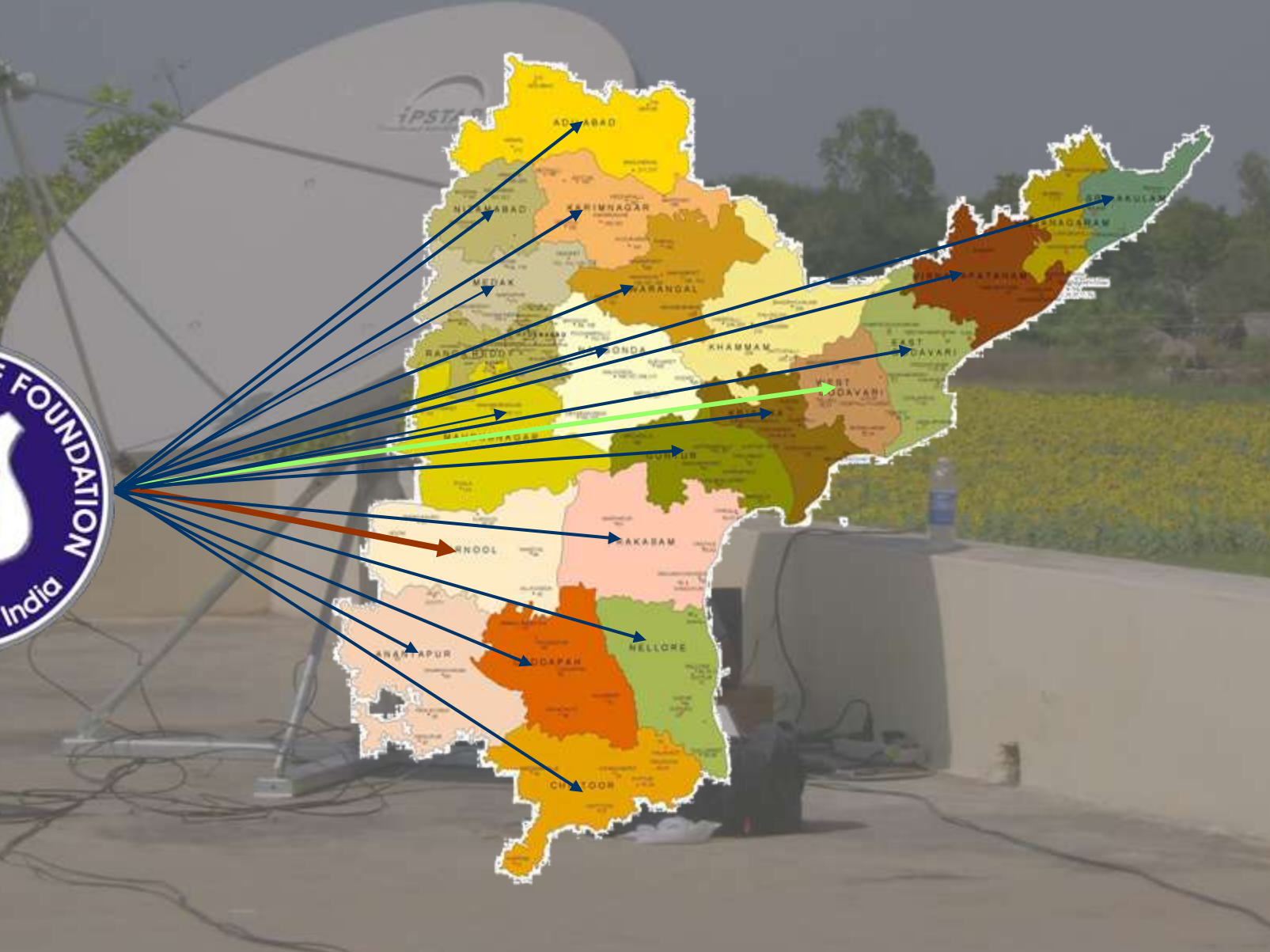
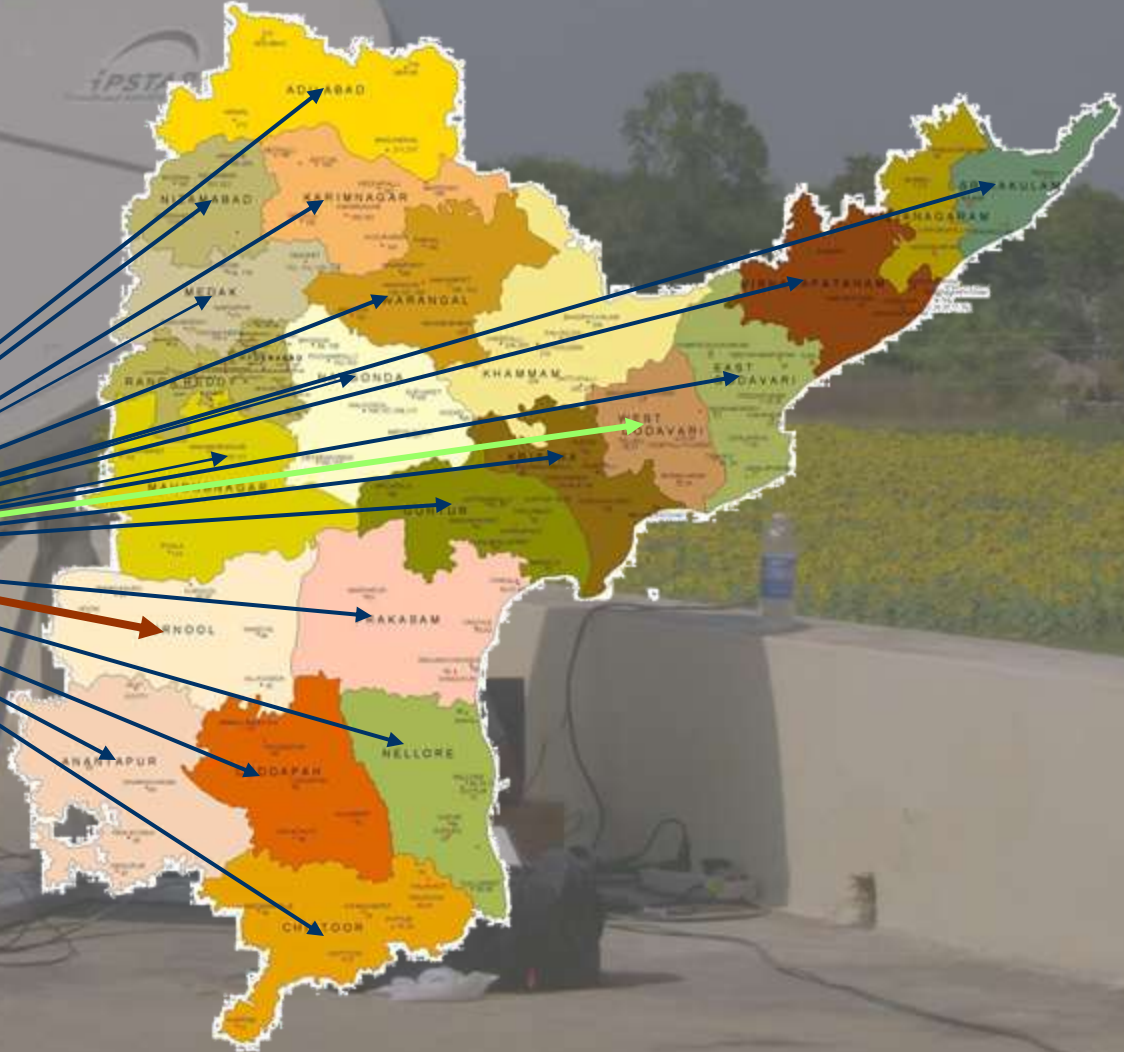
TELE MEDICINE

Back

Holistic EMR

Rural Health Camp – Telemedicine





Rural Health Camp – Telemedicine



Data Generated - Gastroenterology 2005-2010

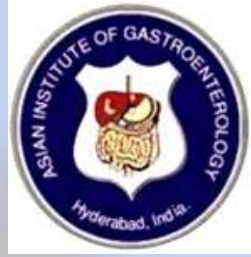


Modes	Number	
Clinical Data		
Out Patients	3,45,960	
In Patients	54,634	
Imaging		Images
Upper GI Endoscopy	1,64,693	4,94,079
Colonoscopy	50,905	1,52,715
ERCP	11	1,44,044
EUS		37,388
US	2,80,280	5,20,560
CT	19,822	
Capsule Endoscopy	633	
Rural Programme & Telemedicine		
Patients Treated	1,47,263	
Endoscopy	4,640	
US	3,244	

5 GB/Day



HIS – Implementation Difficulties & Limitations



Software:

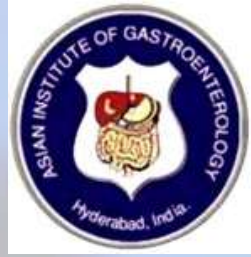
- Integration of Different modules
- Cost and Maintenance
- Version upgrade related

User Acceptance:

- Administrators – Good
- Paramedical – Fair
- Medical – Bad



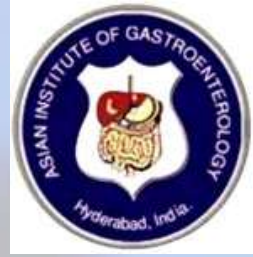
Data Acquisition



- ❑ History , Physical etc – Text based
- ❑ Predefined Templates – Data fields
- ❑ Images – DICOM & Non DICOM
- ❑ Lab Data – Integration with HIS



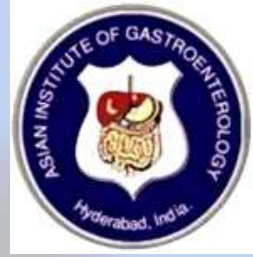
Data Usage - Present



- ❑ Retrieval – Patient Management
- ❑ Analysis :
 - ❑ Retrieved by user defined coding and third party program for analysis
 - Research
 - To evaluate pattern of diseases – Geographical, Seasonal
 - Genetic study
 - Hospital infections – Alerts
 - Auditing – Quality care
 - Images PACS – Diagnostic Automation



Data Usage - Present



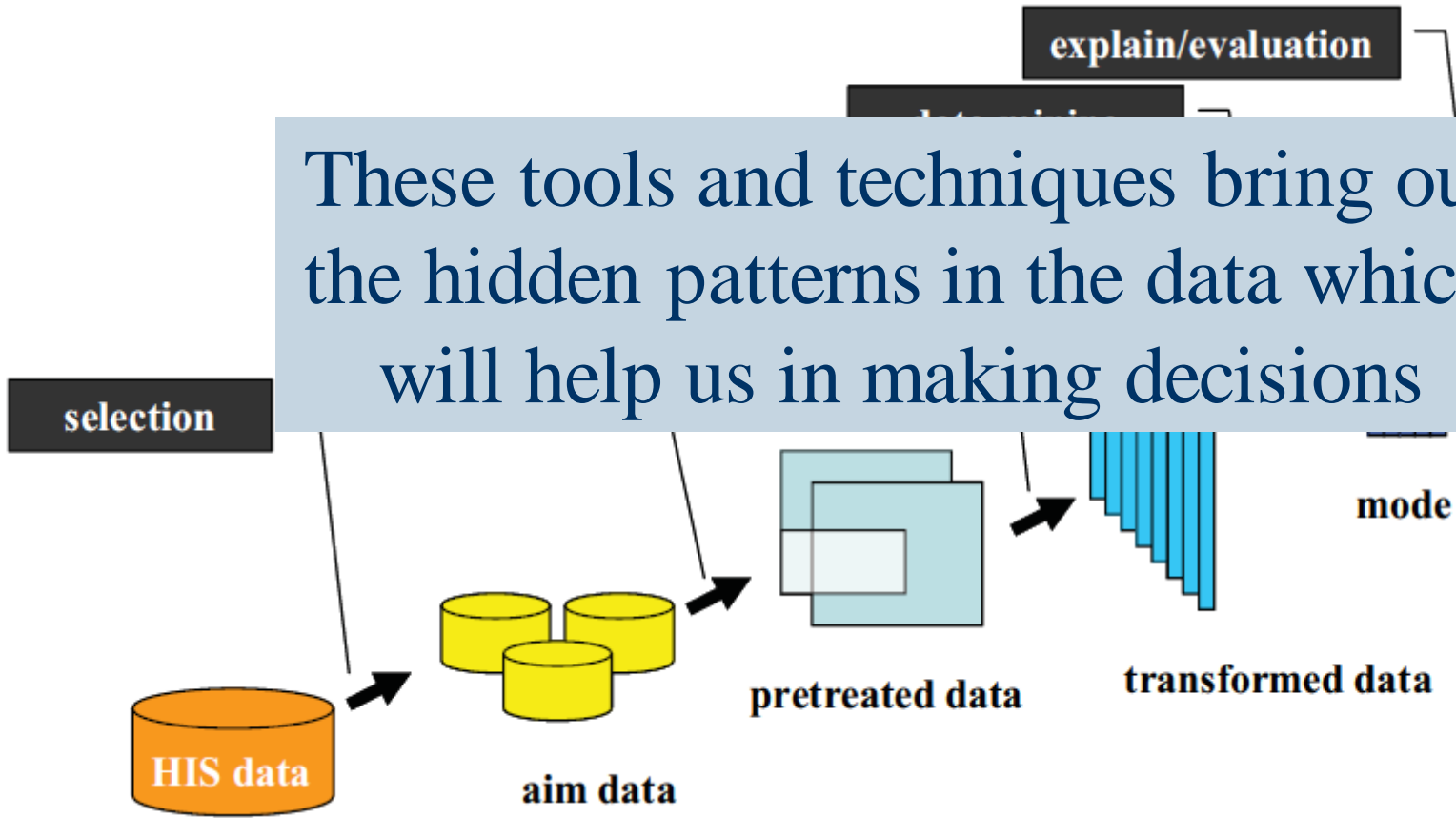
Limitations of Manual analysis:

- Large Data bases
- Hidden and Potential relationships of data may not be recognized



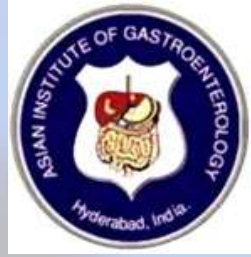
Data Usage - Future

These tools and techniques bring out the hidden patterns in the data which will help us in making decisions





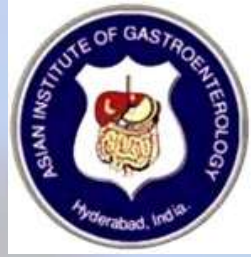
Data Usage - Future



Diagnostic Dilemma
Evaluating Treatment Choices



Inflammatory Bowel Disease



Data:

No of Subjects: >1100

No of Fields / Subject: 78

Data Components:

Clinical, Investigations, Genetic,
Drugs, Surgery, Follow up.

Data Format:

Text, Tables, Excel, Images

PATIENT HISTORY



Case No: 1,056 Reg No: 20050601103 Date: 06/12/2011 Name: M.Ravi kiran reddy

Personal Info | Presenting Complaints | **History** | Investigations and Activity Score | Activity Score | Follow Up-New

Family History

FH of IBD No **Name of Relation** **Comments**

Sanguinity Yes **Relationship** father& mother **Disorder/Disease in Family** Nc... **Relationship**

Family Disorder

Personal History

Diet Mixed **Exposure to any Mutagen/Teratogen with duration** Nc...

Smoking No 0 **Per Day** **Duration** 0 **Tobacco** Nc... **Duration** 0

Past History

Age at Onset Of Symptoms 12 **Years** **Age at Diagnostic** 13 **Years** **No Of Relapses** 2 **H/o ATT** Ye... 0 **true** **Dr Consulted before Diag**

S	Surgery Name	Complications
1	laprotomy: resection of terminal ileum(27 july 2009)	
2		

S	Medication	Others
5	Others	bevon
6	Steroids	wysolone
7	Others	immuron, cibr...
8		



IBD Search Engine

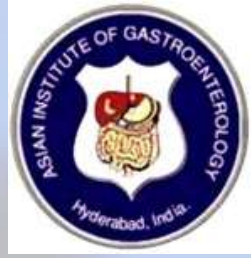


IBD Search Engine

MaritalStatus	Religion	Religion.	Caste	OccupLast_Name	Education_Name	Provisionaldiag_Name	ProvisionalDiagtxt	Hno
Married	Hindu					Ulcerative Colitis		0-0,ramakrishna
Married	Hindu		raj	Professional-Softw	Graduate	Crohns Disease		plot no-49
Married	Hindu					Ulcerative Colitis		3,harishava sec
	Hindu			Skilled	Post Graduate	Ulcerative Colitis		16-9-653/2
Married	Hindu				Graduate	Crohns Disease		8-5-14
Married	Hindu				Post Graduate	Crohns Disease		tirumala nursing
Married	Hindu				Graduate	Crohns Disease		plot no 92A,roa
Married	Hindu				Graduate	Crohns Disease		613,
Married	Hindu				Schooling Second	Crohns Disease		qr no DA-9
Married	Hindu		brahmin		Post Graduate	Crohns Disease		326,indira naga
Married	Hindu				Graduate	Ulcerative Colitis		15-8-140
Married					Schooling Second	Crohns Disease		0-0,
Married	Hindu				Post Graduate	Ulcerative Colitis		no507,krishna r
Married	Hindu			Business	Graduate	Crohns Disease		mayur electroni
Married					Schooling Primary	Crohns Disease		1-3/24-3
UnMarried	Hindu				Schooling Primary	Crohns Disease		1-1-74/c1
Married					Graduate	Ulcerative Colitis		305
Married	Hindu		reddy		Schooling Primary	Ulcerative Colitis		parbani vill, nea
UnMarried					Graduate	Crohns Disease		B3,MANJEERA
Married	Hindu				Schooling Primary	Crohns Disease		83,laxmi nagar
Married	Hindu				Graduate	Crohns Disease		suchita trading
Married					Illiterate	Crohns Disease		kakra,
Married	Hindu				Graduate	Ulcerative Colitis		1-6/6,soumya e
Married	Hindu		Raju		Schooling Primary	Crohns Disease		telephone exch

Case scenario – Crohns Disease

Diagnosis



Problem:

Intestinal TB – Common in India

Crohns Disease – Incidence increasing in India

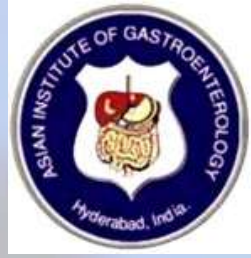
Differentiation:

Difficult

Critical – Treatment is different

Case scenario – Crohns Disease

Diagnosis



Question:

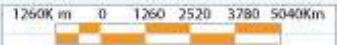
In a given number of patients (>4000) –
(TB & Crohns):

- Can we diagnose the disease accurately?
- Predict the outcome of treatment?
- Recommend best treatment based on previous treatments?

Chronic Pancreatitis: Prevalence



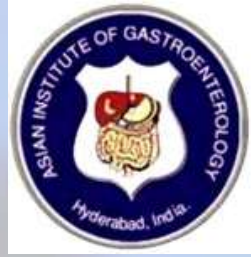
WORLD
Political Map



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Chronic Pancreatitis



Data: 5 Years

No of Subjects: >5000

No of Fields / Subject: 58

Data Components:

Clinical, Investigations, Genetic,
Drugs, Endoscopic Procedure, Surgery,
Follow up.

Data Format:

Text, Tables, Excel, Images



Chronic Pancreatitis - Proforma



Date of screening/current presentation: ___/___/___ Included Excluded _____

AIG no: Study scr./sl. no. ___/___ First visit to AIG: ___/___/___

Name: _____ Age: _____ yrs Gender: M F

Address: _____ Diabetes: Y N Type _____

Telephone no.: Rx: Insulin/OHA

Date of onset of symptoms: ___/___/___ Date of diagnosis: ___/___/___

Etiology: Alcohol (Amt. ___; Durⁿ ___) Idiopathic TCP Smoking (Amt. ___; Durⁿ ___)

Co-morbidities: CAD AlCLD/CLD AVH ___ TB Granulomatous dis. Connective tissue dis. _____

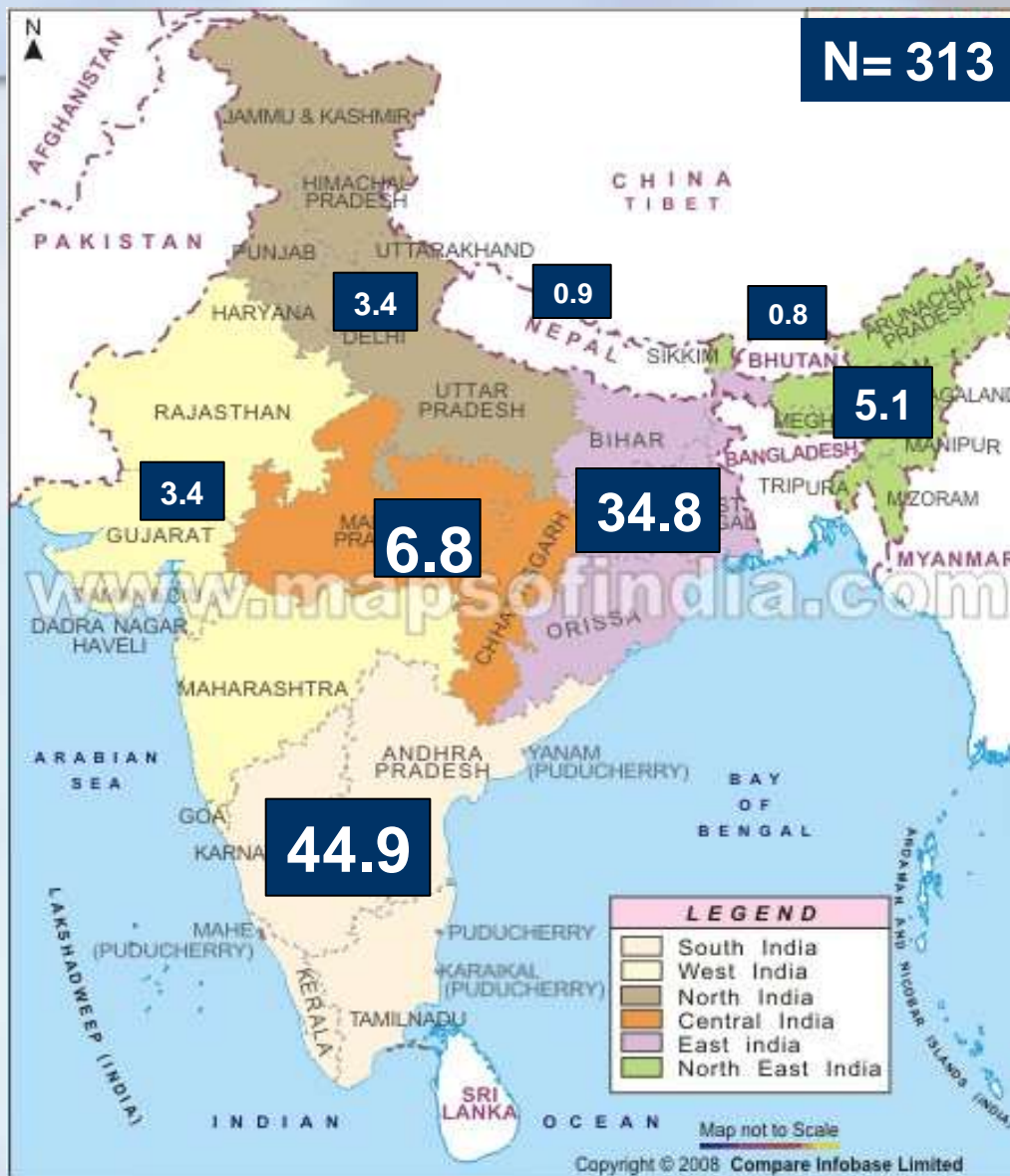
Ac. on CP F/H/O DM Exanthematous/Viral illness

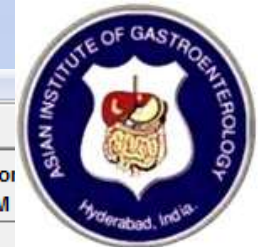
Date and dur ⁿ .	Pain characteristics <i>(Frequency; Intensity[VAS]; Nature [stabbing, burning]; Trigger; Referral; Radiation; Duration; Vomiting; Dyspeptic sx.; Flatulance; Medication; Development of steatorrhea and diabetes)</i>	Morphology <i>(MPD size, SB, MPD stones, Parenchymal cal.; Atrophy, Pseudocysts; Aneurysm; Thrombus)</i>	Procedure <i>(ERCP, ESWL, Surgery)</i>	Drugs	Wt/ BMI



Data of Chronic Pancreatitis

(1st Aug 2011 to 8th Dec 2011)





Beta cell study main database		Age	Age 40 or below	Gender	Habitat	BMI when I saw first	Diabetes	DM before age 40yrs	RX of DM	Duration DM
1		16	YES	F	East		No	No		
2		22	YES	M	East		No	No		No
3		37	YES	F	North		Yes	Yes		No
4		30	YES	F	East		No	No		No
5		38	YES	M	East		No	No		Yes
6		16	YES	M	South		No	No		No
7		41	NO	F	Central		No	No		No
8		60	NO	F	Central		No	No		No
9		53	NO	M	South		No	No		Yes
10		22	YES	M	South		No	No		No
11		15	YES	M	Central		No	No		No
12		37	YES	F	East		No	No		No
13		34	YES	M	East		Yes	Yes		No
14		27	YES	F	East		No	No		No
15		25	YES	F	East		No	No		No
16		38	YES	M	East		Yes	Yes		No
17		40	NO	M	South		No	No		Yes
18		37	YES	F	East		No	No		No
19		.		M	East		No	No		No
20		23	YES	M	East		No	No		No
21		45	NO	F	South		No	No		No
22		39	YES	M	South		Yes	Yes		Yes
23		68	NO	M	Central		Yes	ND		Yes
24		34	YES	M	East		No	No		Yes
25		31	YES	M	East		No	No		No
26		33	YES	M	South		No	No		No
27		32	YES	M	Central		No	No		Yes
28		18	YES	M	South		No	No		No
29		30	YES	M	South		No	No		No
30		21	YES	M	Central		Yes	Yes		No
31		42	NO	M	East		No	No		0 Yes
32		20	YES	M	South		No	No		No
33		36	YES	M	South		Yes	Yes		No
34		31	YES	M	South		No	No		Yes

Columns (32/0)

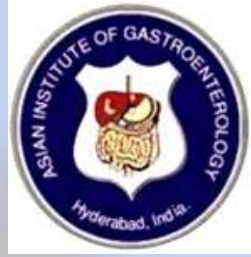
- AIG no
- Name
- Age
- Age 40 or below
- Gender
- Habitat
- BMI when I saw first
- Diabetes
- DM before age 40yrs
- RX of DM
- Duration of DM
- Alcohol alone
- Smoking alone
- Alcohol + Smoking
- Smokeless tobacco
- Idiopathic
- Others
- Diag <2yrs
- Diag 2-5yrs
- Diag 5-10yrs
- Diag >10yrs
- MPD stone
- Only MPD diin
- Max MPD size
- Parenchymal stone
- Pseudocyst
- Stone

Rows

All rows	304
Selected	0
Excluded	0
Hidden	0
Labelled	0



Case scenario – Chronic Pancreatitis Treatment



Problem:

Chronic Calcific Pancreatitis – Heterogeneous group of disease

Different modalities of Treatment - Available

Controversy : Which modality in Which Patient ?



Case scenario – Chronic Pancreatitis Treatment



Question:

Endoscopic versus surgical drainage of the pancreatic duct in chronic pancreatitis.
N Engl J Med. 2007 Feb 15;356(7):676-84.
Cahen DL, Gouma DJ, Nio Y, Rauws EA, Boonen MA, Busch OR, Smeets J, Laméris JS, Dijkgraaf MG, Huibregtse K, Bruno MJ.
Department of Gastroenterology and Hepatology, Academic Medical Center, Amsterdam, The Netherlands. s.djca@zha.nl

CONCLUSIONS: Surgical drainage of the pancreatic duct was more effective than endoscopic treatment in patients with obstruction of the pancreatic duct due to chronic pancreatitis. (Current Controlled Trials number: ISRCTN04572410 [controlled-trials.com].)

	Drainage	Resection
50-70	60-80	65-90

Treatment for painful calcified chronic pancreatitis: extracorporeal shock wave lithotripsy versus endoscopic treatment: a randomised controlled trial.
Gut. 2007 Apr;56(4):545-52. Epub 2006 Oct 17.
Dumonceau JM, Costamagna G, Tringali A, Vahedi K, Delhaye M, Hittellet A, Spera G, Giostra E, Mutignani M, De Maertelaer V, Devière J.
Department of Gastroenterology, Erasmus University Hospital, Brussels, Belgium. jmdumonceau@hotmail.com

CONCLUSIONS: ESWL is a safe and effective preferred treatment for selected patients with painful calcified chronic pancreatitis. Combining systematic endoscopy with ESWL adds to the cost of patient care, without improving the outcome of pancreatic pain.



Data Usage - Future

