

2000 12



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가 , 가

2000 12

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1.	1
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3.	4
•	7
1.	7
2.	9
가.	9
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3.	13
•	14
1.	14
2.	15
가. EPR	15
. EMR	15
. CPR	16
. EHR	16
3.	16
가.	16
.	18
4.	20

가.	20
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1.	26
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5.	48
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가.	53
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3.	56
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.	PACS	60
4.	62
가.	62
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1.	69
가.	69
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2.	74
가.	74
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.	82

3.		83
가.		83
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4.		87
가.		87
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5.		89
가.		89
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1.		21	
2.	9	24	
3.		5	25
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6.		59	
7.		61	
8.	MSC 7	79	

1.	5
2.	8
3.	29
4.	46
5.	73

가
가
가
가
EPR, EMR, CPR, EHR
1970
CPR
가
CPR
CPR
1960

가

가

CPRI

가

가

, PACS

1988

가

가

60

70

97

가

가

•

1.

21

가 가 , 가 가 가 가 (, 1998).

, 1999 7 1 . 2000 7 1

가 , 가 가 가 (, 1999).

가

가

1960 , 1970 ,
1997 MSC(Multimedia Super Corridor) 7

가 가
(, 1999. 4. 16).
가

가 . 가 가

가

가
. . 가

1996), ‘ (, 1996), ‘ (, 1998), ‘ (, 1999), ‘ (, 1999) , ‘telemedicine and the law’(Klein et al., 1995), ‘legal aspects of computer-based patient records and record systems’(Waller, 1997)

가 , 1996

5
1999 ‘

‘(가)

가

가

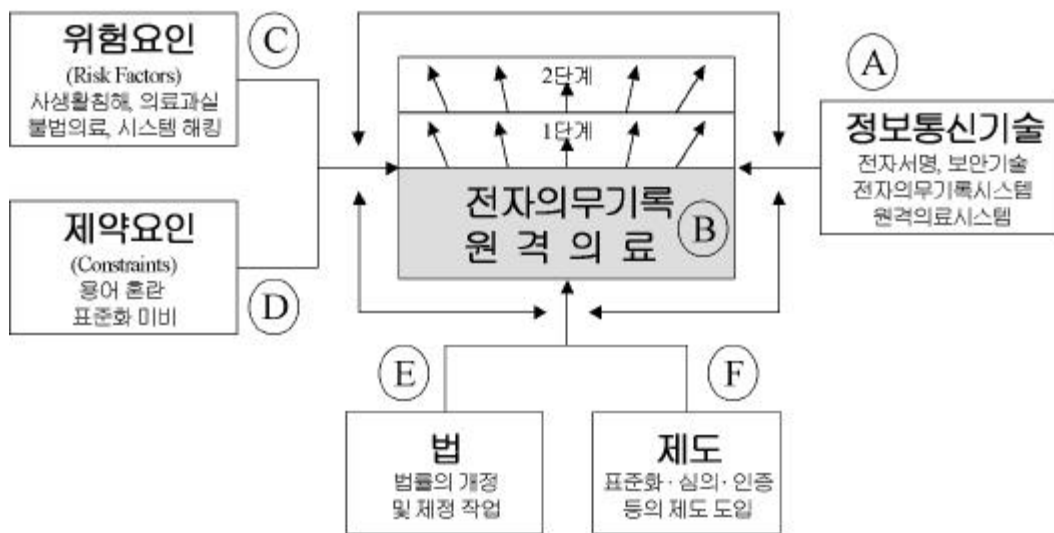
2.

3.

가 가 A() B() 가

가

C() D()가
E() F()가



1.

1980 가

AIM(Advanced Informatics in Medicine) ,

SEISMED(Secure

Environment for Information Systems in MEDicine)

1995

(Barber at al., 1995)

가

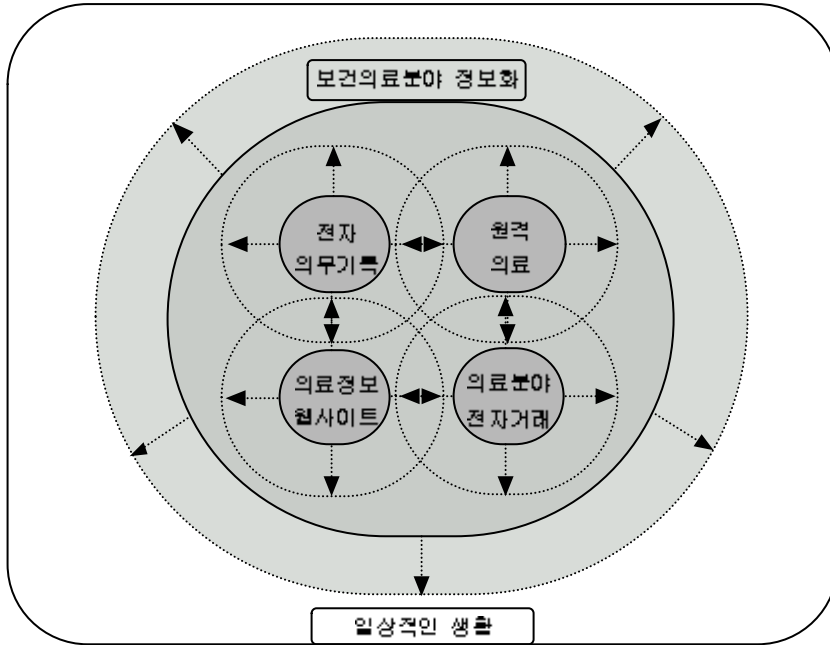
가

가

1.

가 2000 11
 51 , 3
 . 1997 1999 4.7% 65%
 (35%) 2 가
 (, 2000. 12. 21).
 2000 12 11
 (information
 technology) 가 .
 (4,700) 34%
 (18%) (17%) (14%) (0.7%)
 가
 2 가 5
 300 , 1 2,700
 45 , 2 7,300 600 .
 . 1999 10 747
 2000 9 8,000 (21, 2000. 9. 27),
 1 10 .
 가 . ,
 가 .

(, 2000).



2.

가

가

,

,

가 ,

가

가

(, 2000).

2.

가.

가
(, 1997, Davis, 1997, Detmer, 1998).
가
(,
1999).
가 (, 1997).
(national research council)
CSTB(Computer Science and Telecommunications Board)

가
가

가,

가

(realtime quality assurance),
(decision support system), (critiquing engine),
(event monitor)

가

가 (CSTB, 1997).

가 가 가 가
가 가
가 가
가 , ,
가 , ,
가

(, 1997, , 1999, Charles, 2000).

가 , X
가 , 가
가 , 가
가 ,
가 ,

가
가
가
(
, 1999).

3.

가
가
가
가
(, 2000).

1.

가 ,
가 ,
가 ,
가 ,
가 (, 2000).
1991
(national academy of science)
가 computer-based patient records: an essential technology of health care , 1992
CPRI(Computer-based Patient Records Institute)가
(Zolot, 1999).

1).

가 가

2).

2.

가. EPR(Electronic Patient Record)

EPR EMR 가

. EMR(Electronic Medical Record)

, CPR

가

CPR

가

1) North Carolina Code. Medicine and Allied Occupations. § 90-412.

2) Nevada Code. Professions, Occupations and Businesses. NRS 629.021, NRS 630.020.

. CPR(Computer-based Patient Record)

가 , 가
가 , 가
가 .
가 .
CPR
가

. EHR(Electronic Health Record)

CPR , 가 가
EHR (, 1997).

3.

가.

2 2

2 5
가

가 가

가

가

가

가

가

가

(hash result)

가

가

(CPRI, 1997).

가

(, 1999).

1) (Individual Authentication)

ID ID 가 .

2) (Access Controls)

가

가

3) (Audit Trails)

가

ID

가

가

가

가

4) **(Disaster Recovery)**

가

5) **(Remote Access Points)**

가
(firewall)

가

4.

가.

1990

가

1994 S

(order communication system)

1995

I
EMR

1998

J

(, 1999).

1.

1973	1 (0.8 %)	1/230 (0.4 %)
1973 1989	16 (13.3 %)	17/230 (7.4 %)
1990	7 (5.8 %)	24/230 (10.4 %)
1992	16 (13.3 %)	40/230 (17.4 %)
1994	37 (30.5 %)	77/230 (33.5 %)
1996	29 (24.0 %)	106/230 (46.1 %)
1998	15 (12.4 %)	121/230 (52.6 %)
	(100 %)	

1998 230

(medical record management system)

1998 52.6% 121

(, 1999).

1999

19 11 , 30
24
80% (, 1999).

CPR
EPR EMR
DB
, 1999 7 400
75 ,
(CPR) , 2 3
58% 21 (, 1999).

CPR
1997 1999
가 , 2000
,
가 .
CPR , CPR 가
(, 2000).

.
, 1960
가
1991 GAO(General Accounting Office)
, CPR
(CSTB,
1997). 가 가 CPR

COSTAR(Computer Stored Ambulatory Record), RMRS(Regenstrief Medical System), TMR(The Medical Record) (, 1999).

COSTAR 1968

가
1978 COSTAR5

, 가 . COSTAR

가

가 , , , , ,

RMRS 1974

. 1988 25

2500 가

TMR 1975 가

X-ray

TMR

1989 TMR 25

UCSF(University of California San Francisco) 1985

1988 6 STOR(Summary Time Oriented Record), 1983

OMR(Online Medical Record) ,

. 1995 56 가

1995
 1 70 2000 15
 (CSTB, 1997).
 1999 deloitte & touche healthcare centre of excellence
 belgium 가 , , , , ,
 , , , 9 69 80% 55
 (european
 commission-directorate general information society, 2000).

2. 9

	10	11	8	11	10	7	3	()
CPR functions							12	69
Medical Record Registry								
Record Registry ()	10	11	6	4	10	5	8	54 (3)
Archiving ()	10	9	4	3	10	1	4	41 (2)
Clinical Patient Record								
(Registraton of clinical data)	10	9	3	3	6	3	8	42 (15)
(Order entry- Referral)	10	3	3	2	5	0	8	31 (7)
(Capture of results & portocols)	7	6	1	2	5	1	9	31 (7)
(Electronic poescription)	10	5	2	1	4	0	7	29 (22)
(Conclusions, discharge & referral)	10	8	3	1	5	1	7	35 (8)
EDI Inte rchange inte rface	10	6	2	0	3	3	6	30 (3)

, ,
 , EDI
 78%, 59%, 61%,
 45%, 45%, 42%,
 51%, EDI 43% .

가

3. 5

1997	1 : Automated medical records
1997	2 : Computerized medical record system
1997 - 1998	3 : Electronic medical records
2000 - 2005	4 : Electronic or computer-based patient record systems
2005	5 : The electronic health record

(,), (,)
 . Waegemann CP 1997 2005
 CPR EHR
 . CPR EHR ,
 , , , ,
 가
 ,
 가 .

1.

가 EMR CPR

가.

1)

가

가

가

2)

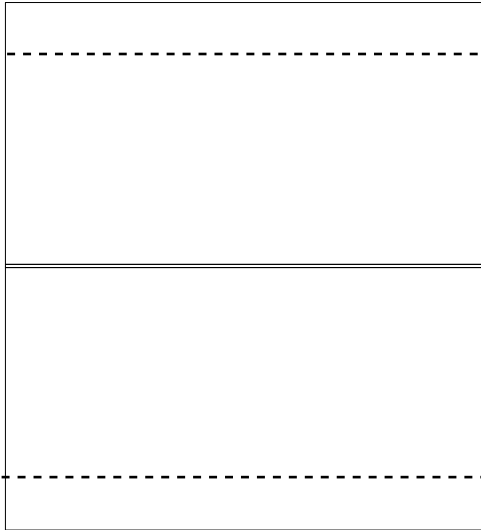
가

(Vogenberg, 1997, Hodge, 1999, Veronesi, 1999, , 1999).

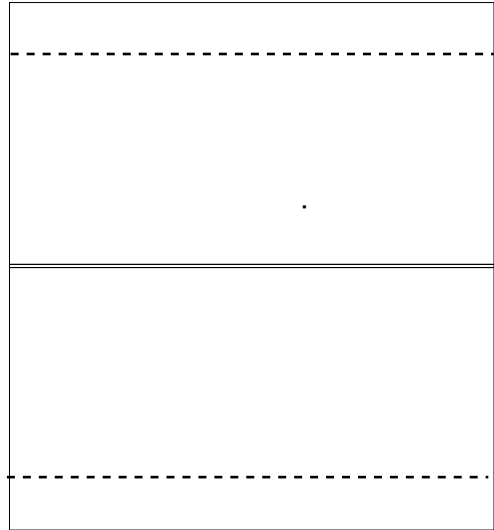
3)

가 가
가 ,
가 ,
가 ,
가 ,
가 ,
가
(Waller, 1997).

CPR
가 ,
CPR
CPR
. CPR
가



3.



2.

가.

1)

123149

3). (d)

255 가
, 1550, 1551
4).
255
가 , 가 가
. .
123149.5 (a)
2290.5 (a)
가
가 5).
2290.5 (a) (1) , , , ,
, , ,
6).
123149 (g)
,
. (b)
, (i)

3) California Health and Safety Code. Sec. 123149.
4) California Evidence Code Sec. 255, 1550-1551.
5) California Health and Safety Code. Sec. 123149.5.
6) California Business and Professions Code. Sec. 2290.5.

2)

43 1 1
. 1 (b)

7).

3)

630.020 (1)(2)(3)

NRS

, 가

8).

4)

333-505-0050 13

가

가

9).

7) Indiana Code. Civil Law and Procedure. IC 34-43-1.

8) Nevada Code. Professions, Occupations and Businesses. NRS 630.020.

9) Oregon Administrative Rules 333-505-0050.

15 , , , 10
 , , , 20 (registered record
administrator) (accredited record technician)
가 , .

5)

R432- 100- 33 ()
 . 3 ,
 , ,
가 , ,
(a) , ,

10). 2 , , ,
 , ,
가 , , ,

.

11). 가

10) Utah Administrative Rules R432- 100- 33. Medical Records.

가 . , 가 .

가 .

12). 1974 가 . ,

가 .

가 . 가 .

가 . 가 .

(, 1998). 가

1988 가

13). ,

1994

. 1997 가 3

11) Freedom of Information Act of 1966.

12) Privacy Act of 1974.

13) Computer matching and Privacy Protection Act of 1988.

가
 1999 2000 106 comprehensive federal
 health information legislation 가 ,
 , , , 5가
 . ,
 가 ,
 , , ,
 , 가
 (Hodge et al., 1999).
 2000 6 30 15).
 , , , ,
 , ,
 . 2000 10 1 가
 .

14) Consumer Internet Privacy Protection Act of 1997.

15) Electronic Signatures in Global and National Commerce Act of 2000.

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1)

100,000 16), 1

2) , ,

, 1978 1 6 17).

1994 7 가 , 1981 1 3 1995 10 24 (, 1999). 1 1 ‘

16) Code pe'nal. Paris: Dalloz(11, rue Soufflot, Paris 75005), 1995-1996.
17) Loi No 78-17 du 6 janvier 1978 relatives a' I' Informatique, fichiers et liberte's.

가 가

3) 가

가 CNIL(Commission Nationale de l'Informatique des libertes's)

CNIL Conseil d' Etat

가 가

. CNIL

CNIL

(, 1999).

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 가
 , 1998
 .18)
 , , ,
 . 2
 ‘ ’ (e) ,
 . 2000 5 25
 가
 가 19).
 .
 1990 12 20 1994 9 14
 20) 5 가
 .
 ,
 ,
 2000 8 16 , , ,
 .
 , 2001 21).

18) Data Protection Act 1998.
 19) Electronic Communications Act 2000.
 20) Bundes daten schutz gesetz (BGBl.I 1990 S.2954).
 21) Verordnung zur digitalen Signatur (Signaturverordnung - SigV).

•

1998 4 29

22) 1

(integrity)

18

가

가

OA

9 ,

19 11 ,

24 ,

23 ,

28

(1999).

1998 12 25

23).

2000

22) Personal Data Act (1998 : 204).

5 31

.24)

2001 4 1

134 ,

27 ,

62 ,

26

29

가

가

가

가

가

23)

90).

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24)

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26)

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. 1 가 , 2

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가

. 46 1 .

가 ,

가 , 3 .

. 14 1 .

가 , 2 가 ,

25) 가 .

26) .

2)

가 .

(hard disk)

(CD-ROM)

가

1)

317

가 3
, 10 700
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, 가 ,
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, 3 가 1
, 가 (4 ,
112 , 149),
19 4
, 20 4
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1995

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3)

가

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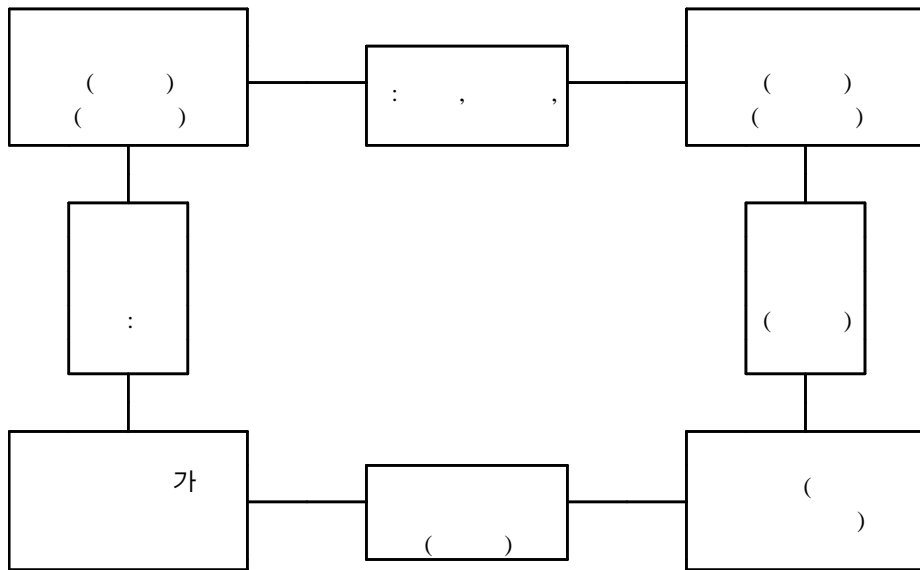
11

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가

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20 1

가 () 가
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가.

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5.

가.

가

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가

가

가 , , , .

1987 ISO(International Standards Organization) OSI(Open System Interconnection) HL7 Version 2.2 HL7

가 (, 2000). ANSI(American National Standards Institute), CPRI(Computer-based Patient Record Institute), JCAHO(Joint Commission on Accreditation of Healthcare Organizations)

CPRI 가 . 가 (, 1997).

•

1.

가 ,
,
(, 1999).

, , , ,
. 가

30 가 .
1959 112

,
1990 가 (, 1997).

2.

4.

() (,) () ()

가

1997).

(, 1997, , 1999).

(, 1999).

,
of medicine, 1996).

(institute

4가

, 가
4가

가.

PACS(Picture Archiving and
Communications System)
(, 1995),

가
PACS

가

가

PACS가

가가

가 가
가

(, 1999).

, , , , , (,
1999, , 1999).

가

가

가

(, 1999).

1995).

가

1

가 가

가

가

가

가
(, 1999).

on-line help service

(institute of medicine, 1996).

가

(, 1997, , 1998).

가 가

,
(, 1999).

3.

가.



(Bashshur, 1997).

5.

◦					◦
◦	,	가			◦
◦			H/W	S/W	◦
◦			,		◦
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◦		가		가	
◦					
◦				가	

가
, ' , 가
, ' H/W S/W ,
,
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,
PACS
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PC PC 가 ,
,
가
PC 가 가 ,
가 PC ,
PC
1999).

가

가

1999).

가

가

가 POTS(Plain Old Telephone Service) PSTN(Public Switched Telephone Network) 56Kbps

ADSL(Asymmetric Digital Subscriber Line)

ISDN(Integrated Services Digital Network)

64K 384K

6.

	PSTN	ISDN	Leased Lines	Cable	ATM	ADSL
(Capacity)	56Kbps	64K - 384Kbps	56K - 155Mbps	40Mbps	154Mbps	6.1Mbps (up) 640Mbps (down)
Frame rate	5- 10 fps 가	15- 25 fps 가	15- 30 fps 가	30 fps 가	30 fps 가	30 fps 가

Mbps, T 3 DC3 45Mbps, OC3 155Mbps

ATM(Asynchronous Transfer Mode)

154Mbps

ADSL 6.1Mbps, 640Mbps

2000 8

ADSL 5

VDSL(Very high-bit-rate Digital Subscriber Line)

가

ADSL

PLC(Power Line Communication)

가

(, 1999).

가

가

PACS

가 , 가

PACS(Picture Archiving and Communications System)

가

가

(, 1999).

PACS DICOM(Digital Imaging and Communication in Medicine)

10Mbps 100M0ps

(ethernet)

. PACS

가

가

DAT

(Digital Audio Tape)

. PACS

DICOM

DICOM

PACS

GUI(Graphic

User Interface)

(image viewer)

가

ID password

(, 1997).

PACS

CT, MRI,

, , 1

7.

	(pixel)	Dynamic Range (bit)	1	(Mbyte)
CT	512 x 512	12	30	15.0
MRI	256 x 256	12	50	6.5
DSA	1000 x 1000	8	15	15.0
Ultrasound	512 x 512	6	36	9.0
Computed radiography	2000 x 2000	10	4	32.0
Digitized Film	4000 x 4000	10	4	128

4.

가.

1)

1988

가 . 1994

T 1

1995 6

가

가

가

가

가

가
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가

, ISDN

(, 1999).

1999 7

가

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2000. 3. 24).

2)

가

가

(www.apayo.com)

가

가 가 (, 1998).

가 가 ,

, , 가

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1)

NASA(National Aeronautic and Space Administration)

40 ,

1992 100 (raleigh)

가 , 6 (lejeune)

1992

27)

27) Georgia Distance Learning and Telemedicine Act of 1992.

system) 1995 8 (allina health
 . 1996 130 450

2) EU

1994 RETAIN(Radiological
 Examination Transfer on ATM Integrated Network) 1997
 RETAIN 가 10Mbps ATM

3 , 1
 가 ,
 rennes barcellona oldenberg가

, JPEG, MPEG 가

. RETAIN DICOM 3.0

(telemed) 가 .
 (EU)

가 2Mbps
 , 가 가

CT (Computerized tomography), US(Ultra Sonography), MRI(Magnetic

Resonance Imaging)

가

가

가 3

가

(, 2000. 7. 5)

3)

가

(CT),

(MRI)

(Communications Research Lab)

CRL

, IPv6

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 가
 2010 가
 가 가
 (, 1999).
 가
 , 24
 , 가
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 (, 1999).
 (kiosk) 가
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 1999). (,

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38

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, 1999).

EU

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가 . 가 ,
가 (Palm, 2000). 가
가 가
가 .
가 가 가 ,
가 가 가
가 가
가 (Department of Foreign
Affairs and International Trade Canada, 1998), 가
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3)

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1) ·

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(techno-terror)

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, 1999).

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30

1980

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가

2)

(, 1996, Charles, 2000),

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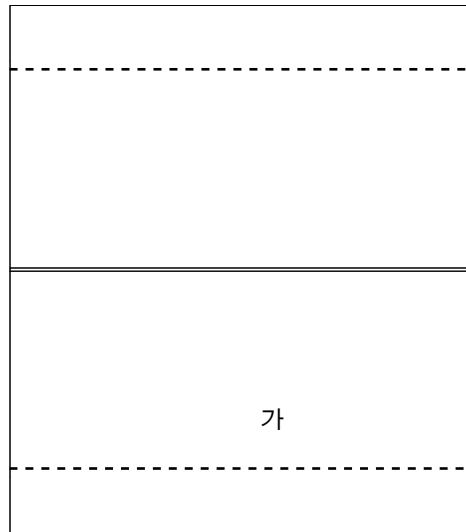
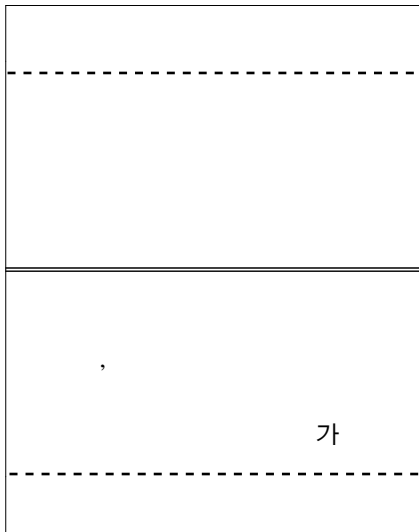
·

3)

(,)
 가 (digital imaging and communication) .
 college of radiology) (american
 association) . 가 (national electrical manufacturers

4) 가

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 가 가 .



5. . .

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가.

HON code

28). 1

가

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가

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1)

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29).

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28) Health On the Net Foundation code. 1996. 7.

29) E-5.025 Physician Advisory or Referral Services by Telecommunications.

2)

가

30).

3)

2000 10 1

가

(physician's certificate),

(restricted certificate),

(temporary certificate)

(telemedicine certificate)가

가 31).

가

1)

(standing committee of european doctors)

30) West Virginia Code. Sec. 30-3-13.

31) Montana Code. Sec. 37-3-301.

가 가
가 가
가 32).

2)

general medical council 1998 11
33).
가 ,
가 ,

가

3)

가 34).

32) Ethical Guidelines in Telemedicine(CP 97/033). 1997. 4.
33) Providing advice and medical services on-line or by telephone. 1998. 11.
34) B.II. §7, Par. 3; German Model Regulations for the Professional Code.

1997

35).

1997 12 24

가

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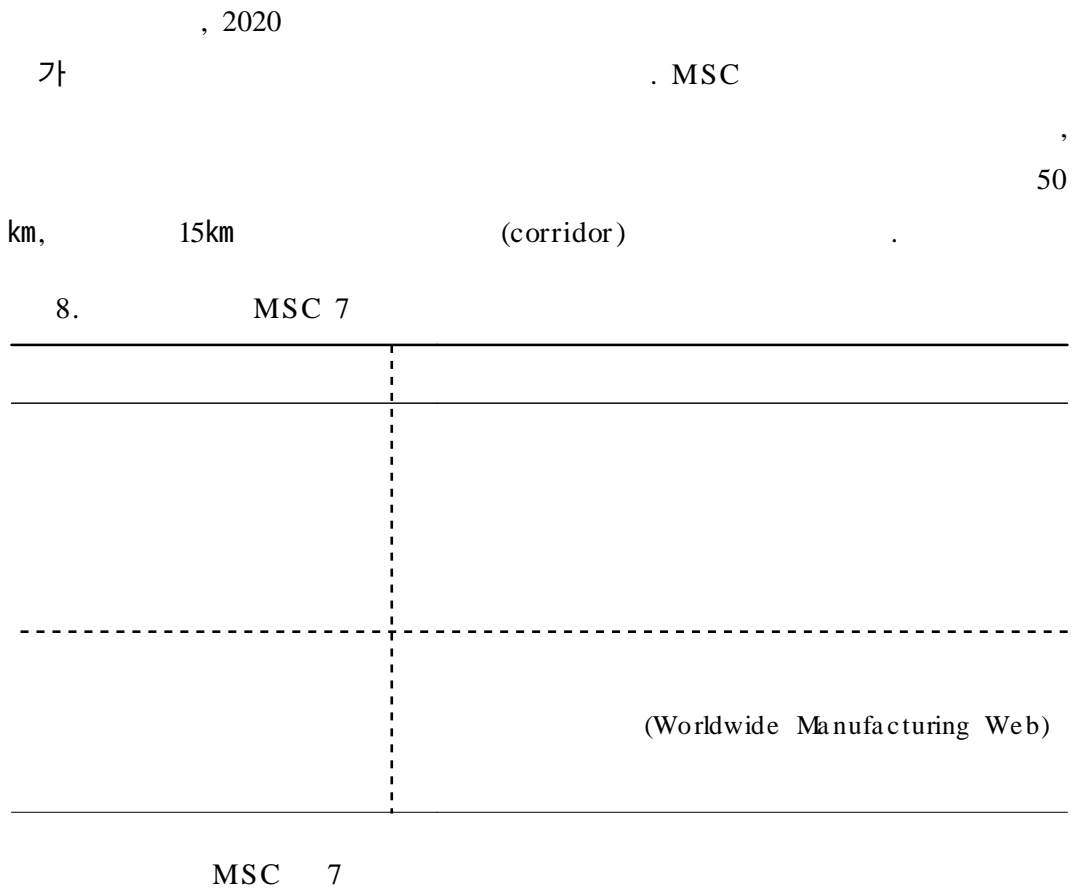
,

,

,

35)

(1075). 1997. 12. 24.



가

Malaysia, 1997).

(Ministry of Health

MSC

가

MSC

1997

1998 10 1

38),

가,

가

1987

1999 4 1

39).

40),

2000 6 1

41),

38) The Digital Signature Act 1997.

39) The Copyright (Amendment) Act 1997.

40) The Communications and Multimedia Act 1998.

41) The Computer Crimes Act 1997.

42). 1997

2)

2

3

가

3

가

가

가

42) The Telemedicine Act 1997.

가

6
(material), (article), (apparatus), (substance), (instrument),

code

HON
가

가

가 가

MSC

3.

가.

1)

3 , 18 , 30 .

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가 가 ’ 43).

3

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18

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43) 98 2481 . 1999. 3. 26.

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(750)

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ABSTRACT

Legal Aspects of Computer-based Medical Record and Telemedicine

Joon Ho Park
Graduate School of
Health Science and Management
Yonsei University

(Directed by Professor Yong Moon Chae, Ph.D.)

The reason why the introduction of computer-based medical record & telemedicine is getting worldwide is that it can bring about better benefits and effectiveness when applying the cutting edge of electronic signature, security system, CPR system, telemedicine system and so on.

As the internet technology progressed and the information-oriented society developed, however, the field of health care unprecedentedly faced a new situation, which made it very difficult for the current medical law to accept the computer-based medical record & telemedicine. Moreover, some parts of the system are not congruent with the current law and the introduction of these system may have such risk factors as invasions of privacy, system hacking, medical conflicts, unauthorized medical practice, and medical malpractice, along with such constraints as non-existence of standardization, distrust between medical staff and patients, extra cost of supplying equipment and recognition of medical insurance reimbursement.

Despite those obstacles, medically advanced countries already introduced the system. This study took into consideration the ways of overcoming these difficulties through the legitimate breakthrough.

The computer-based medical record has the pattern of EPR, EMR, CPR, EHR as well as authentication and security system. The 1970's saw the introduction of the computer-based medical record in Korea. We haven't yet achieved the CPR level but the leading hospitals are in the process of getting there soon. Medically advanced countries like America already introduced the system in late 1960's and most countries in Europe are using the system to their purposes.

According to the analyses of legislative proceedings concerning the system of America, Europe, Japan and so forth, I have found that they validate the computer-based medical record by law and the privacy is protected by law, that is, to get health care provider to implement policies and procedures to include safeguards for preventing the patients' personal information from getting out.

After taking stock of the current law, I have that found it is necessary to validate the storage of the computer-based medical record by law and allow it to be stored in an electronic medium. In addition, it is also necessary to make laws concerning the protection of the patients' electronic record and the security system along with reference and transmission of the electronic medical record. I also want to suggest that standardization organization like CPRI should be formed to standardize and institutionalize medical information like medical terms and electronic medical record. One of the practical steps may be to make a national long-term plan to institutionalize the transmission of the electronic medical record and the standardization of the system.

Telemedicine consists of tele-consultation & tele-diagnosis, tele-home

health care including tele-monitoring, tele-education and cyber-hospital with medical consultation through internet. Telemedicine system has technological qualities of data terminal, server, information super highway, PACS and what not. The Exhibition projects of various kinds for telemedicine has been conducted after the introduction of video-conferencing & tele-diagnosis teleconferencing for the first time in 1988. When it comes to medically advanced foreign countries, America started implementing telemedicine projects in the 1960's, Canada in the 1970's, Malaysia in 1997.

As for the legislative trends in foreign countries concerning telemedicine, America approves of telemedicine in the form of tele-consultation & tele-diagnosis and screens out the qualifications to issue licences for telemedicine. Doctors in America and Europe are advised not to diagnose the patients through telecommunication advisory services. Tele-consultation among doctors and telemedicine between the doctor and the second-time patients are being approved of in Japan.

According to the examination on the current laws concerning telemedicine, it is ultimately necessary to legislate regarding setting the restrictions of internet medical diagnosis, permissible scope of telemedicine, approval of qualifications through license and clarifying where the responsibility of the telemedicine lies and the like. I also suggest that the government should make institutional devices to promote better understanding both the medical staff and the patients, solve the financial problems of supplying telemedicine equipments, together with the standardization and the medical insurance reimbursement for telemedicine.

Key Words : *EMR, CPR, Privacy, Telemedicine, Cyber hospital, Medical Law, Electronic Signature Law, Telemedicine Law, Government Regulations*