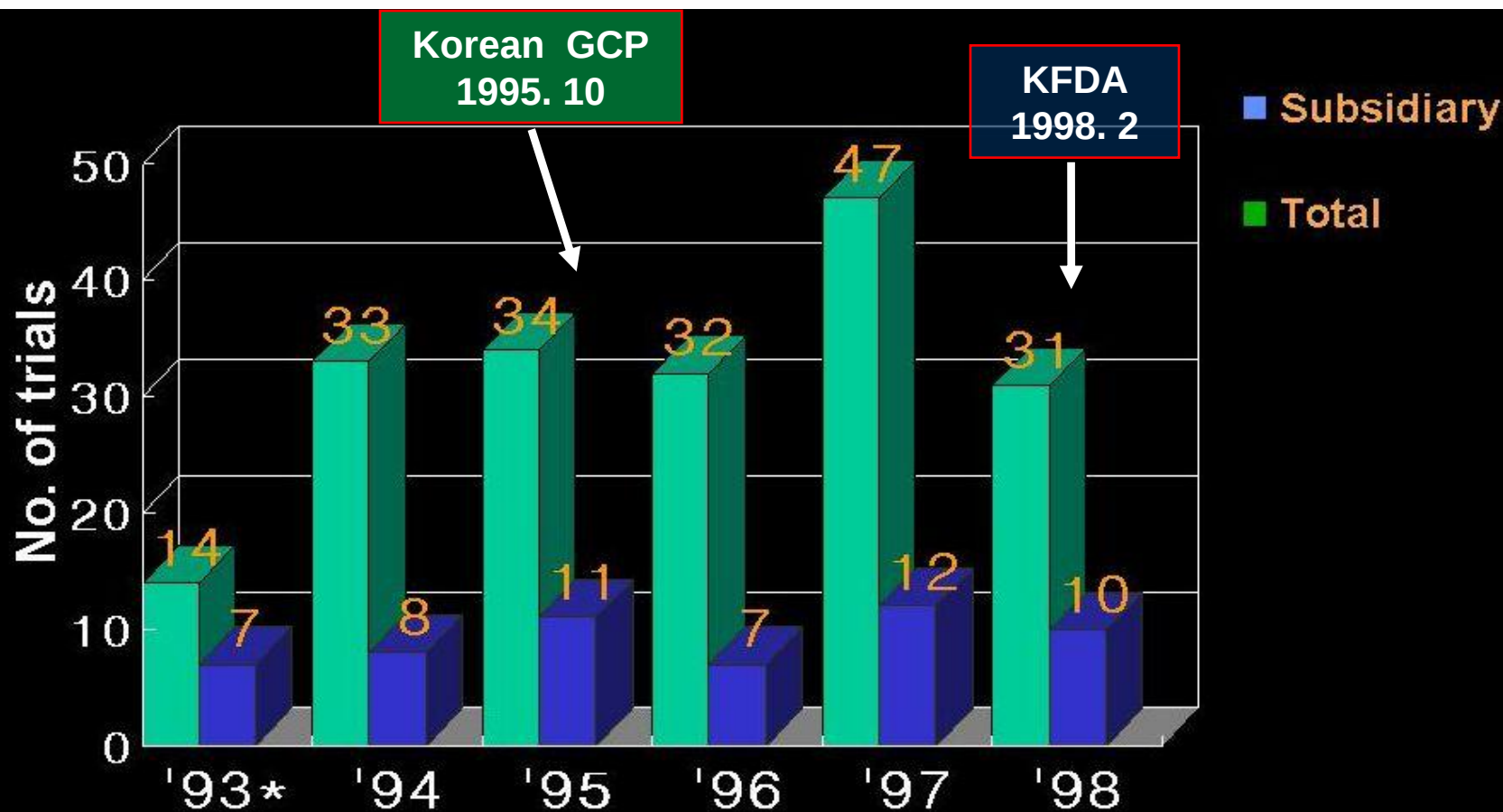


Clinical Trials in Korea

Yung-Jue Bang, M.D., Ph.D.

Vice-President, Korea National Enterprise for Clinical Trials
Director, Clinical Trials Center,
Professor, Division of Medical Oncology,
Seoul National University Hospital

Clinical trials for registration before 2000



Number of clinical trials for the new drug approvals

Driving forces for changes

- ❖ 1998 – 2000 : Comprehensive discussions among regulatory authorities, industry and academia
 - KFDA - successful progress of ICH meetings
 - Domestic pharma companies - new agents to be tested
 - Foreign pharma companies - new drugs to be launched
 - Academia - highly motivated clinical investigators
- ❖ 2000 : Bench-marking visit of Australia

Major regulatory changes in early 2000s

- **KGCP revision, as of January 4, 2000**
 - Harmonize with ICH guideline E6
 - Clarify the responsibility of investigators and the function of IRB
- **Adoption of the Bridging concept (E5) in 2001**
 - Diverse bridging strategies were permitted
- **Separation of IND from combined IND/NDA in 2002**

National Technology Roadmap Project* for clinical trial technology

- Experts Working Group recommend globalization of clinical trials.
 - Establishing ‘Centers of Excellence’
 - Developing educational/training programs for clinical trial professionals
 - International accreditation of IRBs
 - Regulatory reforms

* by MOST & MOHW, in 2002

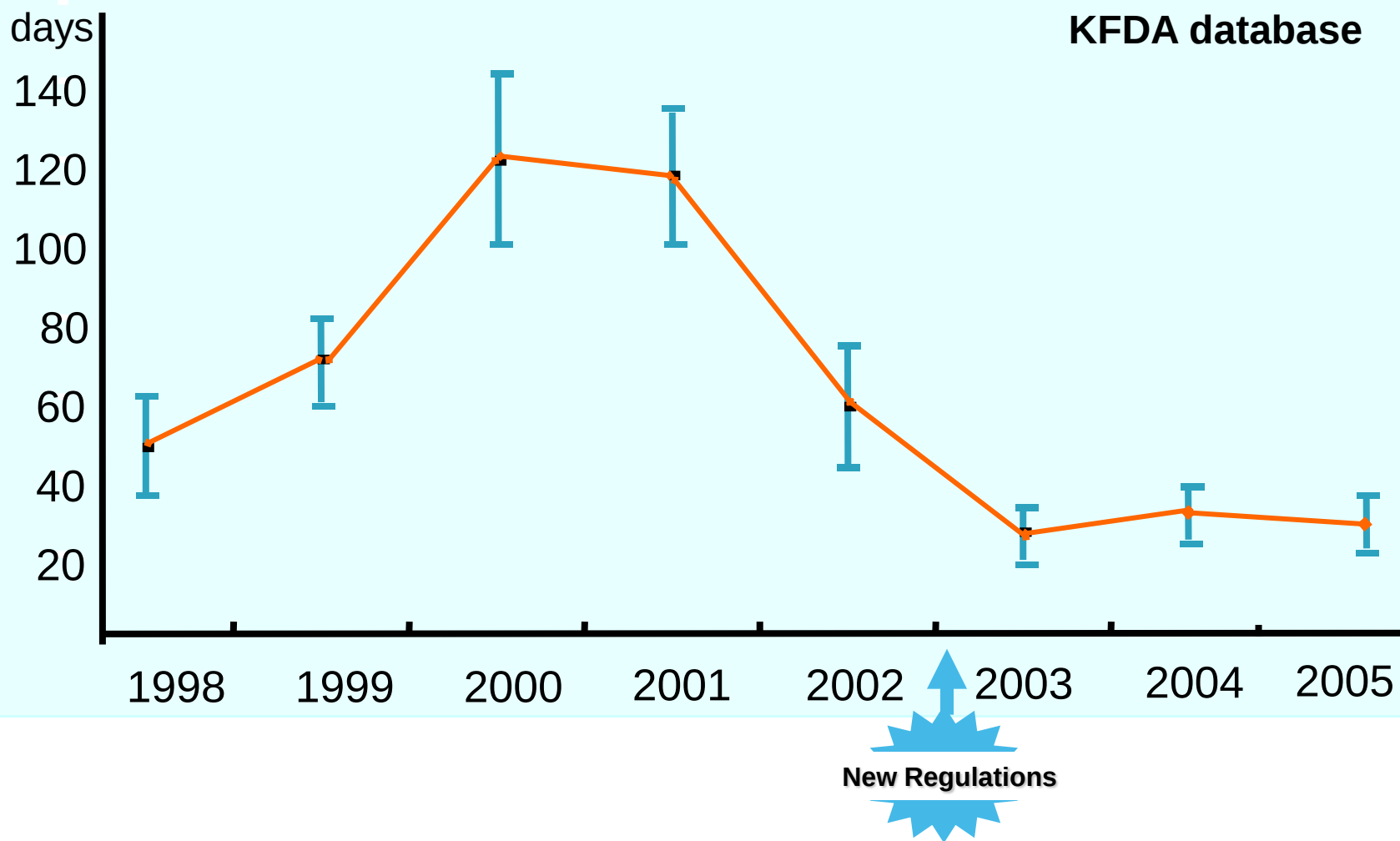
Upgrading IRBs

- Korean Association of IRB (KAIRB) in 2002
 - Non-profit organization with more than 50 IRBs
 - IRB operation guidelines, SOP
 - Education of IRB professionals
 - In 2007, endorsement from MOHW for training of IRB professionals
- International accreditation of IRBs
 - Samsung Medical Center in 2006*
 - Seoul National University Hospital, Asan Medical Center in 2006^
 - Inje University Busan Hospital, Seoul St. Maria Hospital, Chonnam University Hospital in 2007^
 - 14 IRBs as of 2009

* By AAHRPP, ^ by SIDCER/FERCAP

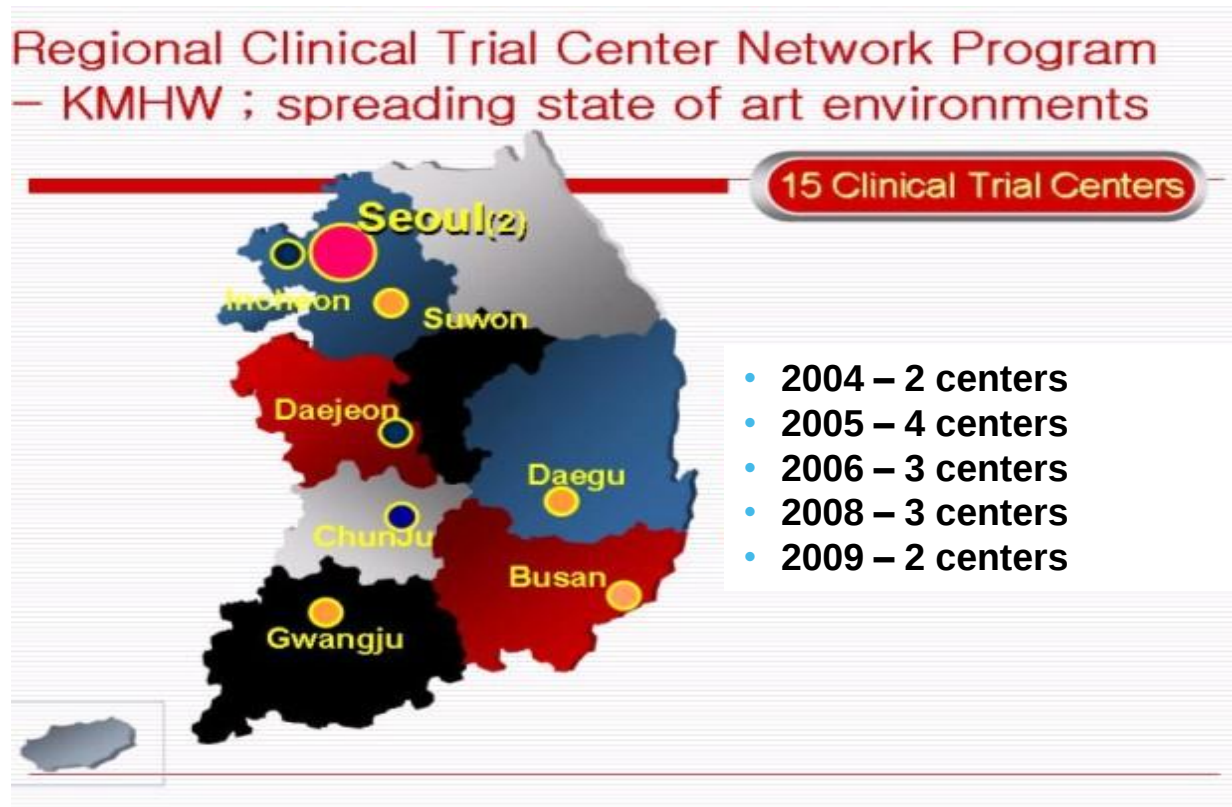
KFDA: Streamlining of IND review system

Reduced IND approval time in Korea



Regional Clinical Center by MOHW

- Similar to US NIH-GCRC supporting program
- 14 centers of excellence (2004-2009)



Clinical Trials Center, SNUH



- Established on June 15, 1997
- Designated as Regional Clinical Trials Center by MOHW in 2004
- Renovation in 2007



Clinical Trials Center, SNUH

Core lab.: sample
processing/storage



Outpatient clinic:
7+1 units



Research ward:
46 trial beds

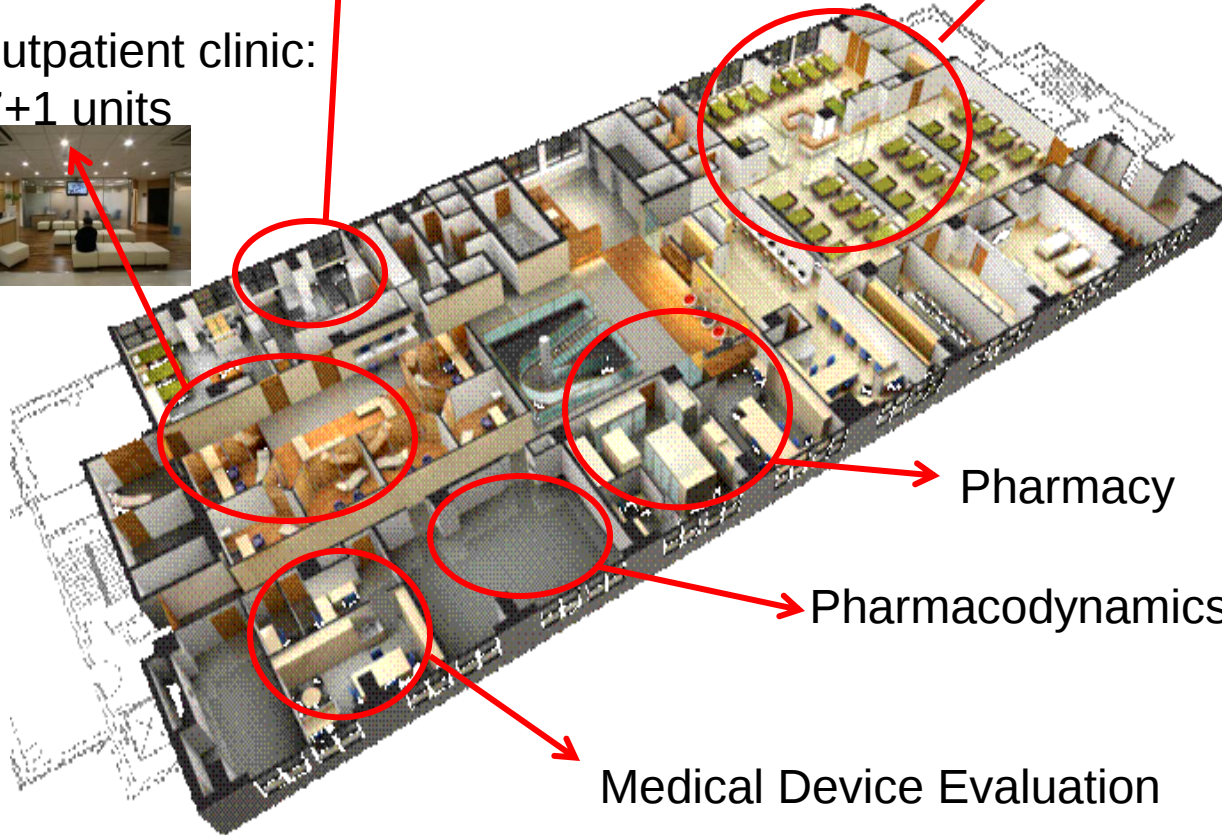


Pharmacy

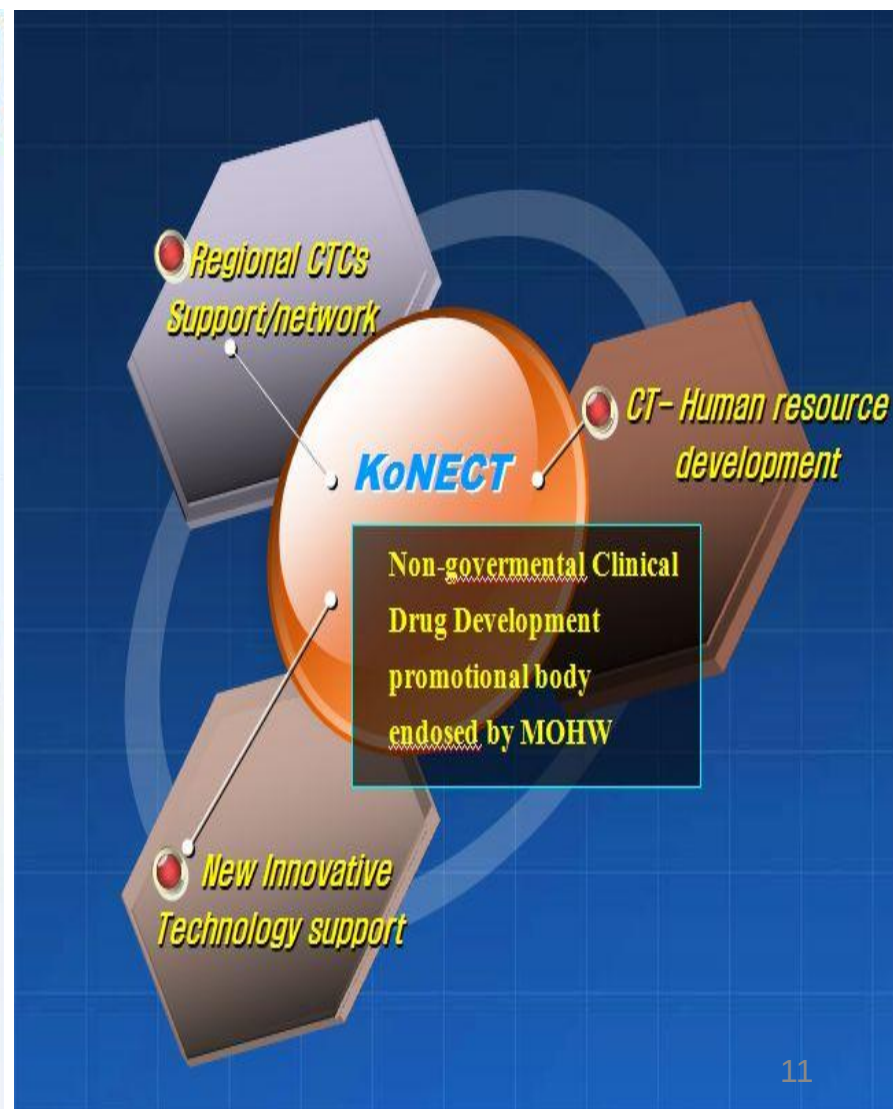


Pharmacodynamics lab.

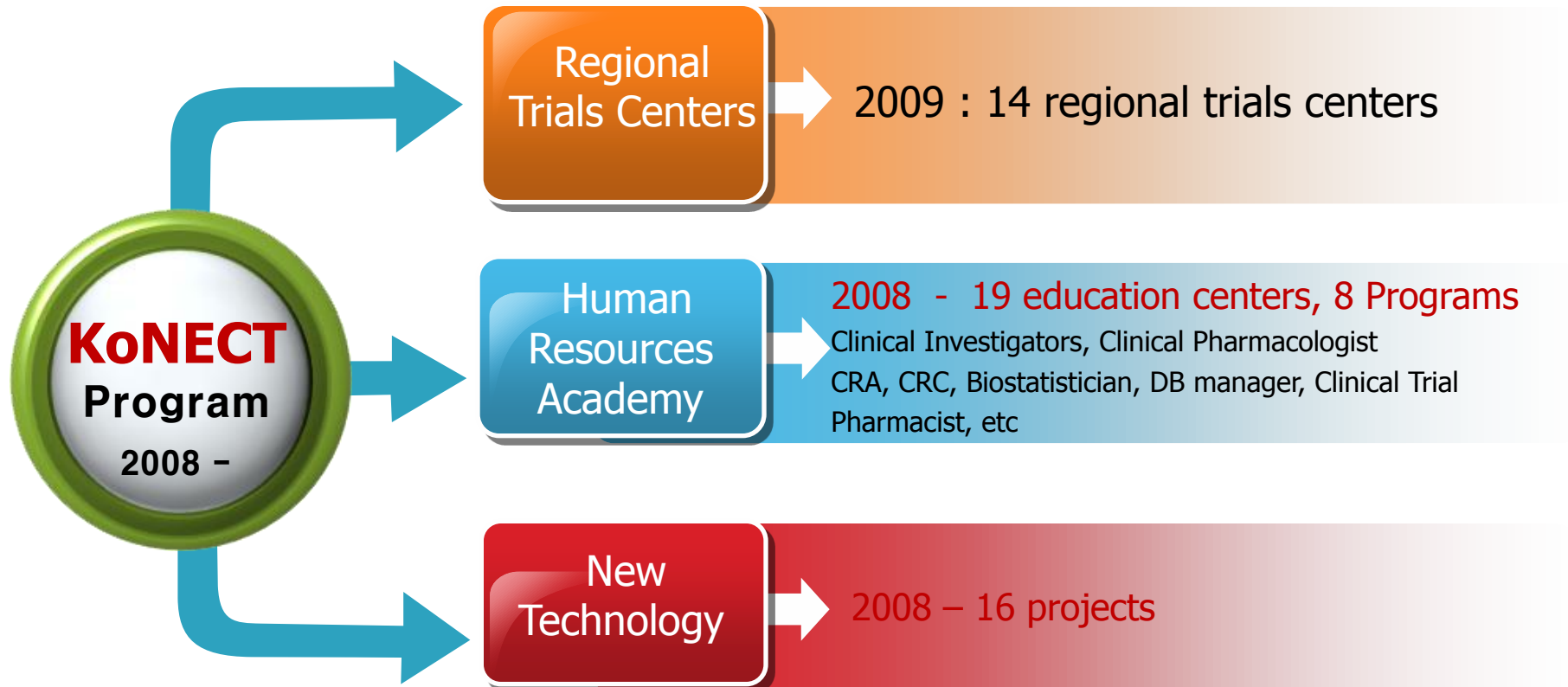
Medical Device Evaluation



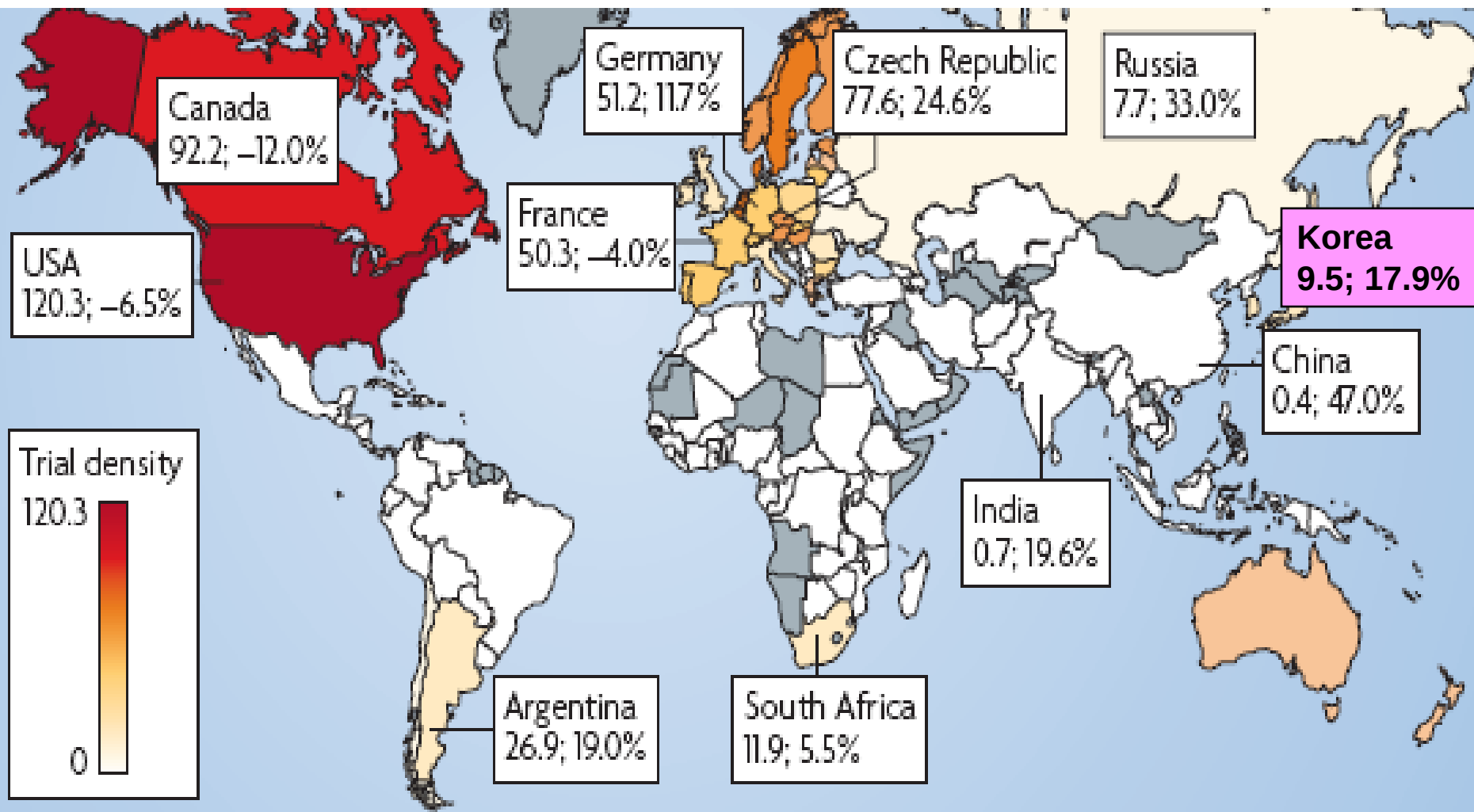
Korea National Enterprise for Clinical Trials (KoNECT) in 2007.12



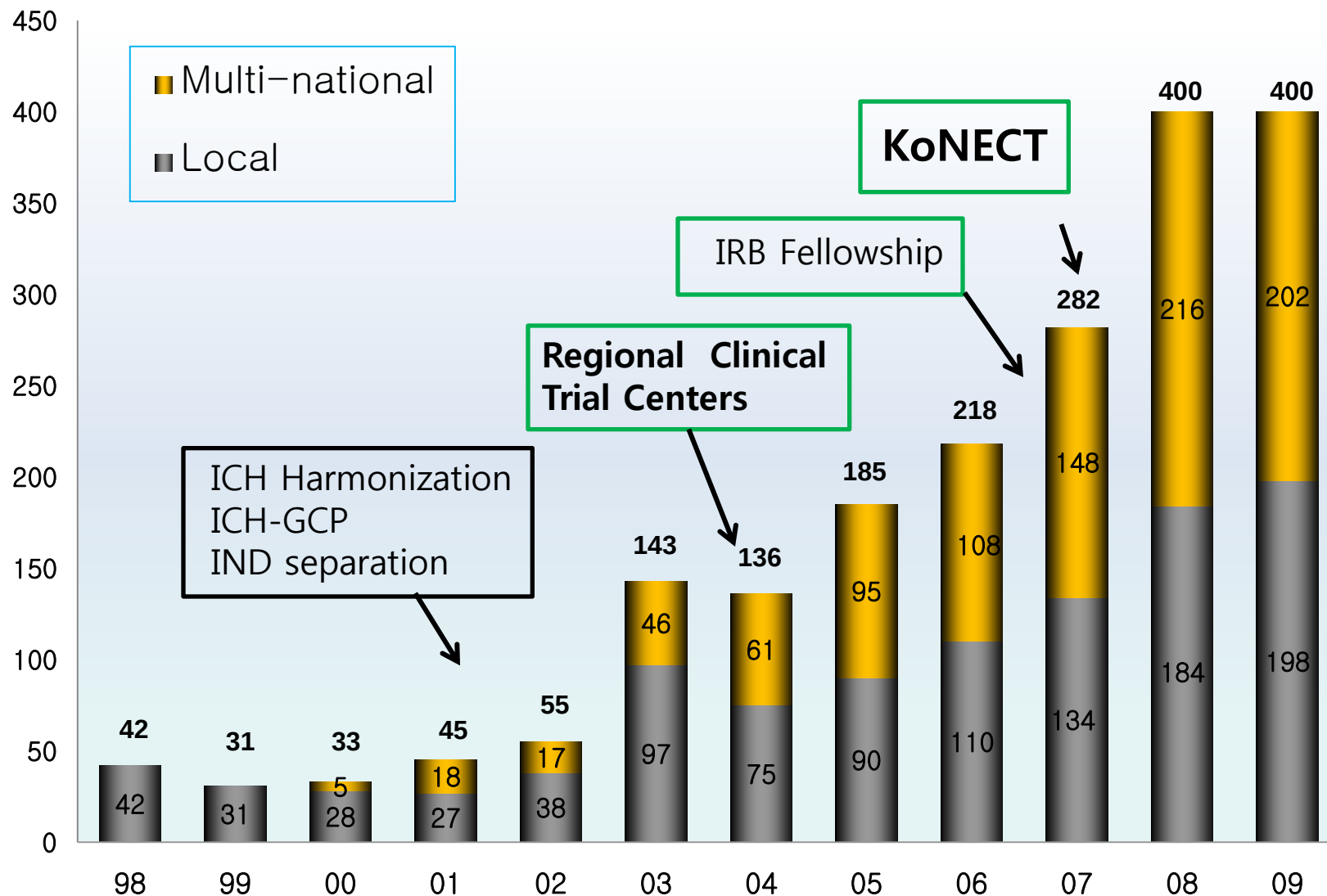
Activities of KoNECT



Globalization of clinical trials; trends



Clinical trials approved by KFDA



Clinical trials by country

❖ Source: www.clinicaltrials.gov, 31. Dec. 2009

	2005 (Total 115773)			2006 (119085)			2007 (115975)			2008 (142597)			2009 (96497)		
1	US	61371	53.01%	US	60289	50.63%	US	54263	46.79%	US	62426	43.78%	US	43918	45.51%
2	Canada	5870	5.07%	Germany	7324	6.15%	Germany	12642	10.90%	France	14266	10.00%	France	8105	8.40%
3	Germany	5817	5.02%	France	5451	4.58%	France	4628	3.99%	Germany	9922	6.96%	Germany	6428	6.66%
4	France	5666	4.89%	Canada	5150	4.32%	Canada	3688	3.18%	Canada	4786	3.36%	Canada	3010	3.12%
5	UK	3107	2.68%	UK	3956	3.32%	UK	3403	2.93%	Japan	4392	3.08%	Spain	2685	2.78%
6	Italy	2807	2.42%	Spain	2961	2.49%	Spain	3281	2.83%	Italy	3776	2.65%	Belgium	2583	2.68%
7	Japan	2578	2.23%	Italy	2841	2.39%	Italy	3053	2.63%	Spain	3548	2.49%	UK	2382	2.47%
8	Spain	2321	2.00%	Japan	2321	1.95%	Japan	2200	1.90%	UK	3240	2.27%	Italy	2347	2.43%
9	Netherlands	2319	2.00%	Poland	1725	1.45%	Poland	1823	1.57%	Russia	2023	1.42%	Japan	2168	2.25%
10	Australia	2177	1.88%	Australia	1642	1.38%	Belgium	1797	1.55%	Belgium	1976	1.39%	Korea	1426	1.48%
11	Belgium	1513	1.31%	Netherlands	1591	1.34%	Russia	1792	1.55%	Poland	1963	1.38%	China	1283	1.33%
12	Poland	1328	1.15%	Russia	1588	1.33%	Australia	1530	1.32%	Netherlands	1666	1.17%	Russia	1217	1.26%
13	Sweden	1255	1.08%	Belgium	1492	1.25%	Netherlands	1374	1.18%	Korea	1582	1.11%	Poland	1120	1.16%
14	Denmark	1214	1.05%	Brazil	1181	0.99%	India	1087	0.94%	Australia	1579	1.11%	Australia	1074	1.11%
15	Norway	937	0.81%	India	1074	0.90%	Hungary	1001	0.86%	India	1497	1.05%	Netherlands	1035	1.07%
16	Russia	909	0.79%	Argentina	1064	0.89%	China	997	0.86%	China	1493	1.05%	India	953	0.99%
17	Czech Republic	906	0.78%	Czech Republic	1058	0.89%	Brazil	974	0.84%	Czech Republic	1441	1.01%	Brazil	865	0.90%
18	South Africa	861	0.74%	Austria	1027	0.86%	Korea	970	0.84%	Brazil	1348	0.95%	Sweden	831	0.86%
19	Brazil	748	0.65%	Israel	973	0.82%	Czech Republic	948	0.82%	Sweden	1216	0.85%	Switzerland	798	0.83%
20	Hungary	741	0.64%	Sweden	883	0.74%	Israel	942	0.81%	Hungary	1103	0.77%	Hungary	753	0.78%
21	Switzerland	718	0.62%	Hungary	859	0.72%	Sweden	831	0.72%	Austria	1034	0.73%	Israel	728	0.75%
22	Taiwan	717	0.62%	Denmark	853	0.72%	Austria	816	0.70%	Israel	1033	0.72%	Austria	649	0.67%
23	Finland	684	0.59%	Mexico	827	0.69%	Argentina	794	0.68%	Denmark	992	0.70%	Denmark	641	0.66%
24	Mexico	625	0.54%	Korea	820	0.69%	Ukraine	742	0.64%	Romania	992	0.70%	Taiwan	633	0.66%
25	Argentina	619	0.53%	South Africa	776	0.65%	Mexico	712	0.61%	Argentina	895	0.63%	Czech Republic	631	0.65%
26	India	618	0.53%	China	774	0.65%	Denmark	666	0.57%	Mexico	850	0.60%	Mexico	605	0.63%
27	Israel	607	0.52%	Ukraine	714	0.60%	Switzerland	656	0.57%	South Africa	800	0.56%	Slovakia	514	0.53%
28	Austria	535	0.46%	Switzerland	571	0.48%	Taiwan	640	0.55%	Greece	798	0.56%	Romania	485	0.50%
29	China	459	0.40%	Romania	526	0.44%	South Africa	607	0.52%	Taiwan	770	0.54%	Finland	477	0.49%
30	Greece	393	0.34%	Finland	470	0.39%	Greece	593	0.51%	Ukraine	744	0.52%	Argentina	451	0.47%
31	Portugal	381	0.33%	Taiwan	460	0.39%	Finland	550	0.47%	Slovakia	688	0.48%	Greece	448	0.46%
32	Korea	373	0.32%	Norway	418	0.35%	Romania	546	0.47%	Finland	623	0.44%	South Africa	434	0.45%

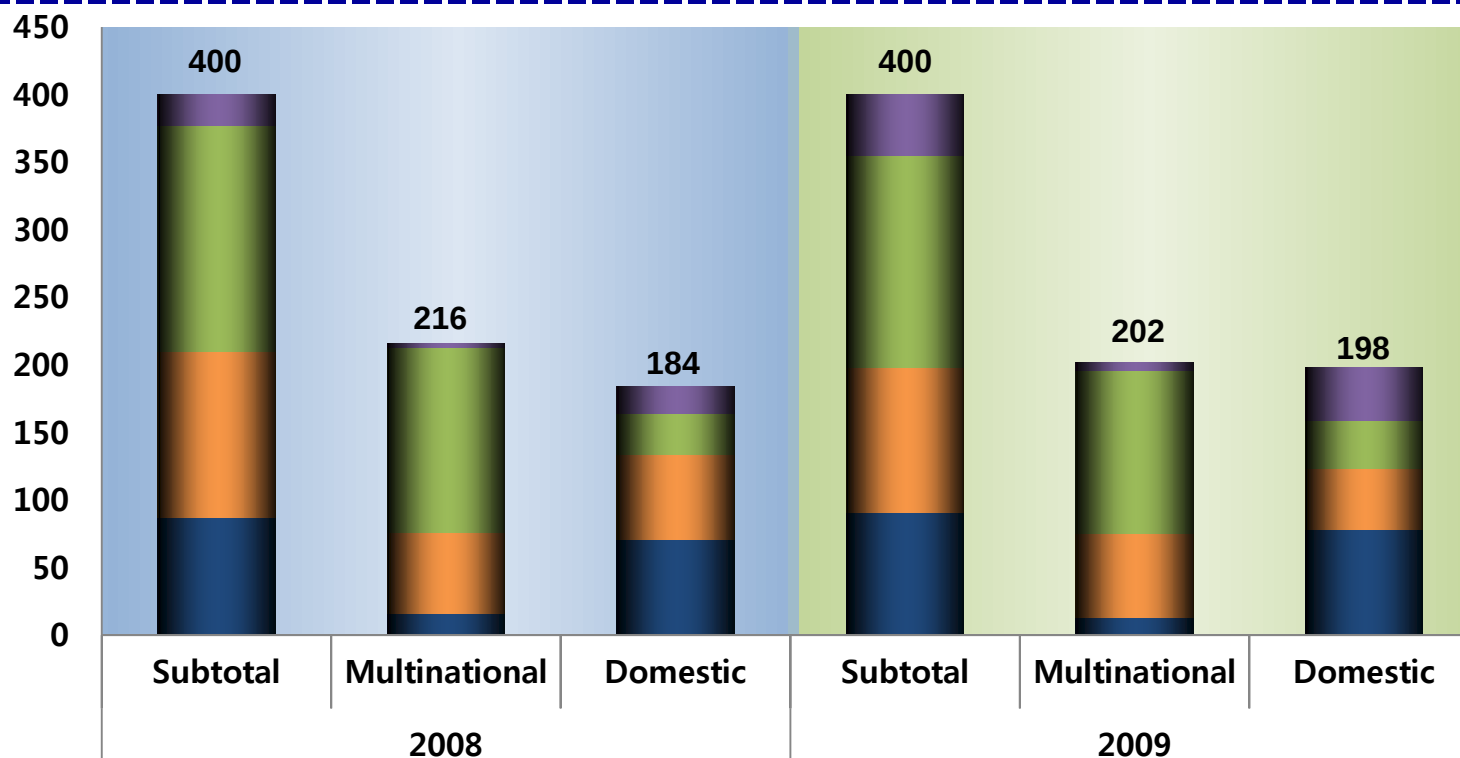
Clinical trials by city

❖ Source: www.clinicaltrials.gov, 31. Dec. 2009

2005 (115773)				2006 (119085)				2007 (115975)				2008 (142597)				2009 (96497)			
1	New York	1140	0.99%	New York	969	0.82%	Houston	1266	1.09%	Houston	1165	0.83%	Houston	934	1.11%				
2	Boston	1124	0.98%	Houston	910	0.77%	New York	1232	1.06%	New York	1164	0.83%	New York	792	0.94%				
3	Houston	955	0.83%	Boston	849	0.71%	Boston	975	0.84%	Boston	966	0.69%	Boston	758	0.90%				
4	Chicago	870	0.76%	Chicago	826	0.70%	Berlin	919	0.79%	Berlin	864	0.61%	Seoul	696	0.83%				
5	Philadelphia	838	0.73%	Philadelphia	763	0.64%	Chicago	796	0.69%	Philadelphia	858	0.61%	Berlin	594	0.70%				
6	Los Angeles	799	0.69%	Baltimore	760	0.64%	Philadelphia	726	0.63%	Chicago	791	0.56%	Philadelphia	572	0.68%				
7	Toronto	748	0.65%	London	725	0.61%	Los Angeles	660	0.57%	Los Angeles	789	0.56%	Chicago	572	0.68%				
8	Atlanta	744	0.65%	Dallas	648	0.55%	Dallas	637	0.55%	Dallas	747	0.53%	San Antonio	549	0.65%				
9	Seattle	732	0.64%	Los Angeles	641	0.54%	London	631	0.55%	San Antonio	747	0.53%	Baltimore	538	0.64%				
10	London	705	0.61%	Toronto	626	0.53%	San Antonio	591	0.51%	London	723	0.51%	London	532	0.63%				
11	Baltimore	688	0.60%	Berlin	617	0.52%	Baltimore	581	0.50%	Seoul	696	0.49%	Paris	525	0.62%				
12	Dallas	637	0.55%	Atlanta	607	0.51%	Rochester	580	0.50%	Baltimore	694	0.49%	Los Angeles	510	0.60%				
13	Portland	619	0.54%	Cleveland	580	0.49%	Cleveland	570	0.49%	Paris	684	0.49%	Dallas	508	0.60%				
14	Paris	611	0.53%	Birmingham	573	0.48%	Toronto	555	0.48%	Toronto	675	0.48%	Toronto	475	0.56%				
15	Pittsburgh	597	0.52%	San Antonio	548	0.46%	Madrid	528	0.46%	Atlanta	652	0.46%	Cleveland	446	0.53%				
16	Rochester	589	0.51%	Madrid	543	0.46%	Moscow	528	0.46%	Birmingham	623	0.44%	Rochester	444	0.53%				
17	Berlin	571	0.50%	Rochester	538	0.45%	Seoul	527	0.46%	San Diego	604	0.43%	Nashville	443	0.53%				
18	San Antonio	558	0.48%	Moscow	534	0.45%	Columbus	522	0.45%	Portland	599	0.43%	Portland	431	0.51%				
19	Cleveland	549	0.48%	Seattle	532	0.45%	Atlanta	521	0.45%	Moscow	592	0.42%	San Diego	429	0.51%				
20	San Diego	546	0.47%	Portland	510	0.43%	Seattle	518	0.45%	Cleveland	587	0.42%	Atlanta	427	0.51%				
21	Birmingham	539	0.47%	Barcelona	508	0.43%	Paris	503	0.43%	Madrid	575	0.41%	Seattle	415	0.49%				
22	Denver	523	0.45%	Pittsburgh	506	0.43%	Barcelona	497	0.43%	Columbus	561	0.40%	Madrid	413	0.49%				
23	Cincinnati	516	0.45%	Columbus	500	0.42%	Nashville	473	0.41%	Seattle	554	0.39%	Birmingham	403	0.48%				
24	St. Louis	499	0.43%	Paris	477	0.40%	Birmingham	467	0.40%	Cincinnati	549	0.39%	Cincinnati	391	0.46%				
25	Montreal	497	0.43%	Indianapolis	476	0.40%	Portland	466	0.40%	Nashville	544	0.39%	Columbus	385	0.46%				
26	Indianapolis	492	0.43%	Montreal	466	0.39%	Pittsburgh	461	0.40%	Rochester	521	0.37%	Barcelona	378	0.45%				
27	Taipei	472	0.41%	Cincinnati	462	0.39%	Cincinnati	433	0.37%	Barcelona	521	0.37%	Moscow	359	0.43%				
28	Columbus	452	0.39%	Miami	455	0.38%	Miami	429	0.37%	Miami	517	0.37%	Miami	357	0.42%				
29	Kansas City	442	0.38%	San Diego	453	0.38%	San Diego	423	0.37%	Indianapolis	511	0.36%	St. Louis	345	0.41%				
30	Miami	439	0.38%	St. Louis	426	0.36%	Indianapolis	419	0.36%	Pittsburgh	499	0.35%	Pittsburgh	324	0.38%				

77위 - Seoul 218 0.19% 37위 - Seoul 376 0.32%

Nature of clinical trials in 2008-2009



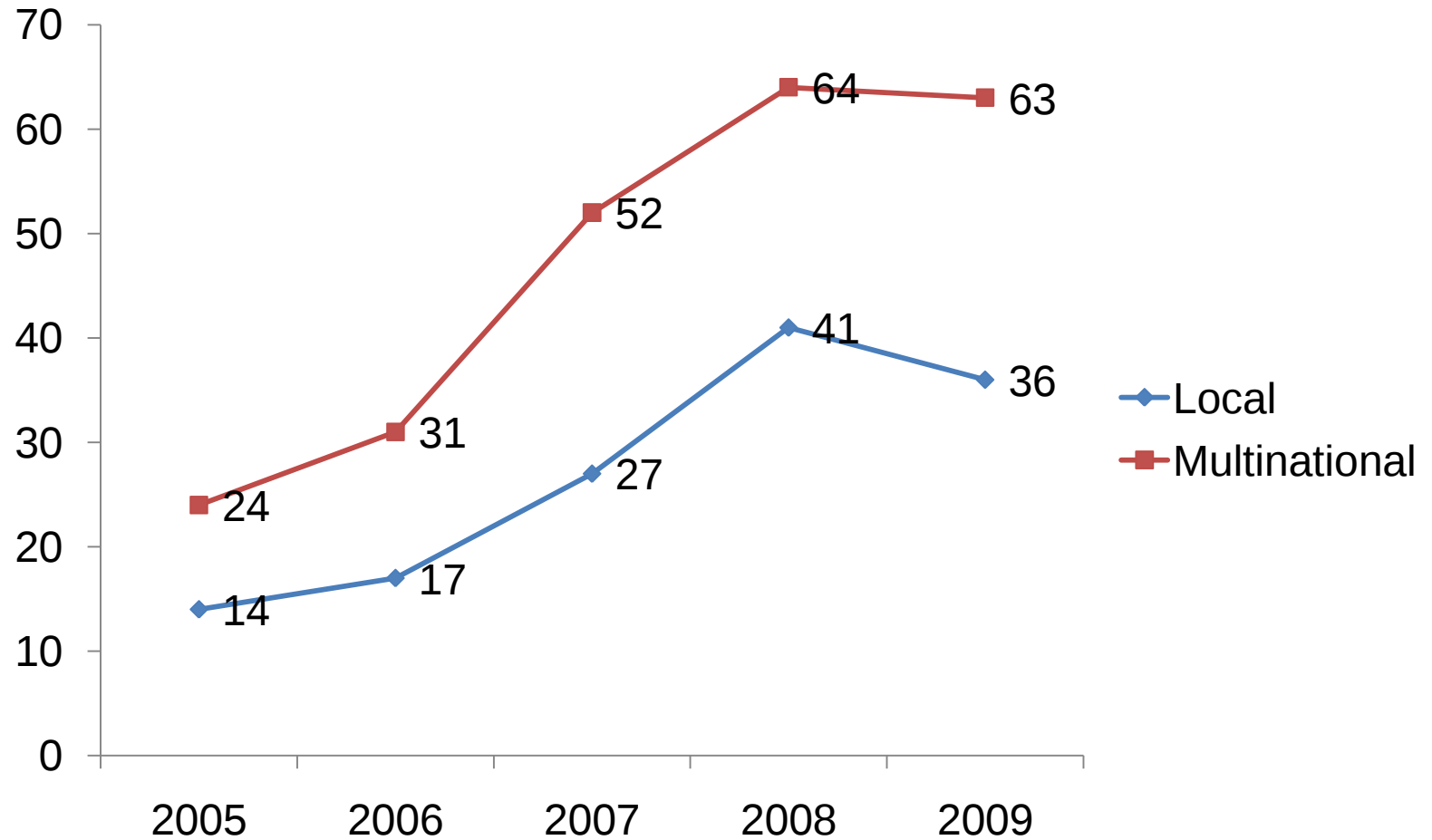
■ Phase IV	23	3	20	45	6	39
■ Phase III	167	137	30	157	121	36
■ Phase II	123	60	63	107	62	45
■ Phase I	87	16	71	91	13	78

Clinical trials by therapeutic category

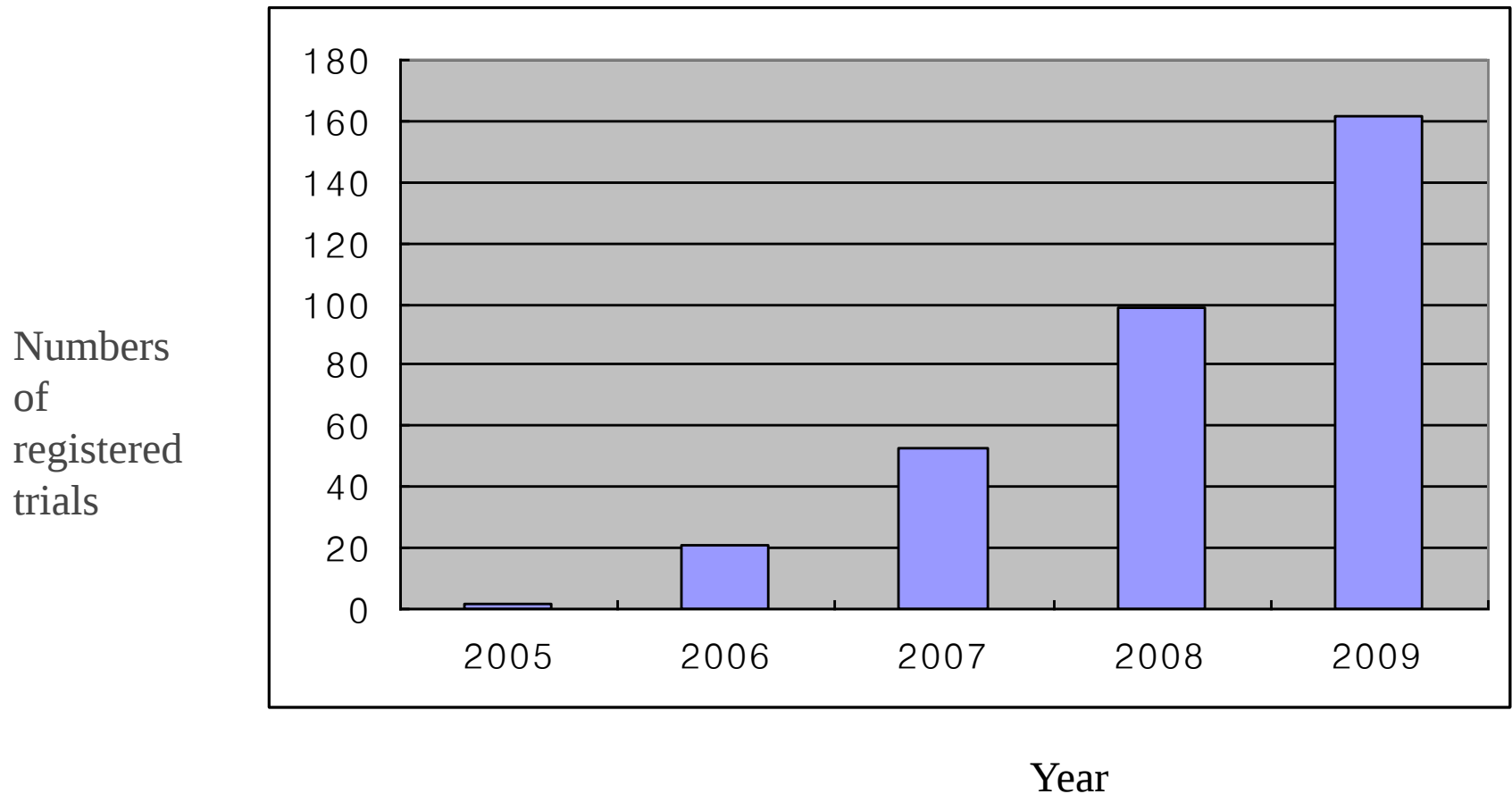
Category	% of MNC		% of Local		% of Total	
	MNC Trials	Trials	Local Trials	Trials	Total Trials	Trials
Oncology	69	31.9%	48	26.1%	117	29.3%
Cardiovascular	25	11.6%	28	15.2%	53	13.3%
Endocrine/Metabolic	23	10.6%	16	8.7%	39	9.8%
Psychiatry	18	8.3%	11	6.0%	29	7.3%
Antinfective	19	8.8%	8	4.3%	27	6.8%
GI	4	1.9%	12	6.5%	16	4.0%
Respiratory	14	6.5%	1	0.5%	15	3.8%
Musculoskeletal	3	1.4%	12	6.5%	15	3.8%
Hematology	9	4.2%	5	2.7%	14	3.5%
Rheumatology	9	4.2%	2	1.1%	11	2.8%
Neurology	7	3.2%	4	2.2%	11	2.8%
Urology	2	0.9%	9	4.9%	11	2.8%
Immunosuppressive	4	1.9%	6	3.3%	10	2.5%
Vaccine	3	1.4%	5	2.7%	8	2.0%
Dermatology	2	0.9%	6	3.3%	8	2.0%
Ophthalmology	5	2.3%	2	1.1%	7	1.8%
Stem Cell	0	0.0%	5	2.7%	5	1.3%
Antihistamine	0	0.0%	2	1.1%	2	0.5%
Other	0	0.0%	2	1.1%	2	0.5%
Totals	216	100.0%	184	100.0%	400	100.0%

Note: Based on top 500 pharmaceutical and biotech companies, Source: Evaluate Pharma® 6Apr2009

Oncology trials in Korea



Investigator-initiated trials in Korea



❖ Source: www.clinicaltrials.gov

Governmental support of academic clinical trials

2004	MOHW nominated 3 Clinical Research Centers
2008	Total 11 Clinical Research Centers
2008.12	MOHW established NECA
2010.5	MOHW established NSCR under NECA

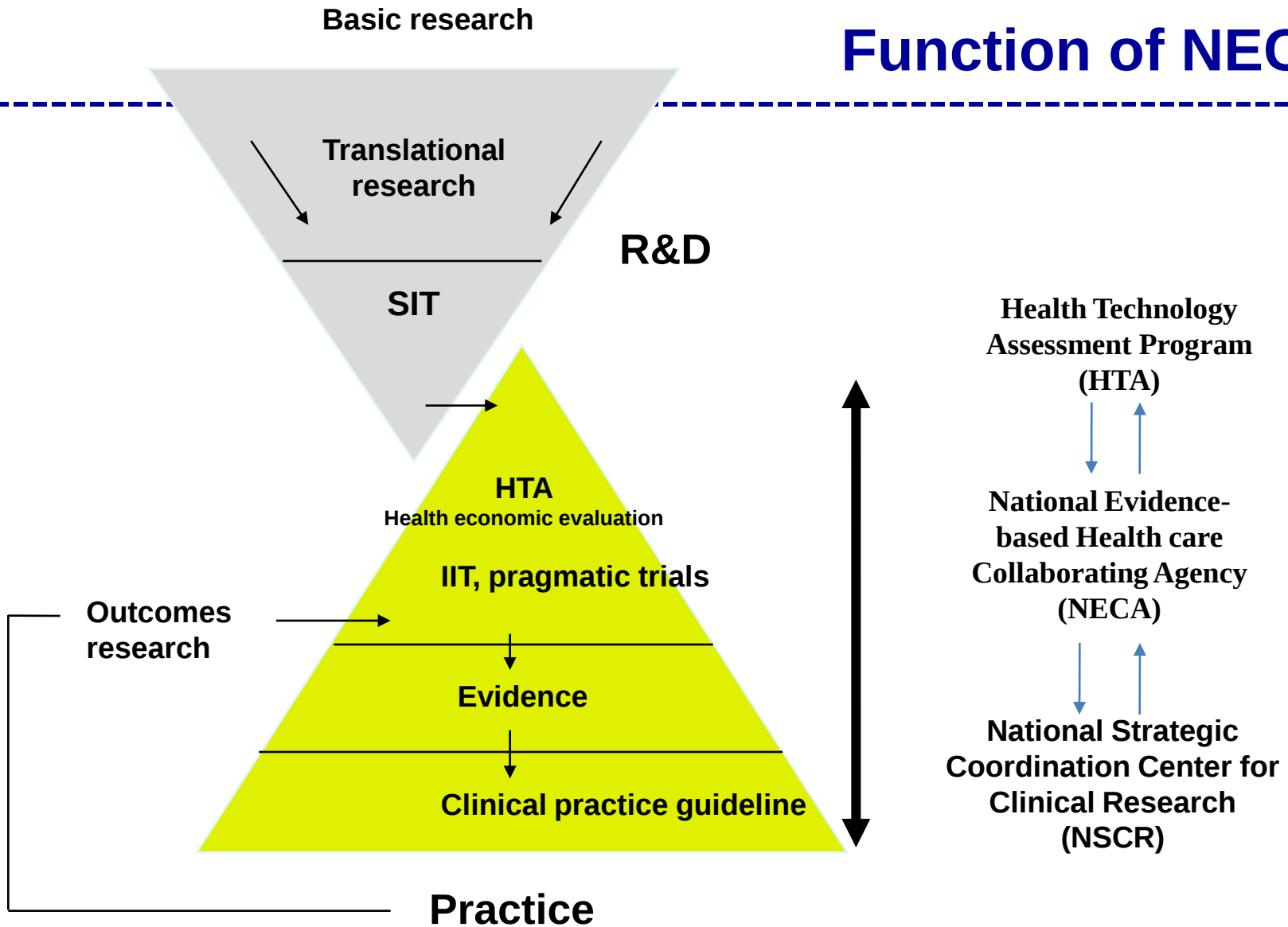
Annual Budget

National Strategic Coordination Center for Clinical Research (NSCR)	9,600,000,000 KW (8,300,000 US\$)
National Evidence-based Healthcare Collaborating Agency (NECA)	5,113,000,000 KW (4,500,000 US\$)
Total	14,713,000,000 KW (12,800,000 US\$)

Government-supported clinical research center

	Name	Period
1	Clinical Research Center for Solid Tumor (CRCST)	'04.11
2	Ischemic Heart Disease Clinical Research Center	'04.11
3	Clinical Research Center for Chronic Obstructive Airway Disease	'04.11
4	Korea National Diabetes Program	'05.4
5	Clinical Research Center for Depression	'05.4
6	Liver Cirrhosis Clinical Research Center	'05.4
7	Clinical Research Center for Stroke	'06.4
8	Clinical Research Center for Dementia	'05.5
9	Clinical Research Center for the Appropriate Antibiotic Use	'08.11
10	Clinical Research Center for End Stage Renal Disease	'08.11
11	Rheumatoid Arthritis Clinical Research Center	'08.11

Function of NECA



National Strategic Coordination Center for Clinical Research (NSCR)

	Target	Recommendation
Topic Selection	Public interests	Reflect social needs
Clinical Trials	- Investigator-initiated trial (IIT) - Pragmatic Clinical Trial (PCT)	-Registration: Clinicaltrials.gov or equivalent -Data management: eVELOS or equivalent
Clinical Epidemiology	- Registry or cohort study - Merge with public healthcare database	Data management: eVELOS or equivalent
Clinical Practice Guideline	Public interests	-Evidence: Systematic review or adaptation -Social Consensus: Appraisal

Conclusions

- There has been a rapid growth in quality and quantity of clinical trials in Korea.
 - Governmental support for infrastructure
 - High-quality medical infrastructure
 - Highly motivated academia
- Strong points of Korea include
 - Big hospitals with huge patient volume
 - Good infrastructures for medical care and clinical trials
- Weak points of Korea include
 - Limited governmental support for academic trials
 - Limited reimbursement for clinical trials