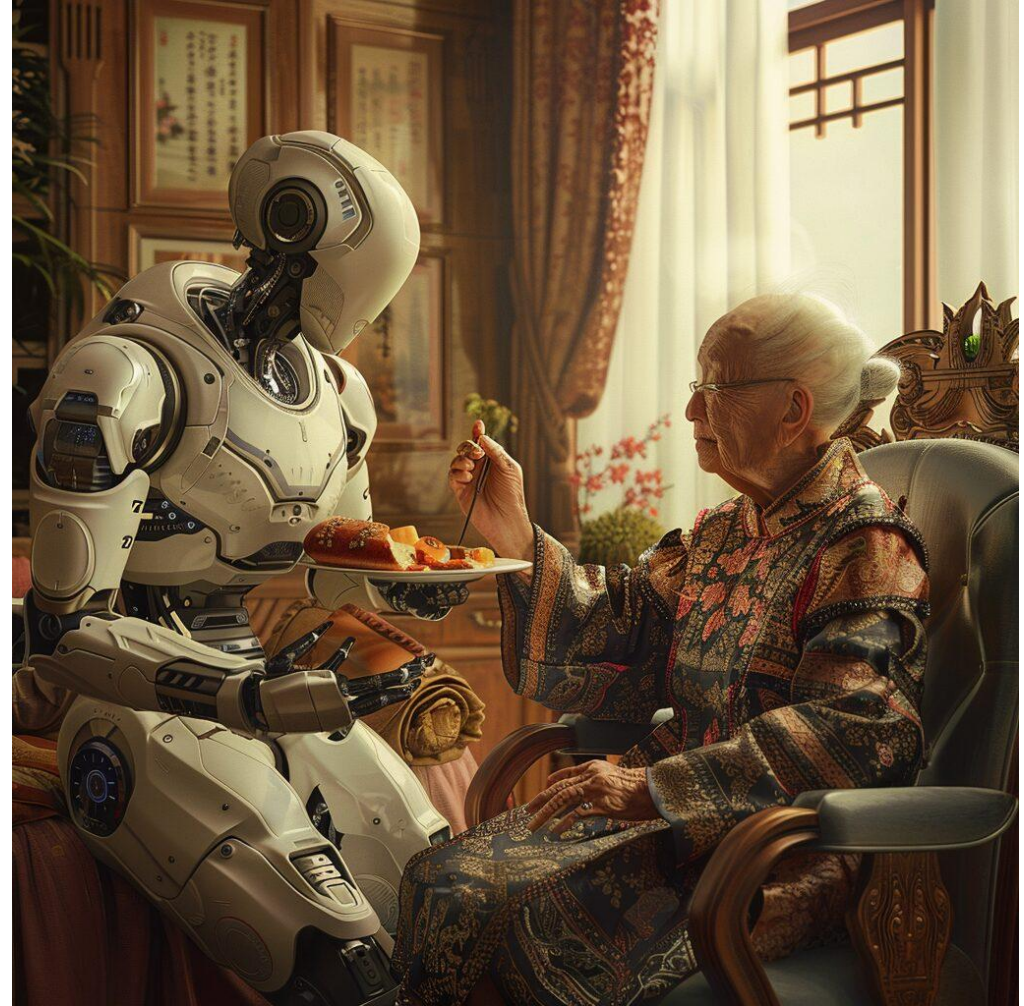
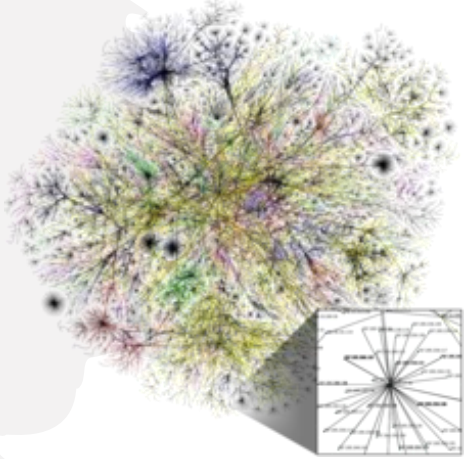


디지털헬스 활용 현황

오주환
서울대학교 병원-의과대학



<https://en.wikipedia.org/wiki/Internet>



The Web was invented by English computer scientist Tim Berners-Lee while working at CERN.] The technology was released outside CERN to other research institutions starting in January 1991, and then to the general public on **23 August 1991**.

https://en.wikipedia.org/wiki/World_Wide_Web

- Four ENIAC panels and one of its three function tables, on display at the School of Engineering and Applied Science at the University of Pennsylvania

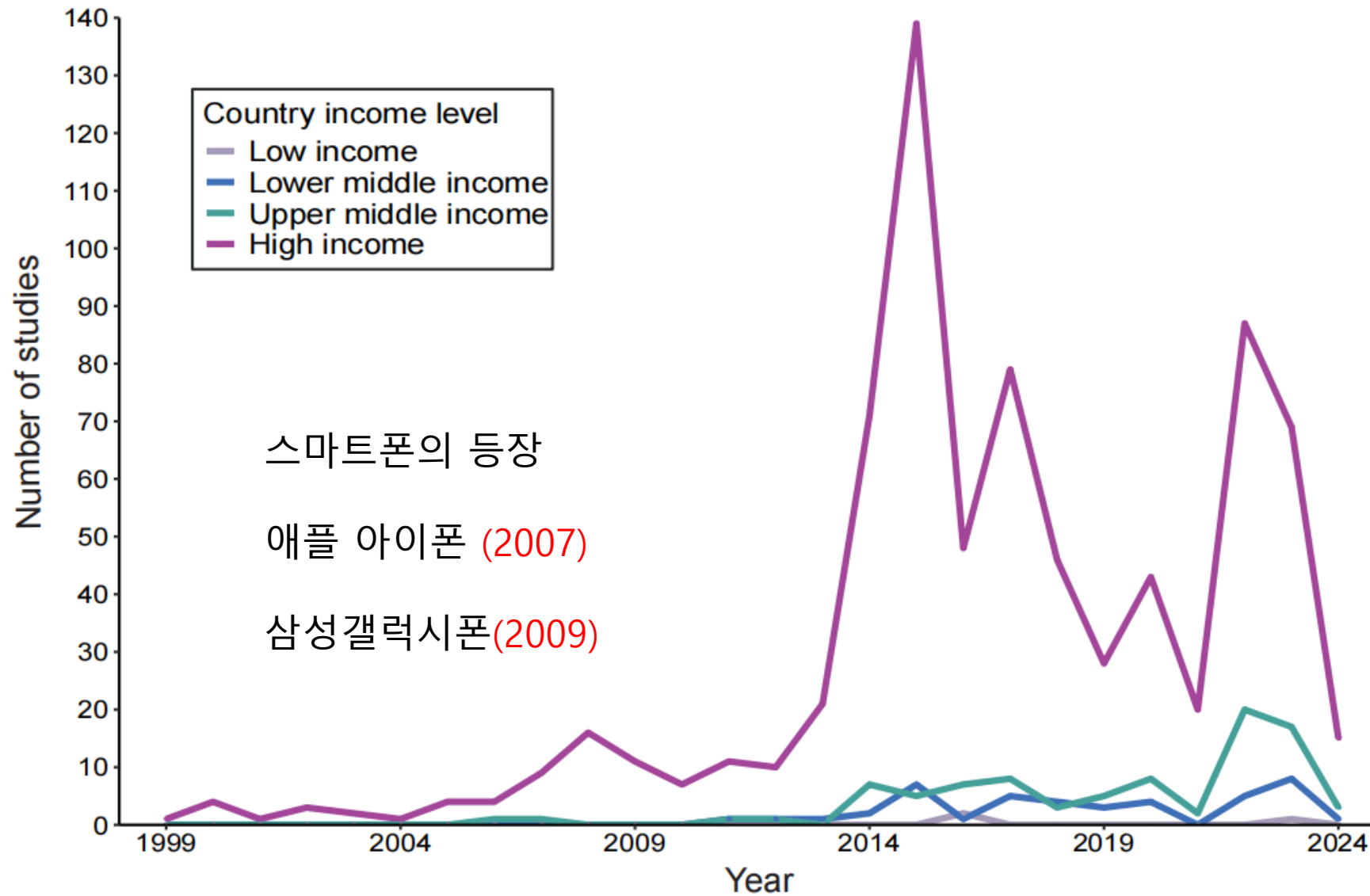
- Location. University of Pennsylvania Department of Computer and Information Science, 3330 Walnut Street, Philadelphia, Pennsylvania, U.S.

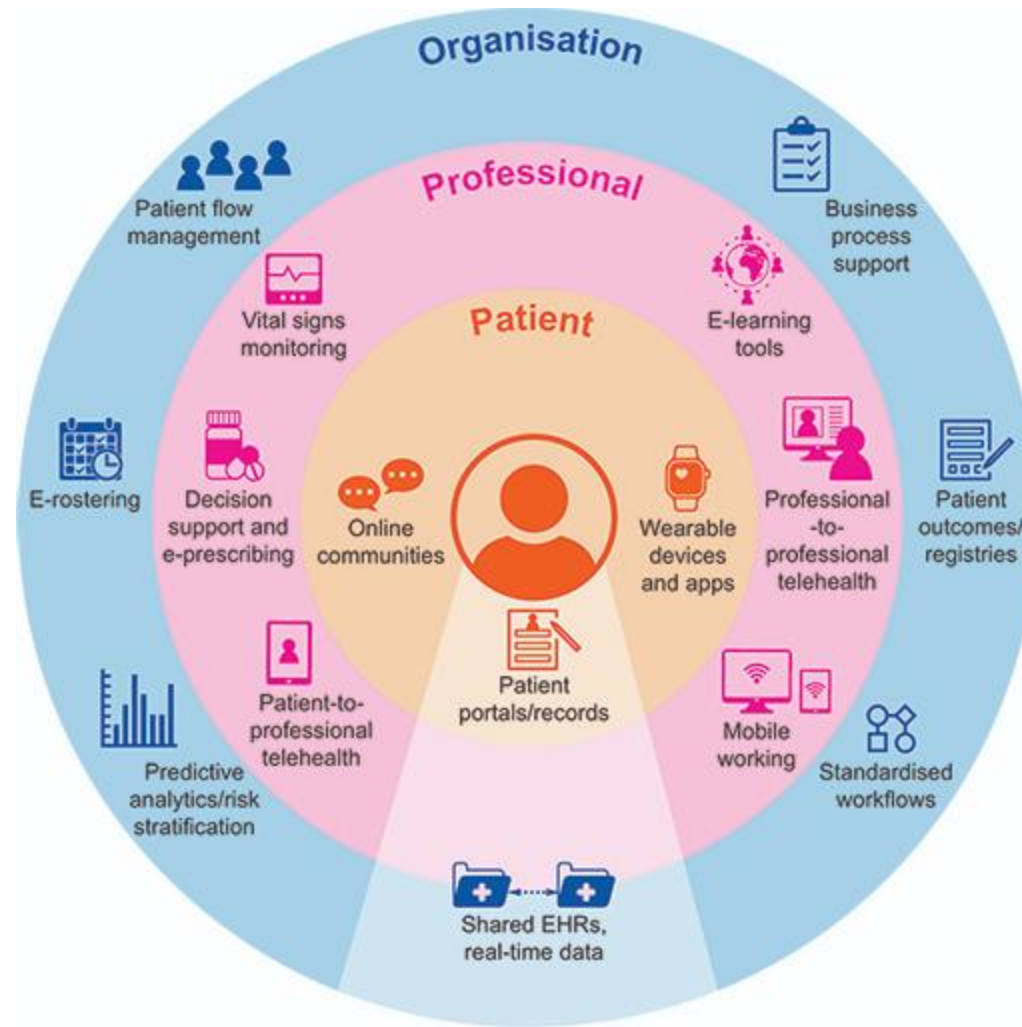
- **Built/founded 1945**

- <https://en.wikipedia.org/wiki/ENIAC>

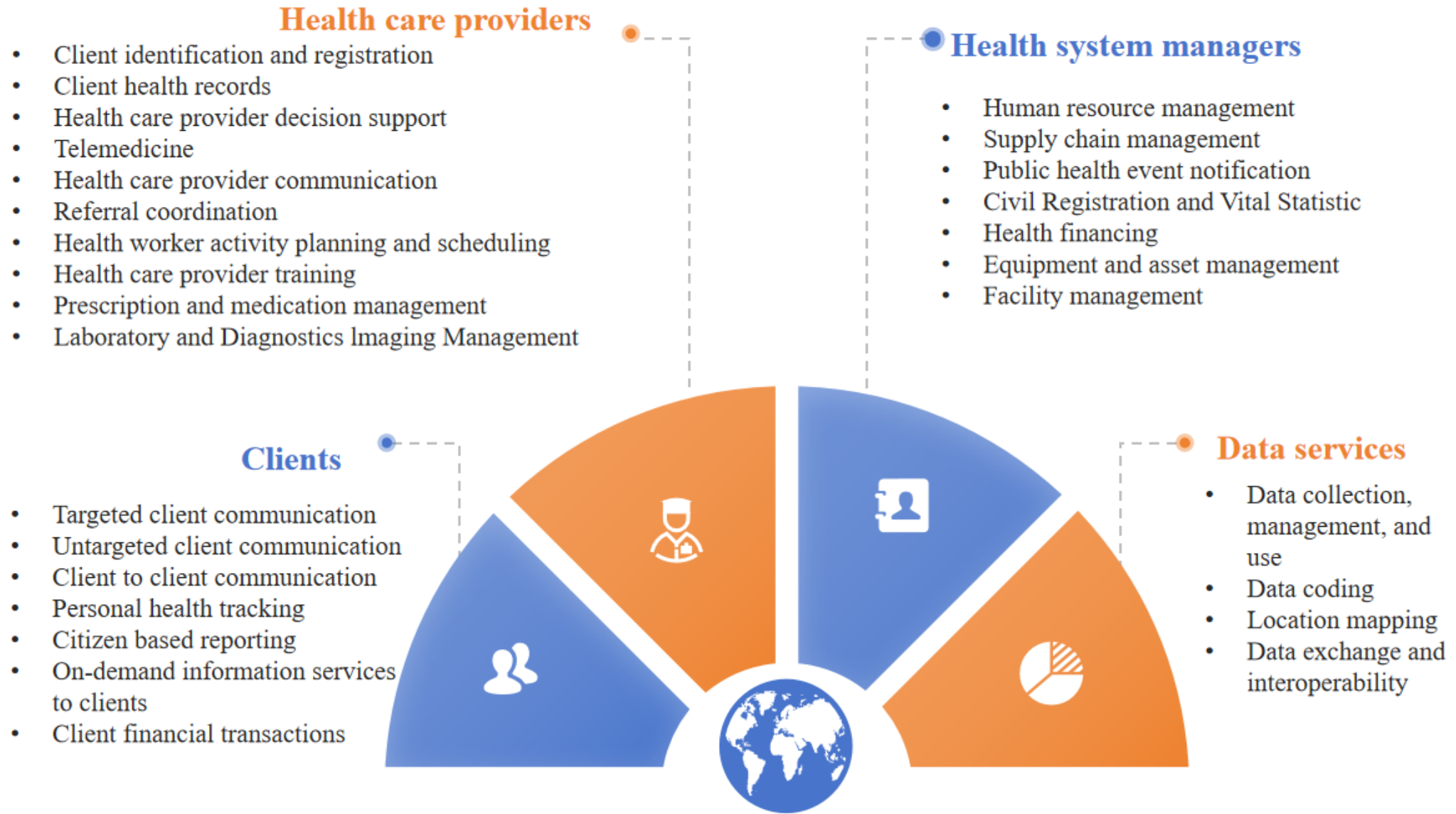


Mapping the Landscape of Digital Health Intervention Strategies: 25-Year Synthesis

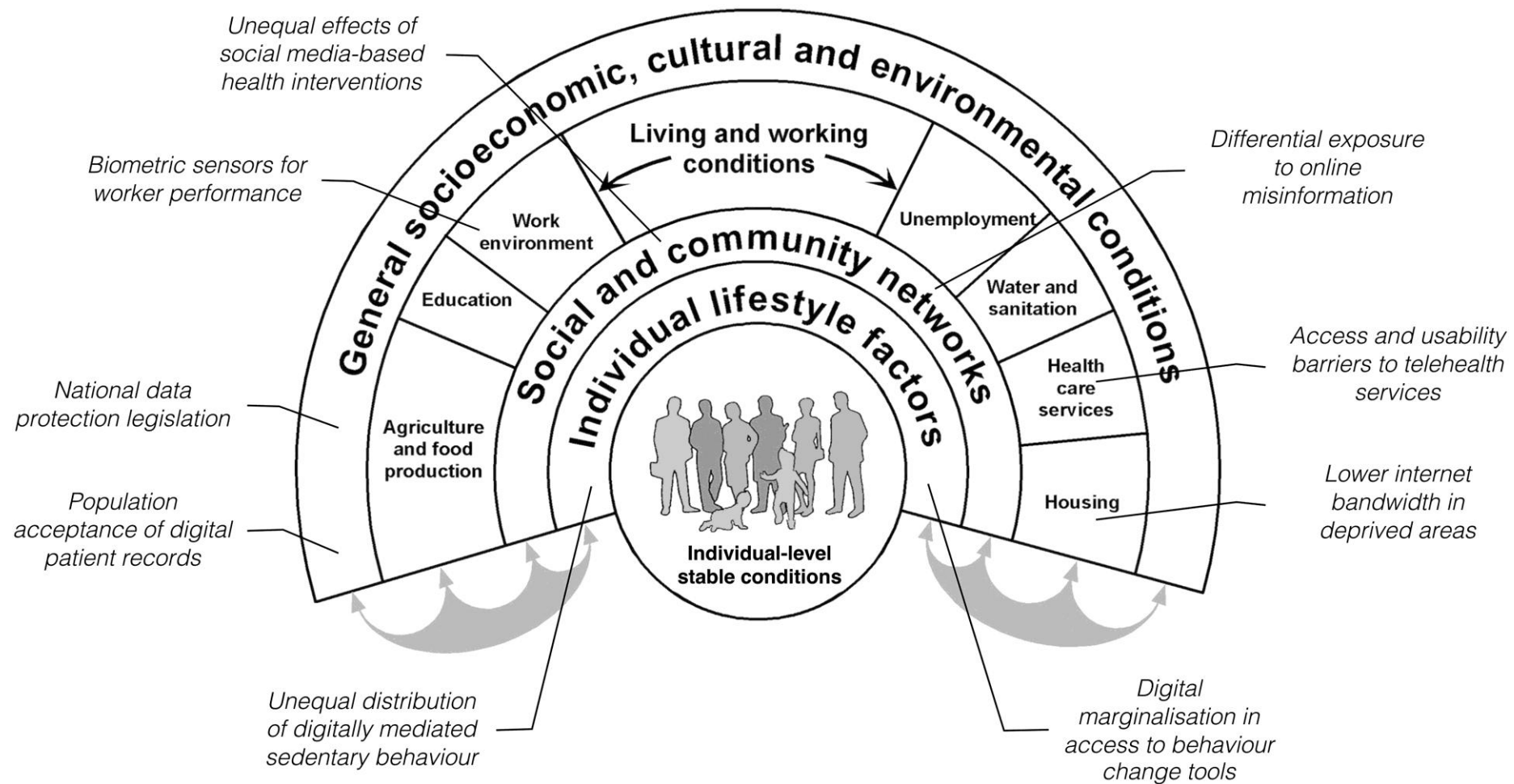




Source: Open University



Source: Liu S, Ma J, Sun M, Zhang C, Gao Y, Xu J. Mapping the Landscape of Digital Health Intervention Strategies: 25-Year Synthesis. J Med Internet Res. 2025 Jan 13;27:e59027



Source: Jahnelt T, Dassow HH, Gerhardus A, Schüz B. The digital rainbow: Digital determinants of health inequities. Digit Health. 2022 Oct 2;8:20552076221129093.

DTx.. 국내에서 허가 받은 품목은 6개나 되지만 처방량은 미미한 상황이다. 현재 식품의약품안전처로부터 품목허가를 받은 DTx로는 ▲에임메드의 '솜즈' ▲웰트 '슬립큐' ▲뉴냅스 '비비드브레인' ▲쉐어앤서비스 '이지브리드'가 ▲뉴라이브 '소리클리어' ▲하이의 '엔자이렉스' 등이다.

강 대표는 "미국과 일본의 DTx 처방량은 각각 2만건과 2,000건을 기록한 반면 국내는 200건에 불과하다"며 "현재 처방되고 있는 회사는 처방 이후 별도의 프로토콜도 없고 전화로 환자 개인별로 챙기고 있어 DTx 확장성이 없는 상황"이라고 말했다. 이어 "병원과 약국마다 운영 시스템이 다르기 때문에 호환성을 가질 수 있는 전달 체계가 필요하지만 이러한 것을 보급하는 것도 쉽지 않다"고 덧붙였다.

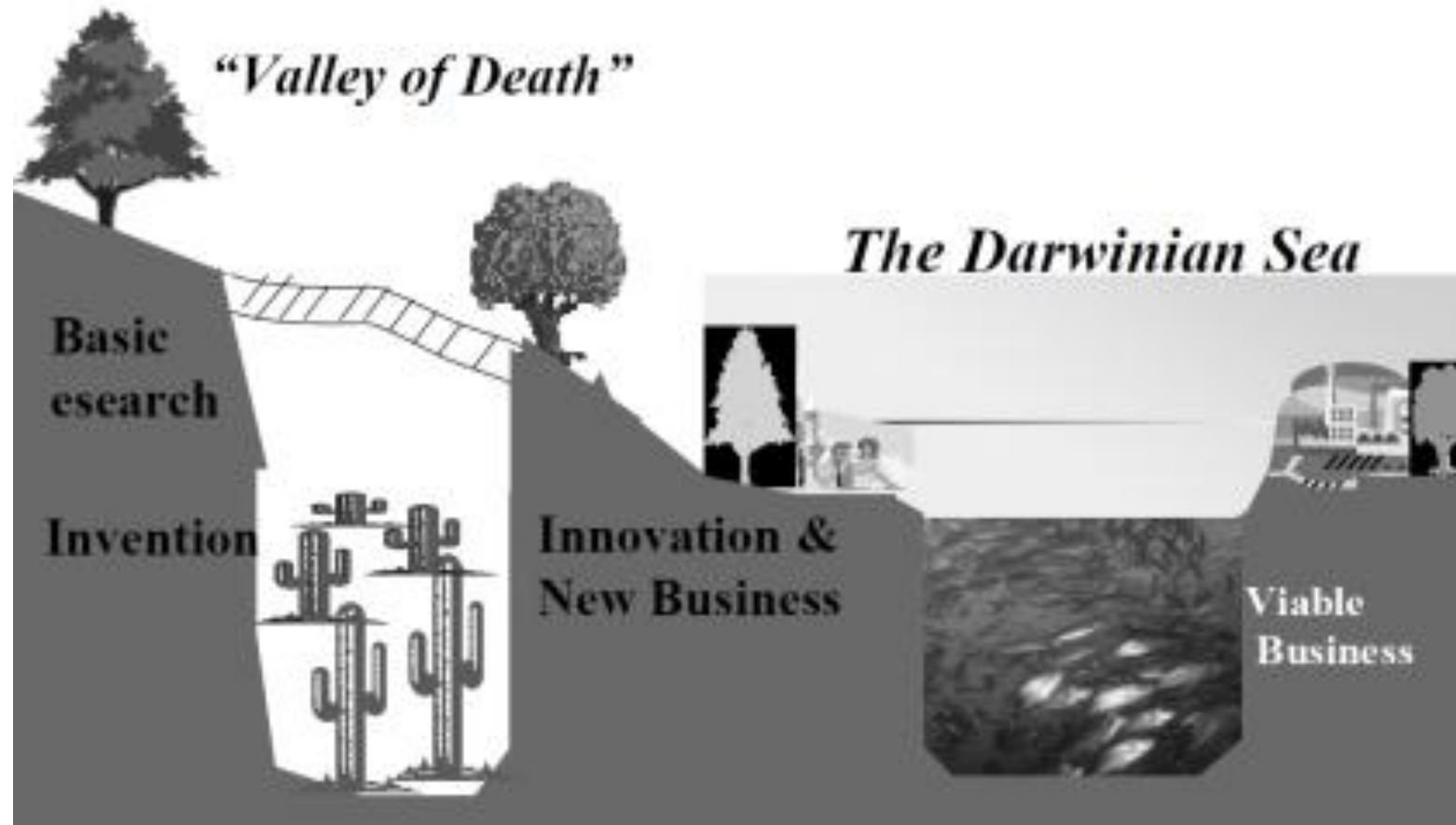
결국 기존 의약품과 같이 DTx를 처방할 수 있는 표준화된 시스템이 필요하다는 지적이다. 이러한 표준화된 시스템으로는 기존 의약품의 처방 시스템과 비대면진료플랫폼을 활용할 수 있다고 했다.

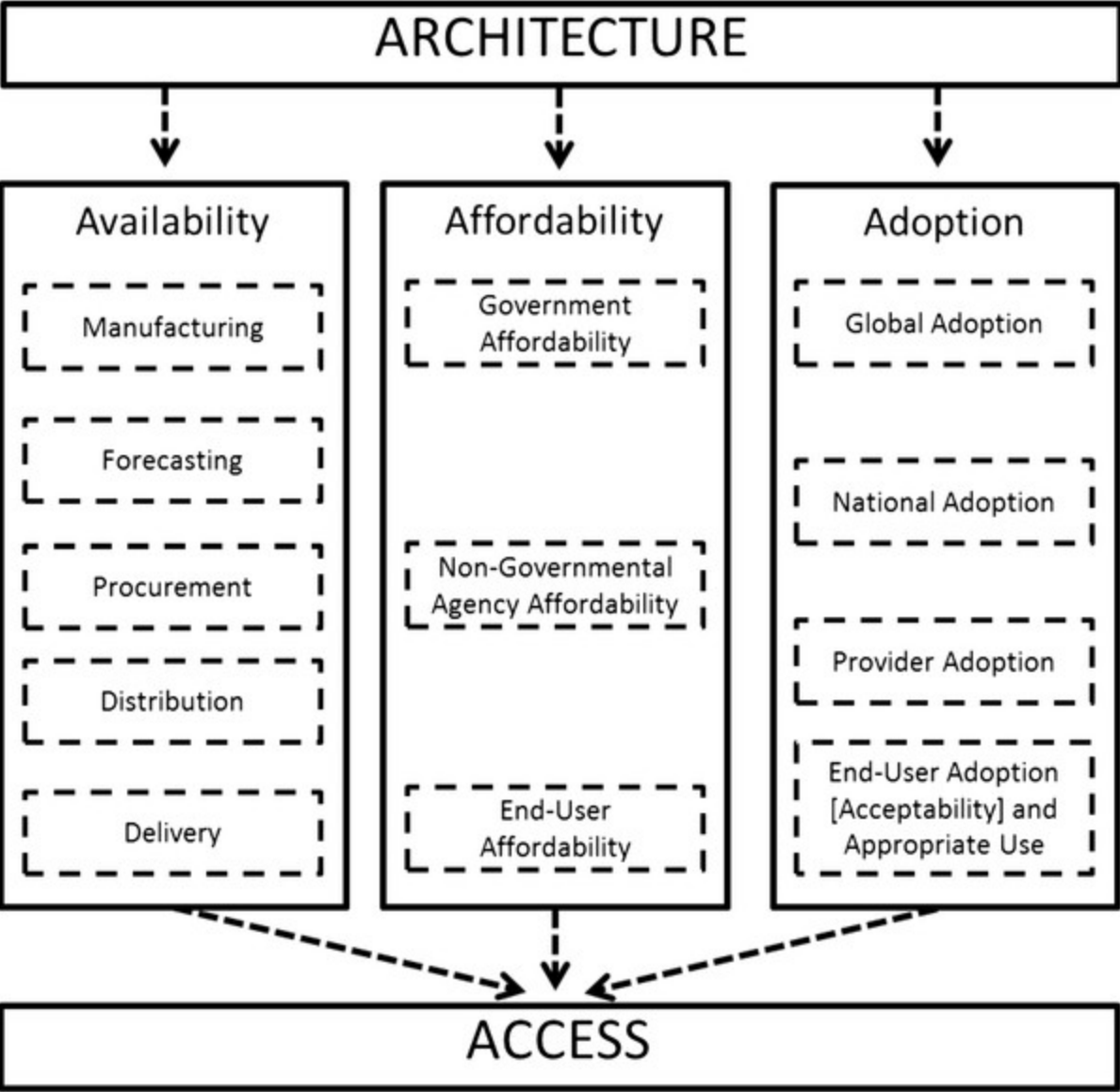
강 대표는 독일의 사례를 들어, 기존 의약품처럼 DTx 처방 프로세스를 구축하는 방안을 제시했다.

그는 "독일은 DTx 처방량이 60만건인데 의료진이 처방 전 DiGa(독일의 디지털치료기기)라고 명시해 사진을 찍어 보내면 곧바로 의사의 처방이 확인돼 환자가 앱 형태의 DTx에 접근할 수 있다"며 "이는 이미 우리가 보유한 의약품 처방 시스템과 동일하다. 우리도 이미 갖고 있는 시스템을 활용하는 것이 합당하다"고 설명했다.

출처 : 청년의사(<http://www.docdocdoc.co.kr>)

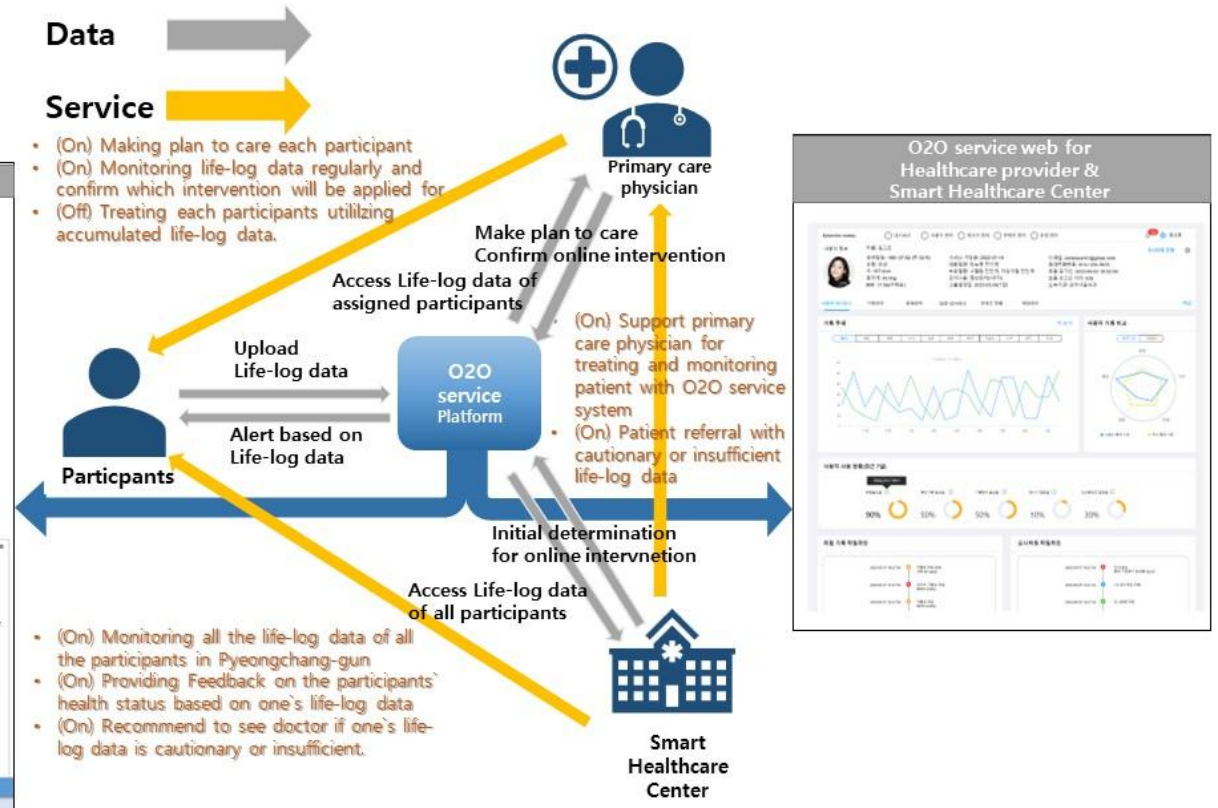
**Crossing the *Valley of Death* only to Arrive
in the Waters of the *Darwinian Sea***



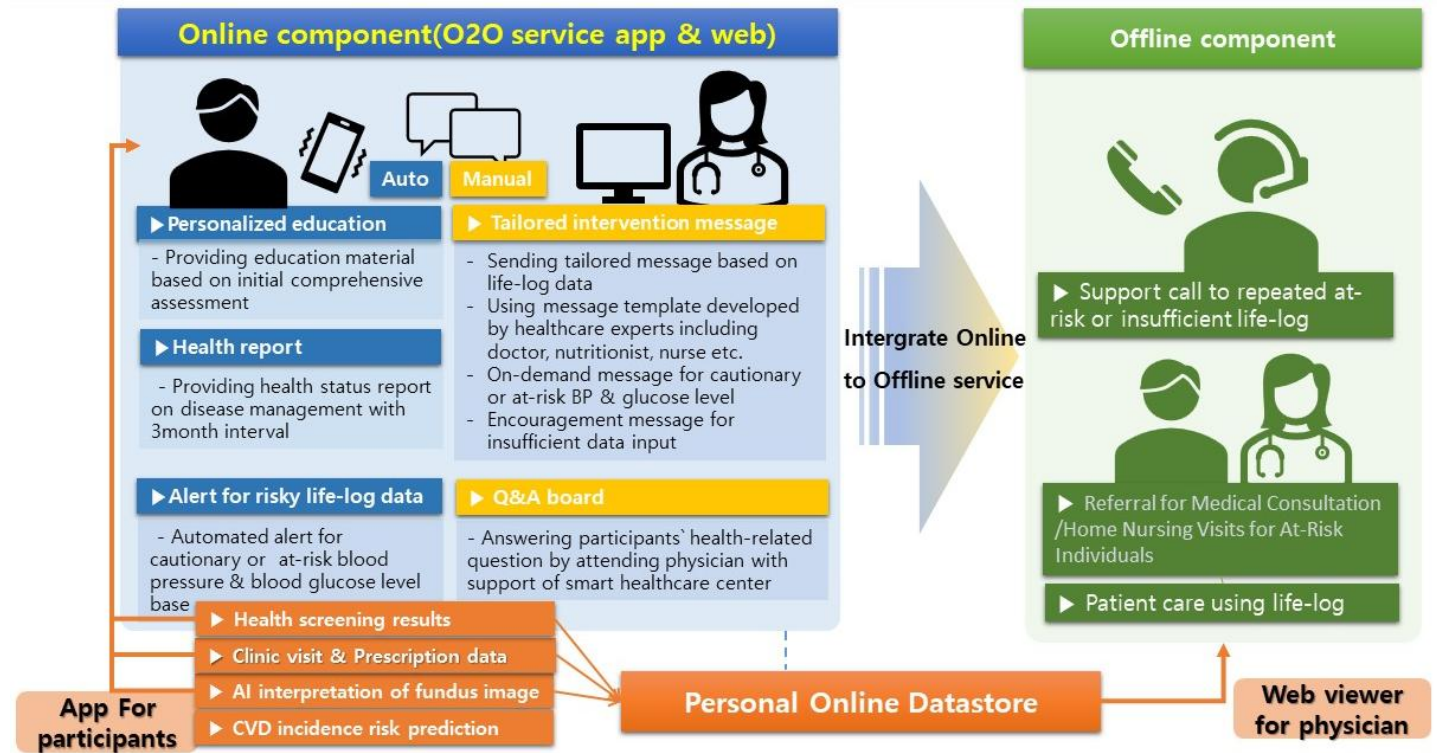




The key players of O2O service model and the data flow among them



Online-and-Offline components of intervention in the O2O service model and concept of personal online datastore(POD)



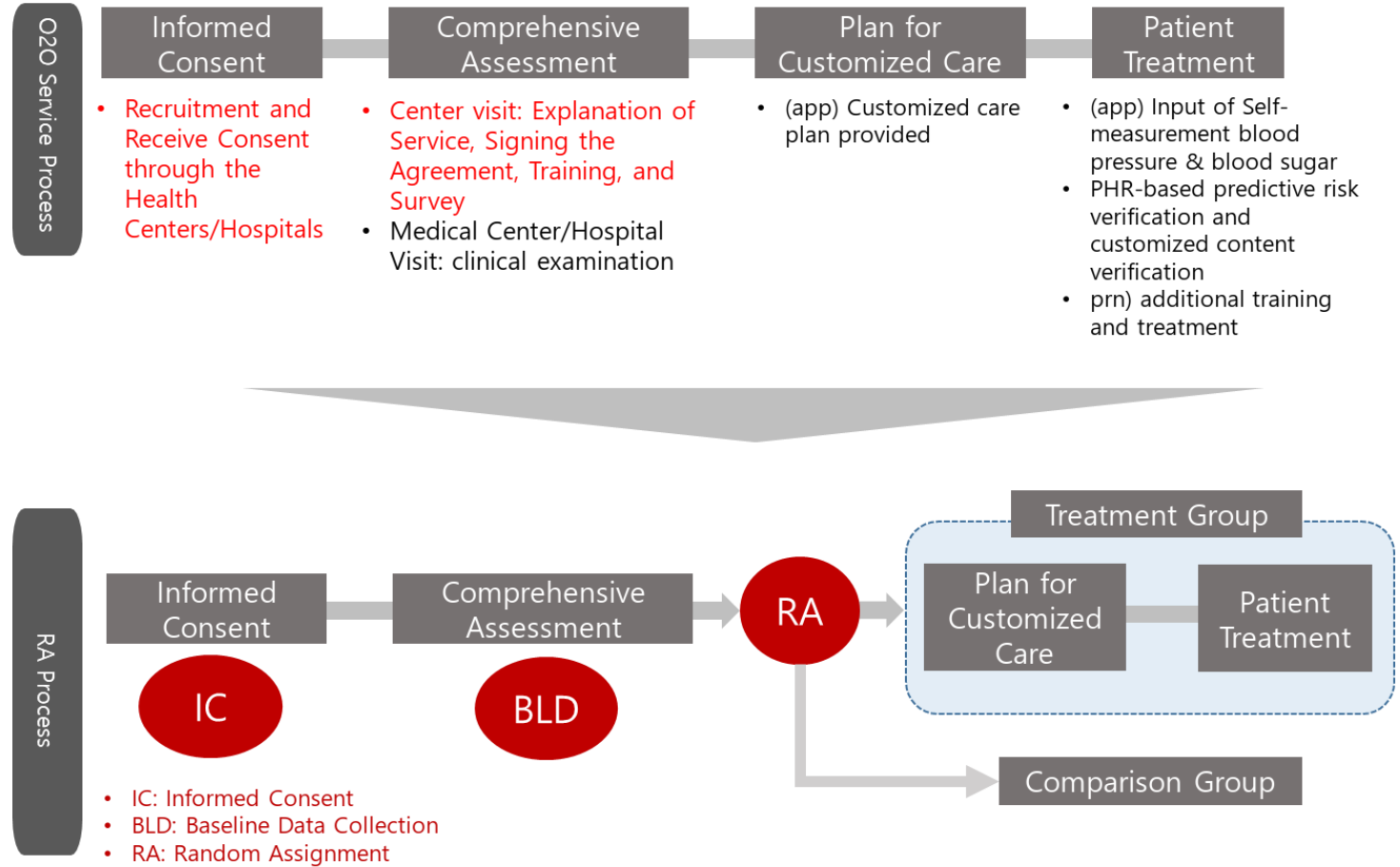
Outcome Data
to be Collected
(specific
outcome data
available at
Table x)

Evaluation Criteria		Data	
Effectiveness	Clinical Outcome	Major Outcome	Diastolic blood pressure, Systolic blood pressure
			Fasting blood glucose (FBG), HbA1C
			Cholesterol, Triglyceride(TG), HDL Cholesterol, LDL Cholesterol
		Secondary Outcome	Body measurement (weight, BMI, waist size) change
			Medication treatment before and after service (Medication Adherence=Duration of Medication Use/ Prescription Period)
			Smoking Behavior
			Health care expenditure
Participation Outcome	Application utilization level (DAU, WAU, etc.), Record rate		
Satisfaction Rate	Satisfaction rate of doctors and care coordinators (Interview) Patient Satisfaction Rate Survey		
Prevention of Acute Complications		Discovery rate of acute complications through healthcare provider monitoring of indicators (such as blood pressure, blood glucose, etc.) that can trigger acute complications at interconnected and recorded values.	

Participant Timeline

	2023	2024				2025
Timepoint	Q4	Q1	Q2	Q3	Q4	Q1
Enrolment:						
Eligibility Screen	X					
Informed Consent	X					
Allocation	X					
Intervention	X	X	X	X		
Data Collection						
Baseline Clinical Examination	X					
Baseline Survey	X					
Life-log Data	X	X	X			
Post-trial Clinical Examination				X	X	
Post-trial Survey				X	X	
Analysis/Reporting						
Data Analysis					X	X
Report					X	X

Integration of O2O Service Process & Random Assignment Process



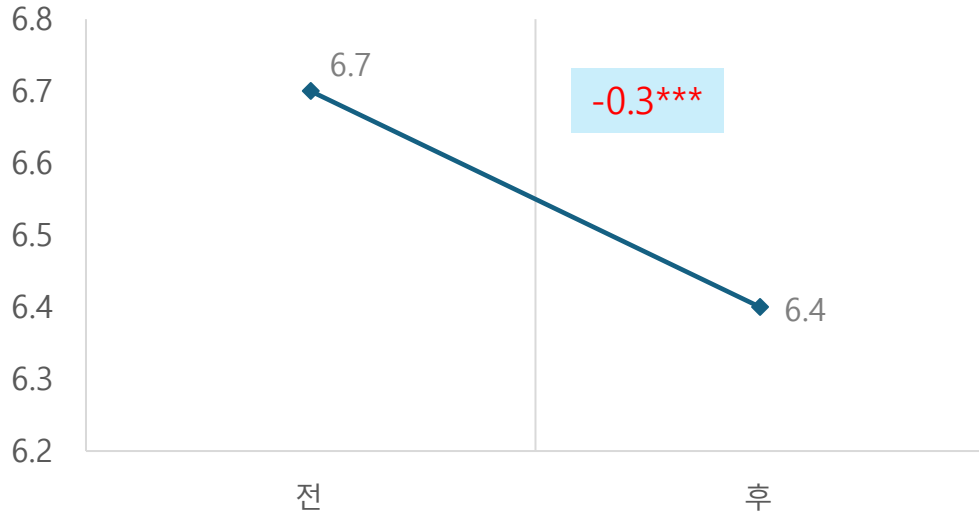
이전실험 (p r o t o t y p e) 결과

주요지표	N	실험군			N	대조군		
		사전	사후	증감률		사전	사후	증감률
당화혈색소	223	6.8	6.7	▼ 0.1 (0.7%)	212	6.9	6.9	▼ 0.1 (0.9%)
공복혈당		113.2	109.2	▼ 4.0 (3.5%)		135.6	134.0	▼ 1.6 (1.2%)
수축기혈압	279	130.3	125.4	▼ 4.9 (3.8%)***	285	131.2	132.9	▲ 1.7 (1.3%)**
이완기혈압		85.5	82.6	▼ 2.9 (3.4%)***		80.3	82.4	▲ 2.1 (2.6%)***
총콜레스테롤	502	172.9	170.6	▼ 2.4 (1.4%)	502	170.2	169.5	▼ 0.7 (0.4%)
중성지방		143.5	135.7	▼ 7.8 (5.4%)*		164.3	157.5	▼ 6.8 (4.1%)*
HDL-콜레스테롤		54.4	55.7	▲ 1.3 (2.4%)***		52.8	53.8	▲ 1.1 (2.1%)**
LDL-콜레스테롤		90.6	88.6	▼ 2.1 (2.3%)		86.2	86.0	▼ 0.2 (0.3%)
체중		69.8	68.6	▼ 1.1 (1.6%)***		66.6	66.5	▼ 0.1 (0.2%)
허리둘레	501	89.0	87.7	▼ 1.3 (1.5%)***	501	88.3	88.6	▲ 0.3 (1.4%)
BMI		25.8	25.4	▼ 0.4 (1.6%)***		25.1	25.1	▼ 0.1 (0.2%)

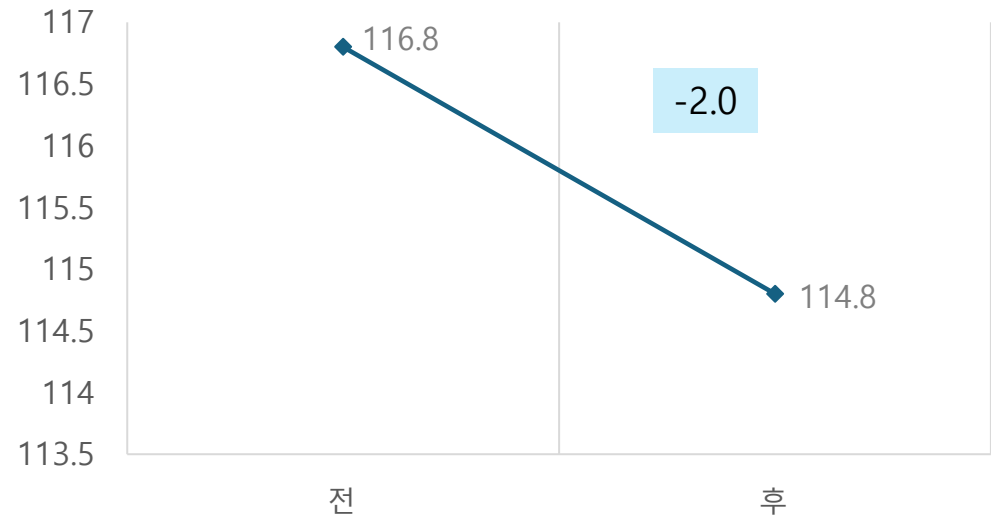
[서비스 참여 전후 임상지표 변화]

- 당뇨중재군의 주요 임상지표 변화 * <0.05, ** <0.01, *** <0.001

당화혈색소



공복혈당



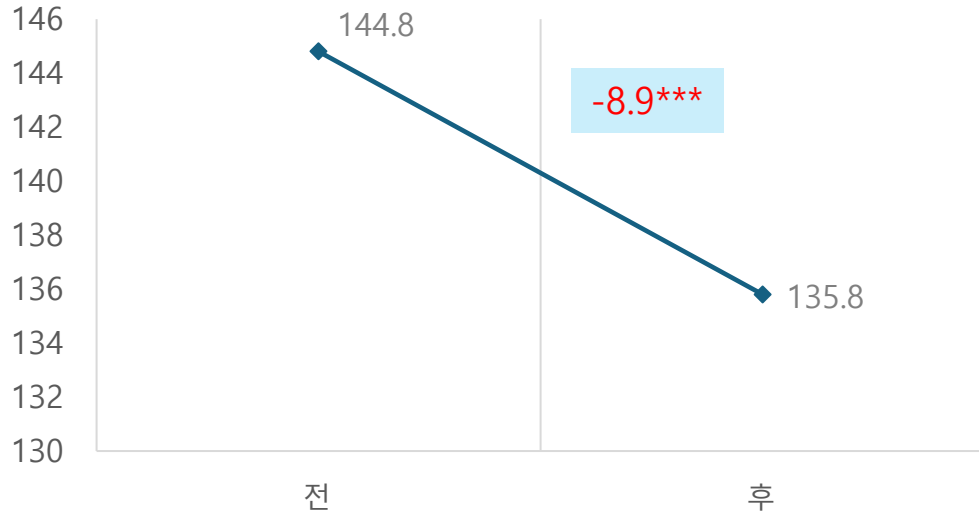
< 당뇨군 임상지표변화 (n=214) >

	전	후	증감	P-value
당화혈색소	6.7 ± 1.1	6.4 ± 1.0	-0.3	<0.001
공복혈당	116.7 ± 26.6	114.7 ± 28.2	-2.0	0.2276
BMI	26.4 ± 4.4	25.8 ± 3.3	-0.6	<0.001
중성지방	133.6 ± 62.6	133.6 ± 69.7	0.1	0.9909
총콜레스테롤	174.8 ± 45.8	167.6 ± 41.9	-7.2	0.0018
HDL-콜레스테롤	56.6 ± 16.2	48.1 ± 12.8	-8.5	<0.001
LDL-콜레스테롤	97.6 ± 40.8	93.7 ± 32.1	-3.9	0.0799

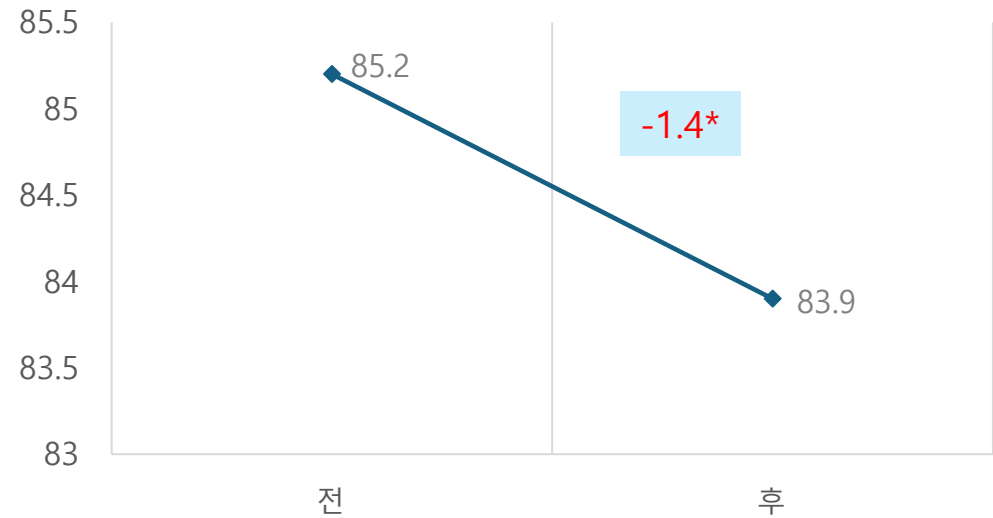
[서비스 참여 전후 임상지표 변화]

- 혈압중재군의 주요 임상지표 변화 * < 0.05, ** < 0.01, *** < 0.001

수축기혈압



이완기혈압



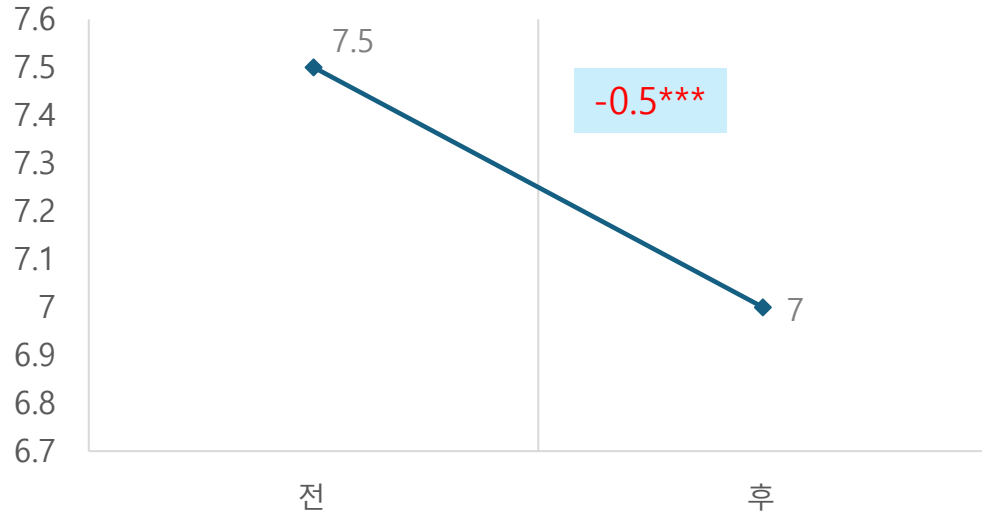
<혈압군 임상지표 변화 (n=251)>

	전	후	증감	95%CI	P-value
수축기혈압	144.7 ± 16.0	135.8 ± 12.7	-8.9	-10.9 to -7.1	<0.001
이완기혈압	85.2 ± 10.9	83.9 ± 9.2	-1.4	-2.5 to -0.0	<0.05
BMI	26.3 ± 3.4	25.9 ± 3.2	-0.5	-0.7 to -0.3	<0.001
중성지방	137.4 ± 69.5	132.5 ± 71.3	-4.9	-12.8 to 5.5	0.294
총콜레스테롤	177.3 ± 44.3	171.9 ± 40.9	-5.4	-9.5 to -1.1	<0.05
HDL-콜레스테롤	57.3 ± 16.2	49.7 ± 13.8	-7.6	-9.1 to -6.1	<0.001
LDL-콜레스테롤	98.9 ± 39.8	96.8 ± 37.1	-2.2	-6.2 to 1.9	0.960

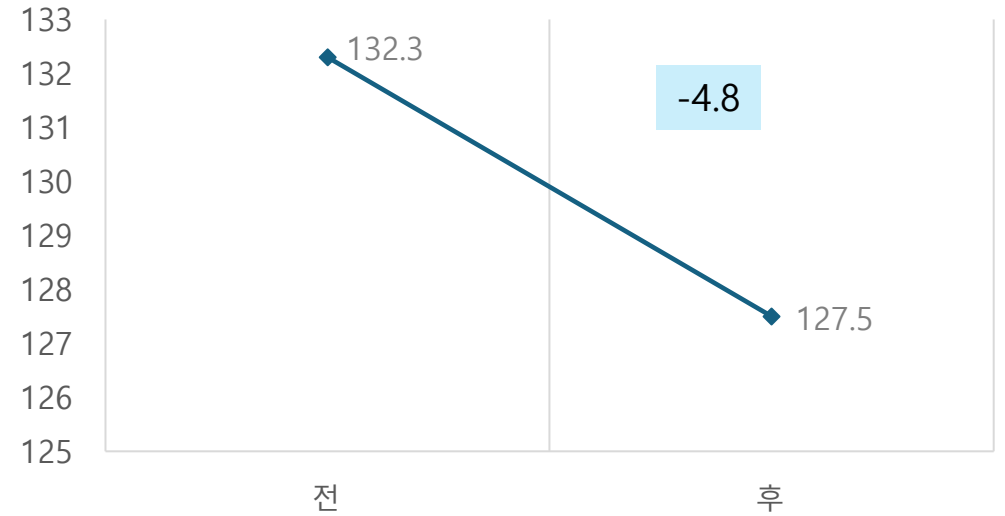
[서비스 참여 전후 임상지표 변화]

- 고위험(당화혈색소 6.5 이상) 혈당중재군의 주요 임상지표 변화 * < 0.05, ** < 0.01, *** < 0.001

당화혈색소



공복혈당



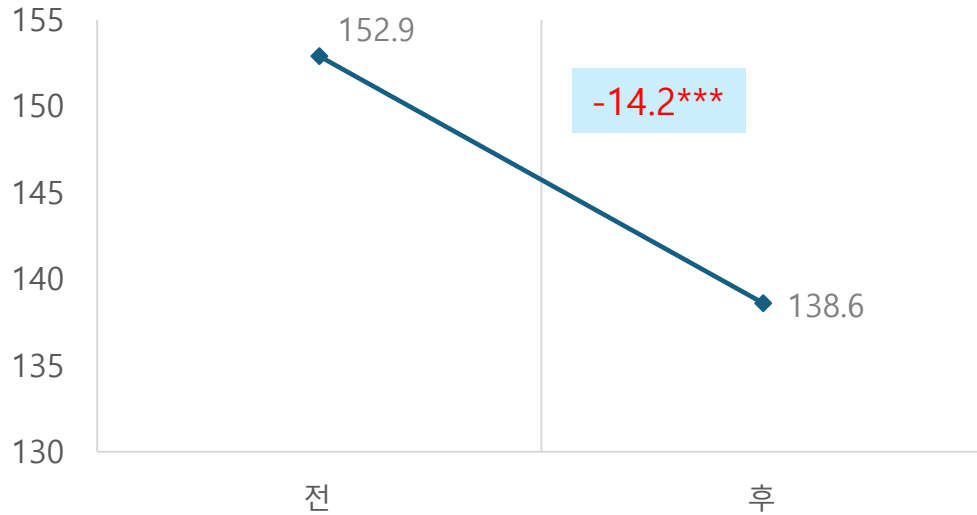
< 당뇨 고위험군 (n=100) >

구분	전	후	증감	95%CI	P-value
당화혈색소	7.5 ± 1.2	7.0 ± 1.1	-0.5	-0.6 to -0.3	<0.001
공복혈당	132.3 ± 29.8	127.5 ± 34.9	-4.8	-11.5 to 1.9	0.073

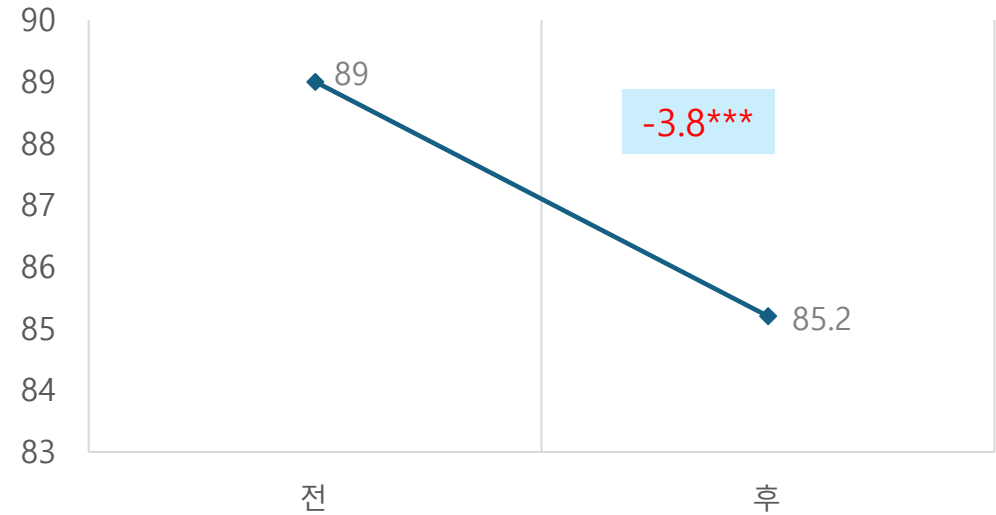
[서비스 참여 전후 임상지표 변화]

- 고위험(수축기혈압 140mmHg 또는 이완기혈압 90mmHg 이상) 혈압증재군의 주요 임상지표 변화 * < 0.05, ** < 0.01, *** < 0.001

수축기혈압



이완기혈압



혈압 고위험군 (n=167)

구분	전	후	증감	95%CI	P-value
수축기혈압	152.9 ± 12.9	138.6 ± 12.4	-14.2	-16.4 to -12.1	<0.001
이완기혈압	89.0 ± 10.2	85.2 ± 9.3	-3.8	-5.2 to -2.4	<0.001

[무작위 배정] 중재군-대조군 간 유사성 분석 결과 (등록자 전체)

- 당뇨병에서 HDL에서 유의미한 차이 존재하나 전반적으로 T/C간 유사성 높음

	당뇨군			혈압군		
	대조군	중재군	p	대조군	중재군	p
n	266	263		301	304	
Age	62.8	62.5	0.748	61.8	61.9	0.837
Sex	0.5	0.5	0.516	0.5	0.5	0.351
Height	161.3	161.3	0.994	161.6	161.9	0.703
Weight	68	68.5	0.598	68.6	68.8	0.828
BMI	26	26.5	0.42	26.1	26.2	0.903
SBP	142.5	143.5	0.51	144.1	144.7	0.639
DBP	83.8	83.6	0.91	85.7	85.2	0.575
HbA1c	6.6	6.7	0.398	6.4	6.4	0.674
Glucose*	143	145.4	0.398	136.4	137.5	0.674
FBS	116.5	115.9	0.848	112.8	111.3	0.539
Triglycerid	140	131	0.2	138.4	135.2	0.624
Total cholesterol	176.8	171.9	0.214	178.5	174.8	0.296
HDL cholesterol	60.1	57.1	0.037	59.9	57.6	0.083
LDL Cholesterol	95.5	94.6	0.791	97.4	96.3	0.697
AST	26.7	25.9	0.501	26.5	25.9	0.584
ALT	26.7	26.2	0.765	26.5	25.7	0.614

*Glucose = hba1c 보정 후 변환 : $28.7 \times A1C - 46.7 = eAG$. (계산식 출처: https://professional.diabetes.org/glucose_calc)

[무작위 배정] 중재군-대조군 간 유사성 분석 결과 (탈락자 제외)

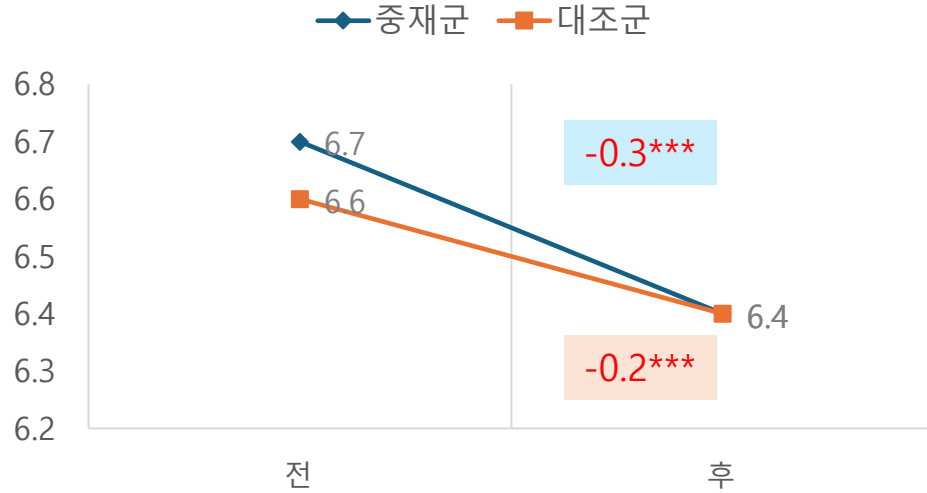
- 당뇨병에서 HDL에서 유의미한 차이 존재하나 전반적으로 T/C간 유사성 높음

	당뇨군			혈압군		
	대조군	중재군	p	대조군	중재군	p
n	212	214		240	255	
Age	63.1	62.6	0.626	62.2	61.9	0.732
Sex	0.5	0.5	0.335	0.5	0.5	0.363
Height	161.4	161.5	0.906	161.8	162.1	0.673
Weight	68.6	69	0.748	69.1	69.4	0.796
BMI	26.2	26.4	0.595	26.2	26.3	0.865
SBP	143.3	143.8	0.757	144.8	144.7	0.963
DBP	83.6	83.9	0.818	85.3	85.2	0.899
HbA1c	6.6	6.7	0.464	6.4	6.4	0.921
Glucose*	142.3	144.4	0.464	136.5	136.7	0.921
FBS	118.2	116.7	0.623	114.6	112.2	0.376
Triglycerid	135.9	133.6	0.747	134.7	137.4	0.697
Total cholesterol	177.2	174.8	0.579	178.4	177.3	0.785
HDL cholesterol	60.7	56.6	0.013	60.2	57.3	0.052
LDL Cholesterol	96.7	57.6	0.808	98.1	98.7	0.856
AST	25.9	26	0.937	26	25.9	0.921
ALT	25.2	26.8	0.313	25.4	26.3	0.557

*Glucose = hba1c 보정 후 변환 : $28.7 \times A1C - 46.7 = eAG$. (계산식 출처: https://professional.diabetes.org/glucose_calc)

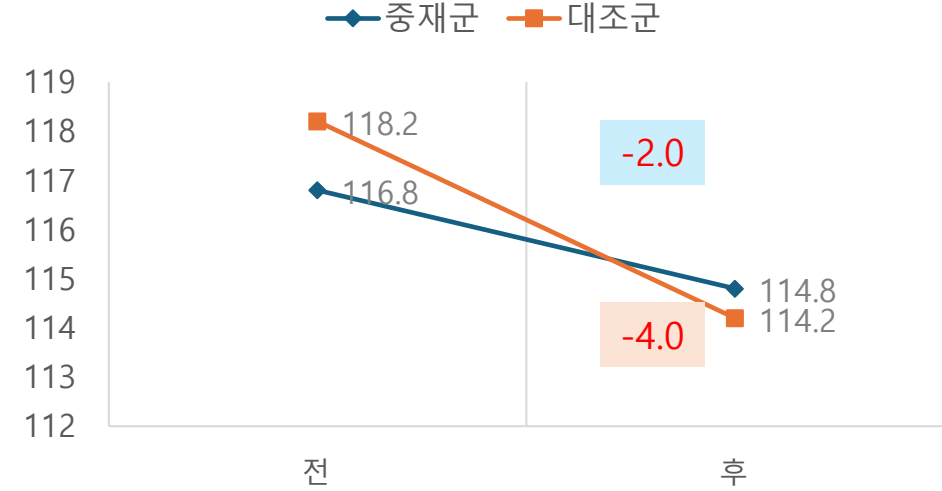
[당뇨군] 중재군 - 대조군 전후비교 결과

당화혈색소 변화



Variable	Baseline ¹	Follow-up ¹	Mean Difference	95% CI	P-value
HbA1c	6.7 ± 1.1	6.4 ± 1.0	-0.3	-0.4 to -0.2	<0.001
FBS	116.8 ± 26.7	114.8 ± 28.4	-2.0	-5.3 to 1.3	0.200
BMI	26.4 ± 4.4	25.8 ± 3.3	-0.6	-1.0 to -0.3	<0.001
SBP	143.9 ± 16.5	135.5 ± 12.9	-8.4	-10.5 to -6.4	<0.001
DBP	83.9 ± 10.8	83.1 ± 8.4	-0.8	-2.1 to 0.5	0.176
Total Cholesterol	175.0 ± 46.1	167.8 ± 42.0	-7.1	-11.6 to -2.6	<0.05
Triglyceride	133.1 ± 62.3	134.2 ± 69.9	1.1	-7.8 to 10.0	1.000
HDL	56.7 ± 16.2	48.2 ± 12.9	-8.5	-10.2 to -6.8	<0.001
LDL	97.8 ± 41.1	93.8 ± 37.5	-3.9	-8.3 to 0.4	0.322

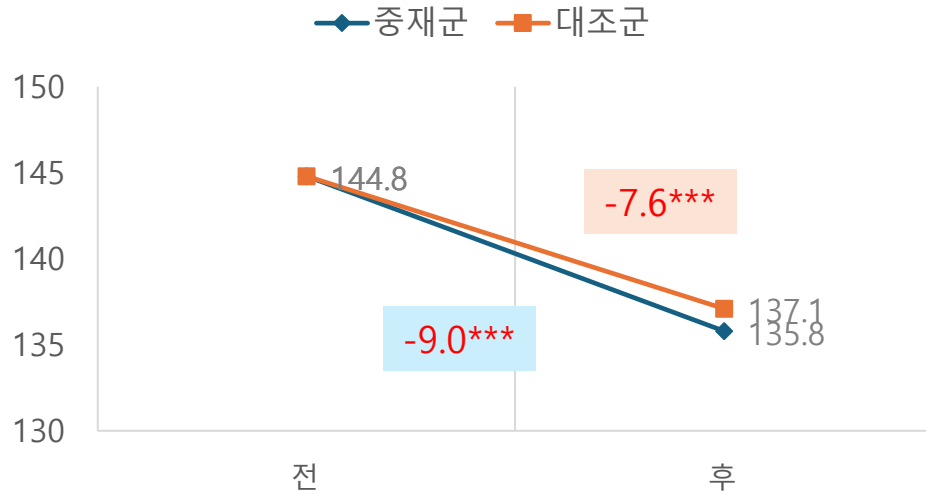
공복혈당 변화



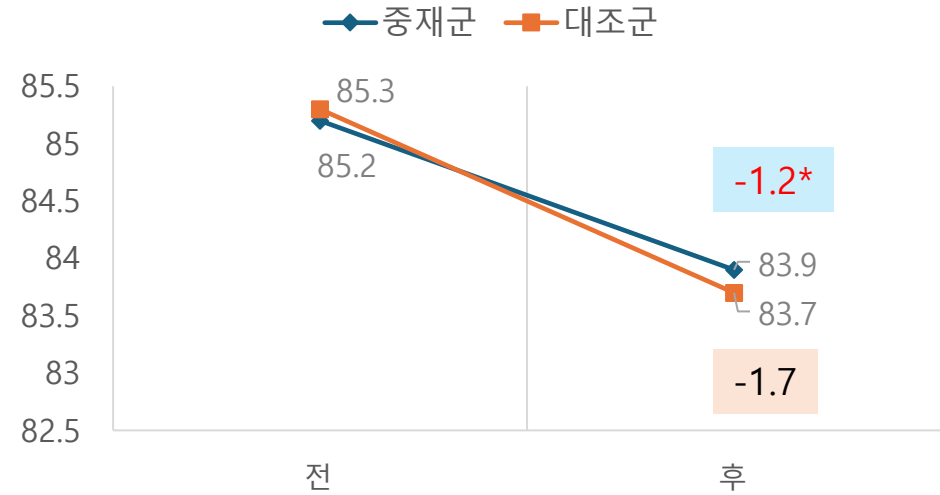
Variable	Baseline ¹	Follow-up ¹	Mean Difference	95% CI	P-value
HbA1c	6.6 ± 1.0	6.4 ± 0.9	-0.2	-0.3 to -0.1	<0.001
FBS	118.2 ± 36.1	114.2 ± 24.7	-4.0	-8.4 to 0.3	0.178
BMI	26.2 ± 3.5	25.8 ± 3.5	-0.4	-0.5 to -0.3	<0.001
SBP	143.3 ± 18.3	136.2 ± 14.1	-7.2	-9.4 to -4.9	<0.001
DBP	83.6 ± 12.1	82.8 ± 10.0	-0.8	-2.3 to 0.7	0.767
Total Cholesterol	177.2 ± 44.2	169.3 ± 41.8	-8.0	-12.9 to -3.0	<0.05
Triglyceride	135.9 ± 86.5	123.0 ± 71.9	-13.0	-24.4 to -1.5	<0.05
HDL	60.7 ± 17.3	51.6 ± 13.8	-9.0	-10.9 to -7.2	<0.001
LDL	96.7 ± 38.0	92.6 ± 36.5	-4.1	-8.8 to 0.6	0.106

[혈압군] 중재군 - 대조군 전후비교 결과

수축기혈압 변화



이완기 변화

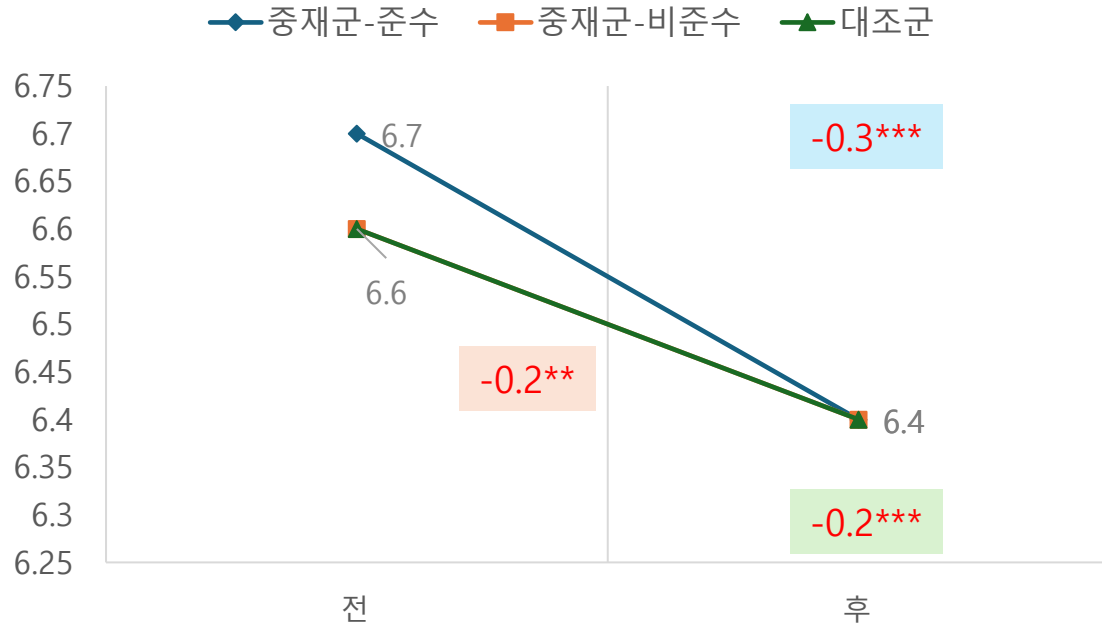


HTN Intervention (n=251)					
Variable	Baseline ¹	Follow-up ¹	Mean Difference	95% CI	P-value
SBP	144.8 ± 16.1	135.8 ± 12.7	-9.0	-10.9 to -7.1	<0.001
DBP	85.2 ± 10.8	83.9 ± 9.2	-1.2	-2.5 to -0.0	0.049
HbA1c	6.4 ± 1.1	6.2 ± 1.0	-0.2	-0.3 to -0.1	<0.001
FBS	112.2 ± 25.4	111.1 ± 27.1	-1.1	-3.8 to 1.7	0.516
BMI	26.3 ± 3.4	25.9 ± 3.2	-0.5	-0.7 to -0.3	<0.001
Total Cholesterol	177.3 ± 44.5	172.0 ± 41.0	-5.3	-9.5 to -1.1	0.143
Triglyceride	136.5 ± 68.6	132.8 ± 71.6	-3.7	-12.8 to 5.5	0.294
HDL	57.3 ± 16.2	49.7 ± 13.8	-7.6	-9.1 to -6.1	<0.001
LDL	98.9 ± 39.8	96.8 ± 37.1	-2.2	-6.2 to 1.9	0.960

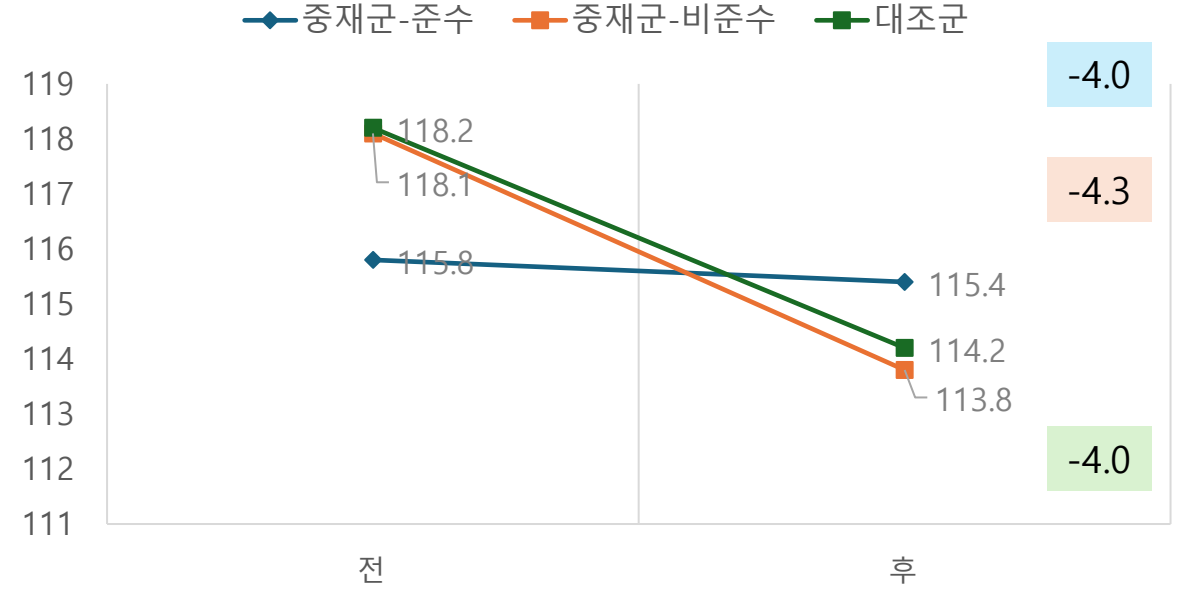
HTN Control (n=240)					
Variable	Baseline ¹	Follow-up ¹	Mean Difference	95% CI	P-value
SBP	144.8 ± 17.0	137.1 ± 13.3	-7.6	-9.7 to -5.6	<0.001
DBP	85.3 ± 11.8	83.7 ± 9.7	-1.7	-3.1 to -0.3	0.094
HbA1c	6.4 ± 1.0	6.2 ± 0.9	-0.2	-0.2 to -0.1	<0.001
FBS	114.6 ± 35.1	110.9 ± 24.3	-3.7	-7.6 to 0.1	0.141
BMI	26.2 ± 3.5	25.9 ± 3.5	-0.3	-0.5 to -0.2	<0.001
Total Cholesterol	178.4 ± 42.6	170.6 ± 40.6	-7.8	-12.3 to -3.2	0.001
Triglyceride	134.7 ± 86.5	123.4 ± 71.7	-11.3	-21.9 to -0.7	0.050
HDL	60.2 ± 17.0	51.5 ± 13.6	-8.7	-10.4 to -7.0	<0.001
LDL	98.1 ± 37.5	94.2 ± 35.6	-3.9	-8.2 to 0.4	0.114

[당뇨군] 중재군(프로토콜 준수/비준수) - 대조군 전후비교

당화혈색소 변화



공복혈당 변화

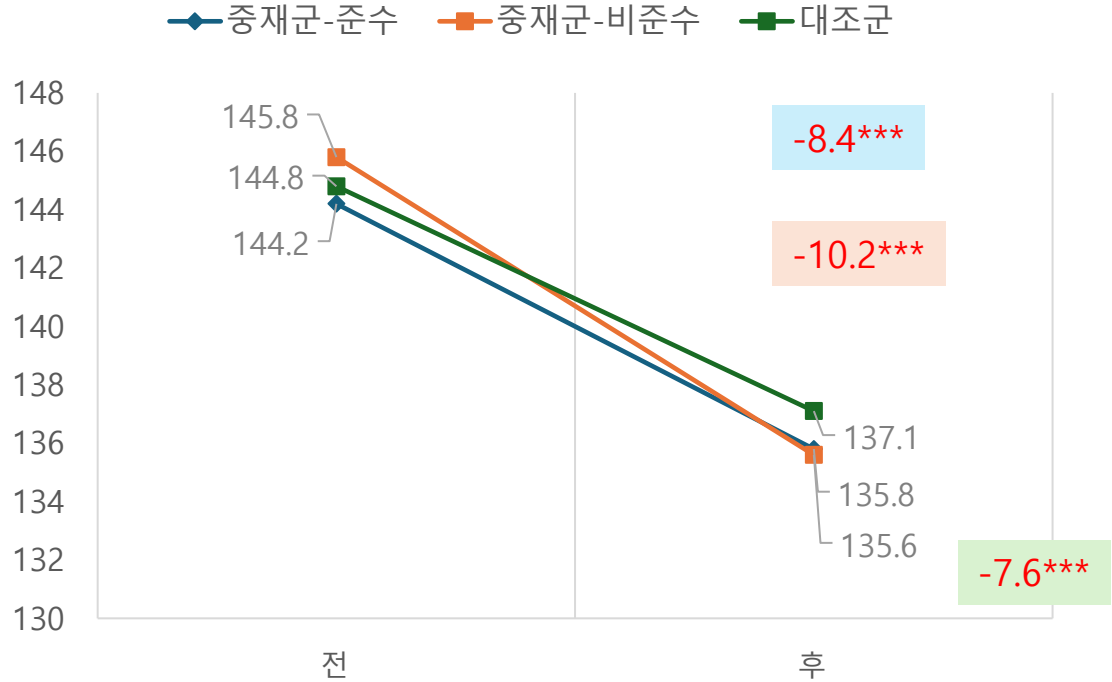


Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
DM Control (n=212)	6.6 ± 1.0	6.4 ± 0.9	-0.2	<0.001
DM Adherent (n=128)	6.7 ± 1.2	6.4 ± 1.0	-0.3	<0.001
DM Non-adherent (n=86)	6.6 ± 1.0	6.4 ± 0.9	-0.2	<0.05

Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
DM Control (n=212)	118.2 ± 36.1	114.2 ± 24.7	-4.0	0.178
DM Adherent (n=128)	115.8 ± 26.9	115.4 ± 32.0	-0.4	0.470
DM Non-adherent (n=86)	118.1 ± 26.4	113.8 ± 21.4	-4.3	0.257

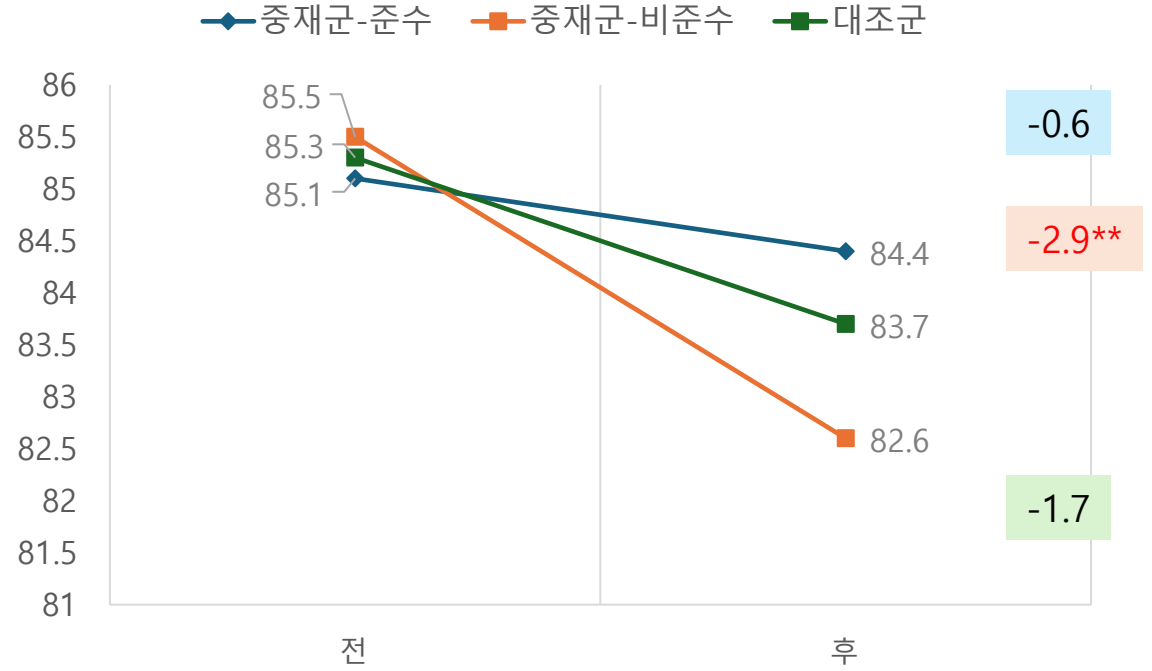
[혈압군] 중재군(프로토콜 준수/비준수) - 대조군 전후비교

수축기혈압 변화



Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
HTN Control (n=240)	144.8 ± 17.0	137.1 ± 13.3	-7.6	<0.001
HTN Adherent (n=174)	144.2 ± 16.6	135.8 ± 11.9	-8.4	<0.001
HTN Non-adherent (n=81)	145.8 ± 14.5	135.6 ± 14.3	-10.2	<0.001

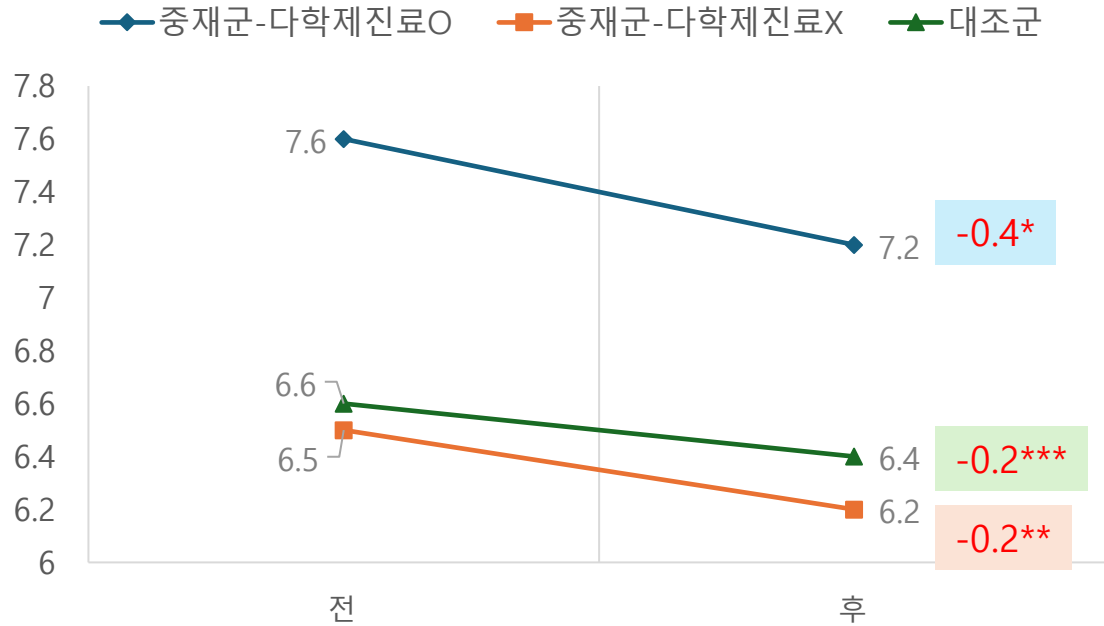
이완기혈압 변화



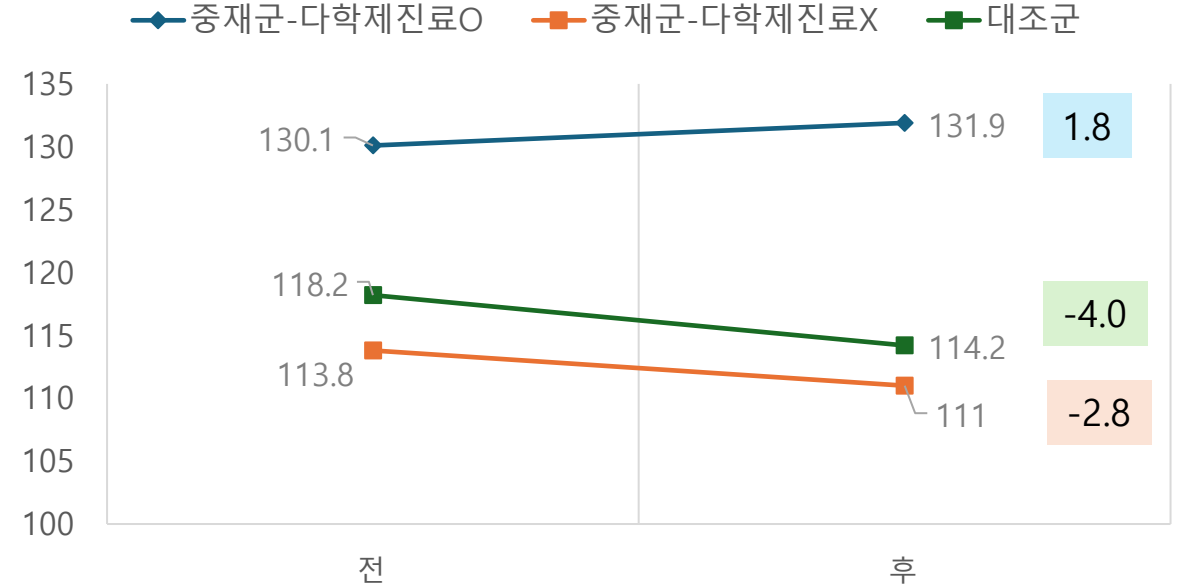
Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
HTN Control (n=240)	85.3 ± 11.8	83.7 ± 9.7	-1.7	0.094
HTN Adherent (n=174)	85.1 ± 11.0	84.4 ± 8.8	-0.6	0.402
HTN Non-adherent (n=81)	85.5 ± 10.7	82.6 ± 10.0	-2.9	0.005

[당뇨군] 중재군(다학제진료여부) - 대조군 전후비교

당화혈색소 변화



공복혈당 변화

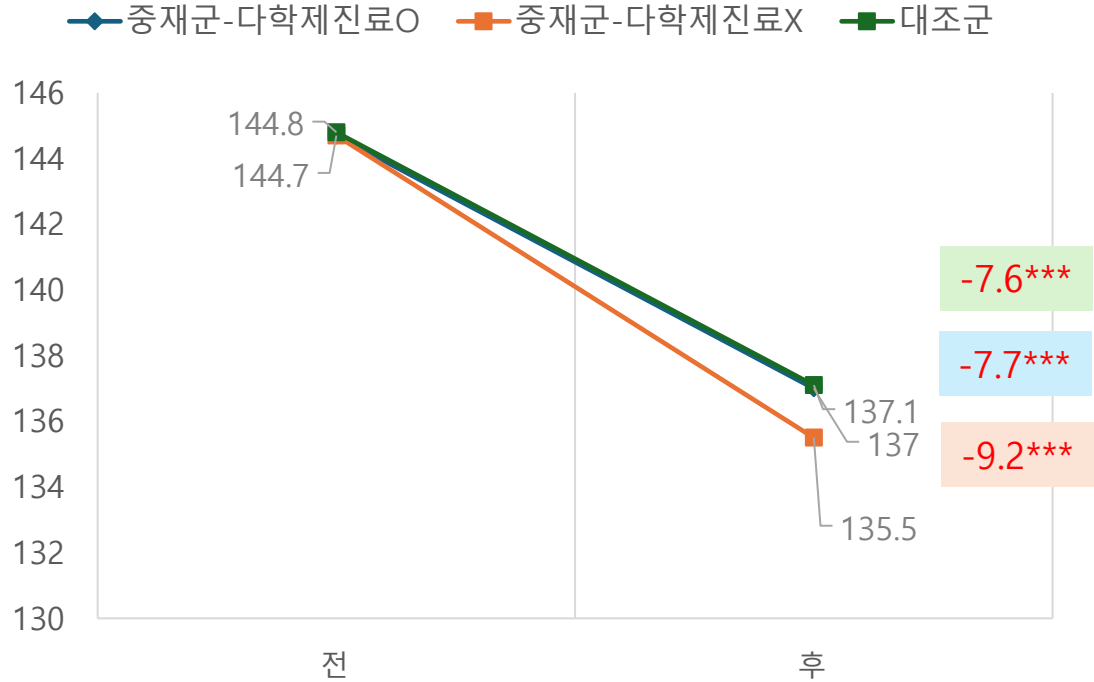


Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
DM Control (n=212)	6.6 ± 1.0	6.4 ± 0.9	-0.2	<0.001
DM 다학제진료O (n=38)	7.6 ± 1.5	7.2 ± 1.6	-0.4	<0.05
DM 다학제진료 X (n=176)	6.5 ± 0.9	6.2 ± 0.7	-0.2	<0.001

Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
DM Control (n=212)	118.2 ± 36.1	114.2 ± 24.7	-4.0	0.178
DM 다학제진료O (n=38)	130.1 ± 34.7	131.9 ± 38.2	1.8	0.748
DM 다학제진료 X (n=176)	113.8 ± 23.7	111.0 ± 24.1	-2.8	0.169

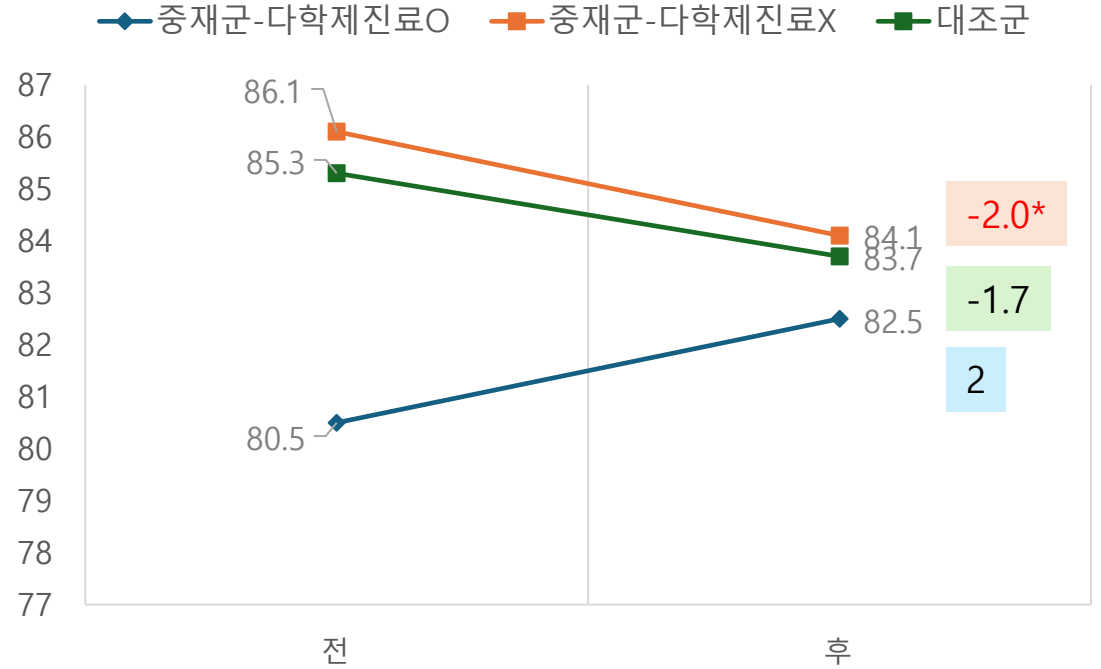
[혈압군] 중재군(다학제진료여부) - 대조군 전후비교

수축기혈압 변화



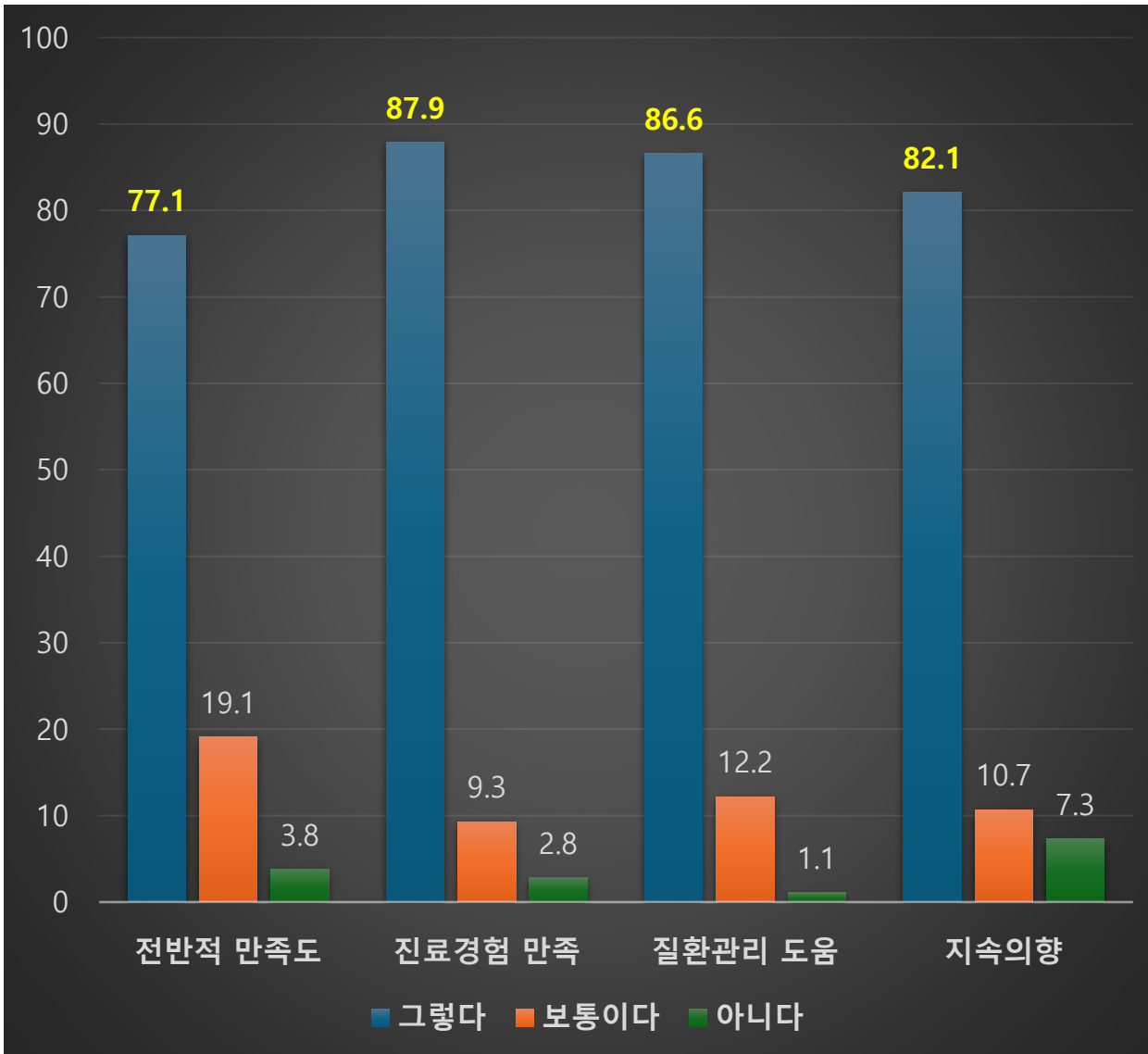
Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
HTN Control (n=240)	144.8 ± 17.0	137.1 ± 13.3	-7.6	<0.001
HTN 다학제진료 O (n=40)	144.7 ± 12.6	137.0 ± 11.4	-7.7	<0.001
HTN 다학제진료 X (n=215)	144.7 ± 16.5	135.5 ± 12.9	-9.2	<0.001

이완기 변화



Variable	Baseline ¹	Follow-up ¹	Mean Difference	P-value
HTN Control (n=240)	85.3 ± 11.8	83.7 ± 9.7	-1.7	0.094
HTN 다학제진료 O (n=40)	80.5 ± 10.1	82.5 ± 8.7	2	0.242
HTN 다학제진료 X (n=215)	86.1 ± 10.8	84.1 ± 9.3	-2.0	<0.05

중재군 대상 만족도 설문 결과



설문문항	응답 인원	%
Q. 프로그램 참여에 대해 전반적으로 만족하십니까?		
그렇다	202	77.1%
보통이다	50	19.1%
그렇지 않다	10	3.8%
Q. 주치의 진료시, 앱 내 기록을 활용하여 진료받은 경험이 있는 경우, 해당 경험에 대해 만족하셨나요?		
그렇다	94	87.9%
보통이다	10	9.3%
그렇지 않다	3	2.8%
Q. 이 앱은 여러모로 만성질환 환자들에게 많은 도움이 될 것이다.		
그렇다	227	86.6%
보통이다	32	12.2%
그렇지 않다	3	1.1%
Q. 본 만성질환관리 서비스를 계속해서 받으실 의향이 있으십니까?		
그렇다	215	82.1%
보통이다	28	10.7%
그렇지 않다	19	7.3%



A village doctor-led multifaceted intervention for blood pressure control in rural China: an open, cluster randomised trial

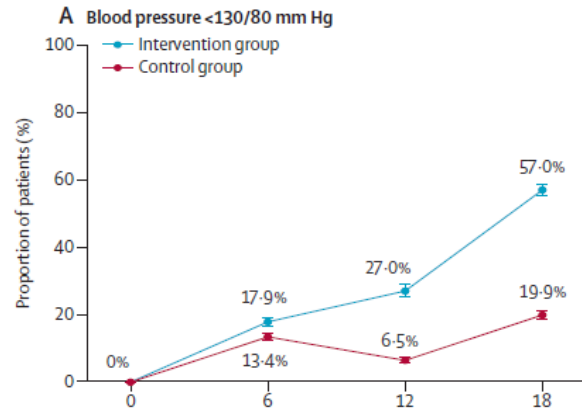
Yingxian Sun, Jianjun Mu, Dao Wen Wang, Nanxiang Ouyang, Liying Xing, Xiaofan Guo, Chunxia Zhao, Guocheng Ren, Ning Ye, Ying Zhou, Jun Wang, Zhao Li, Guozhe Sun, Ruihai Yang, Chung-Shiuan Chen, Jiang He, for the CRHCP Study Group*

Summary

Background The prevalence of uncontrolled hypertension is high and increasing in low-income and middle-income countries. We tested the effectiveness of a multifaceted intervention for blood pressure control in rural China led by village doctors (community health workers on the front line of primary health care).

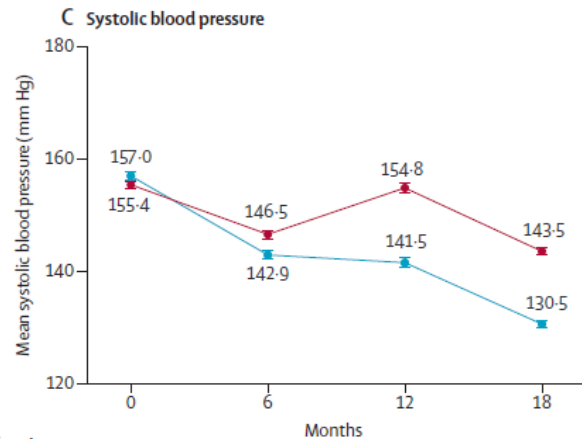
Lancet 2022; 399: 1964–75

Published Online
April 29, 2022



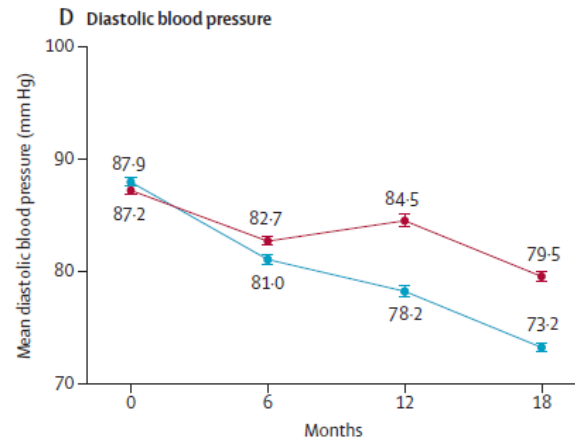
Number of patients

Intervention group	17 407	14 781	14 563	15 414
Control group	16 588	13 831	12 943	14 500



Number of patients

Intervention group	17 407	14 781	14 563	15 414
Control group	16 588	13 831	12 943	14 500



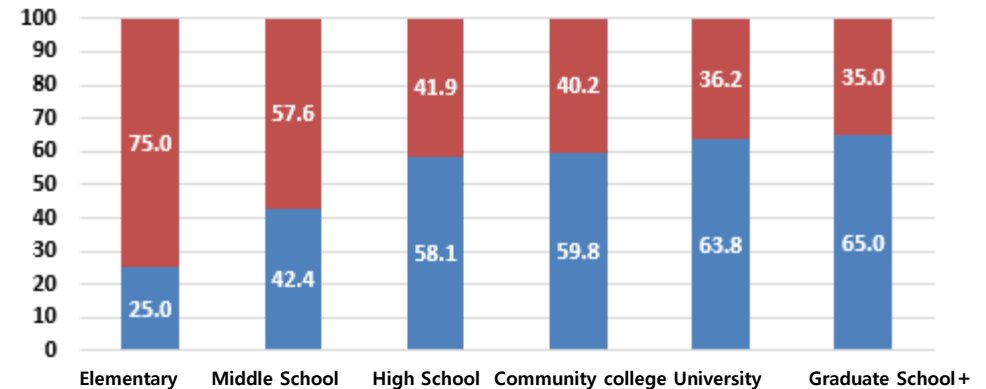
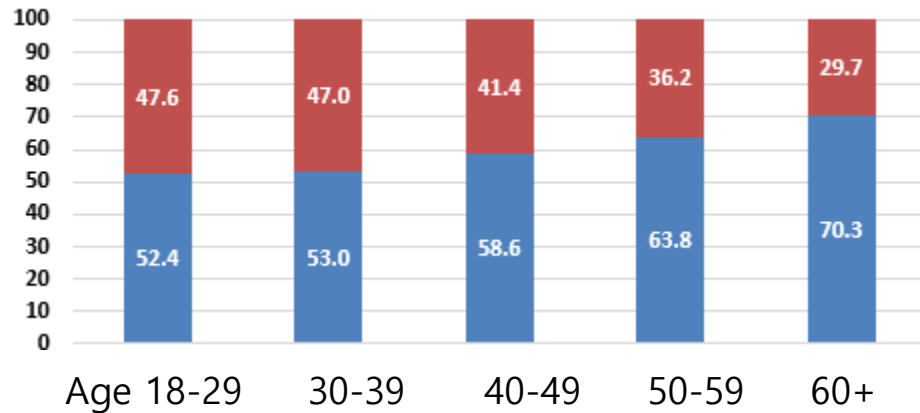
Intervention group	17 407	14 781	14 563	15 414
Control group	16 588	13 831	12 943	14 500

Figure 2: Blood pressure control during trial follow-up in intervention and control groups

Proportion of patients with systolic blood pressure <130 mm Hg and diastolic blood pressure <80 mm Hg (A) and those with systolic blood pressure <140 mm Hg and diastolic blood pressure <90 mm Hg (B). Mean systolic blood pressure (C) and mean diastolic blood pressure (D). Error bars indicate 95% CIs. All p values for interactions between the intervention and follow-up time are <0.0001.

Willingness to allow private digital health information for research purpose in Korea (2023)

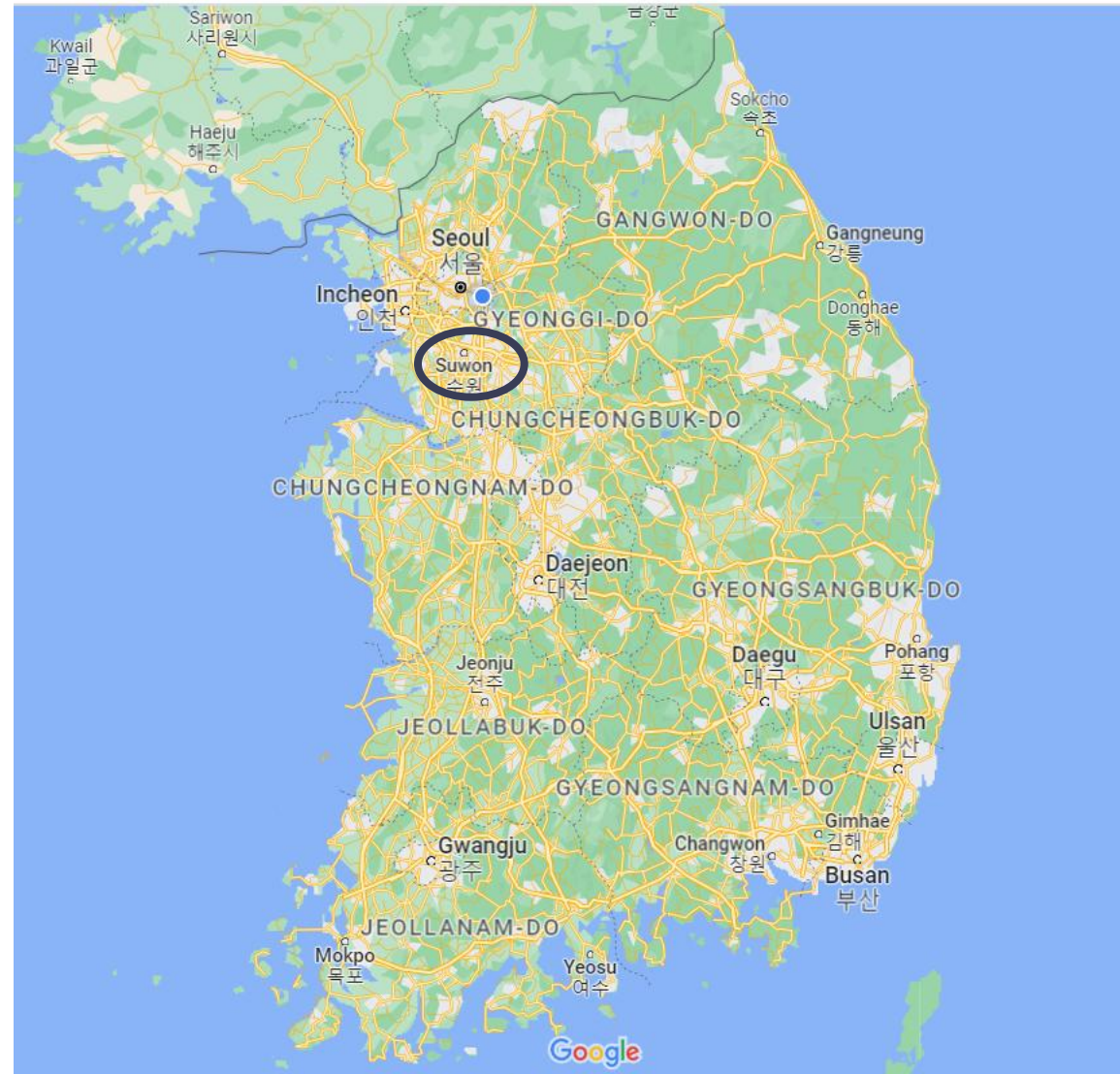
- N=2,000 (Online nationally representative survey): **People's Voice Survey** conducted by Oh J et al (2023)
 - Older age, female, high income, high education showed more willing to provide



Blue: Yes

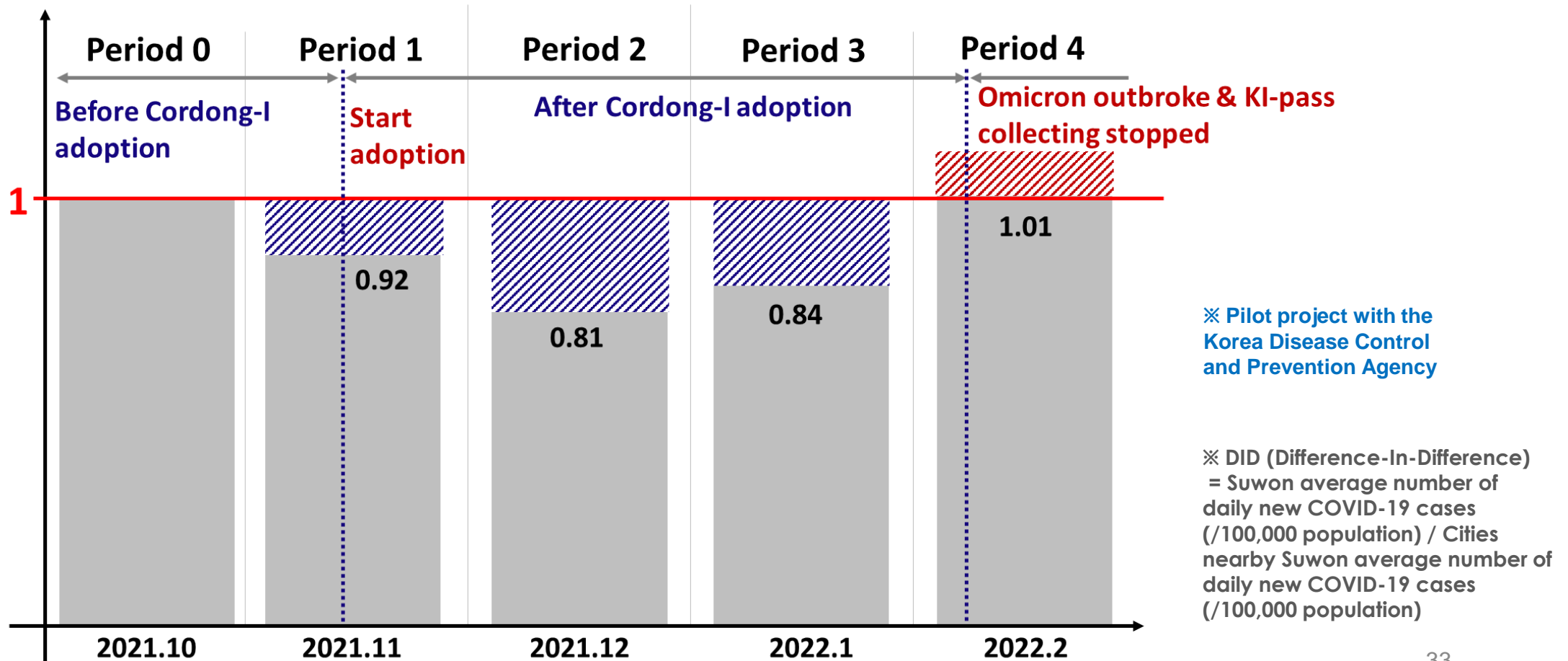
Red: No

Suwon city actively adopted a newly developed Digital Technique for timely detection & notification for the exposed person (cell phone app users) to the infected Using GPS info of smart phone user : Exposure Notification App



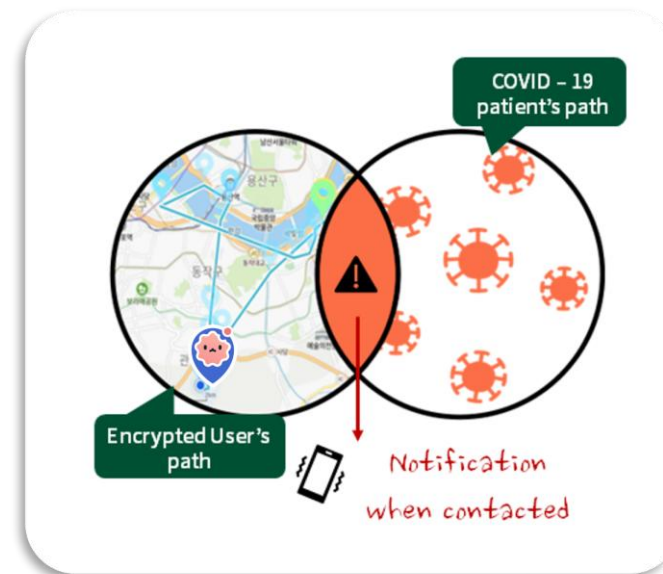
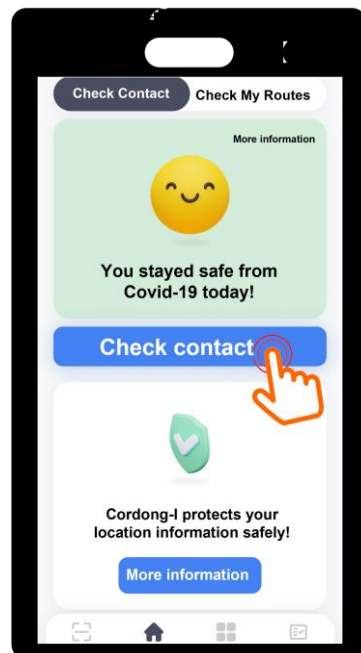
Outcomes of Cordong-I's Utility

■ **Relatively low COVID-19 infection rate** after the adoption of Cordong-I in Suwon City, South Korea compare to cities nearby Suwon



Strength of Cordong-I

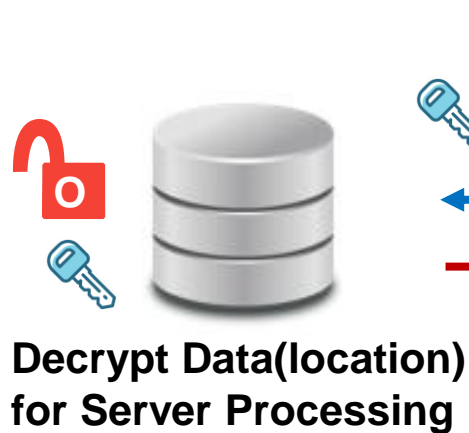
- By comparing user's routes with the COVID-19 confirmed case's routes, it **informs them of contact status with protecting the privacy.**
- By sharing user's routes, the app enable **an active citizen-engaged** in digital epidemiology.



Cordong-I , the world first HE application

- ▣ The Homomorphic Encryption(HE) method is **absolutely secure by keeping the secret key individually.**

[Classical Encryption Method]

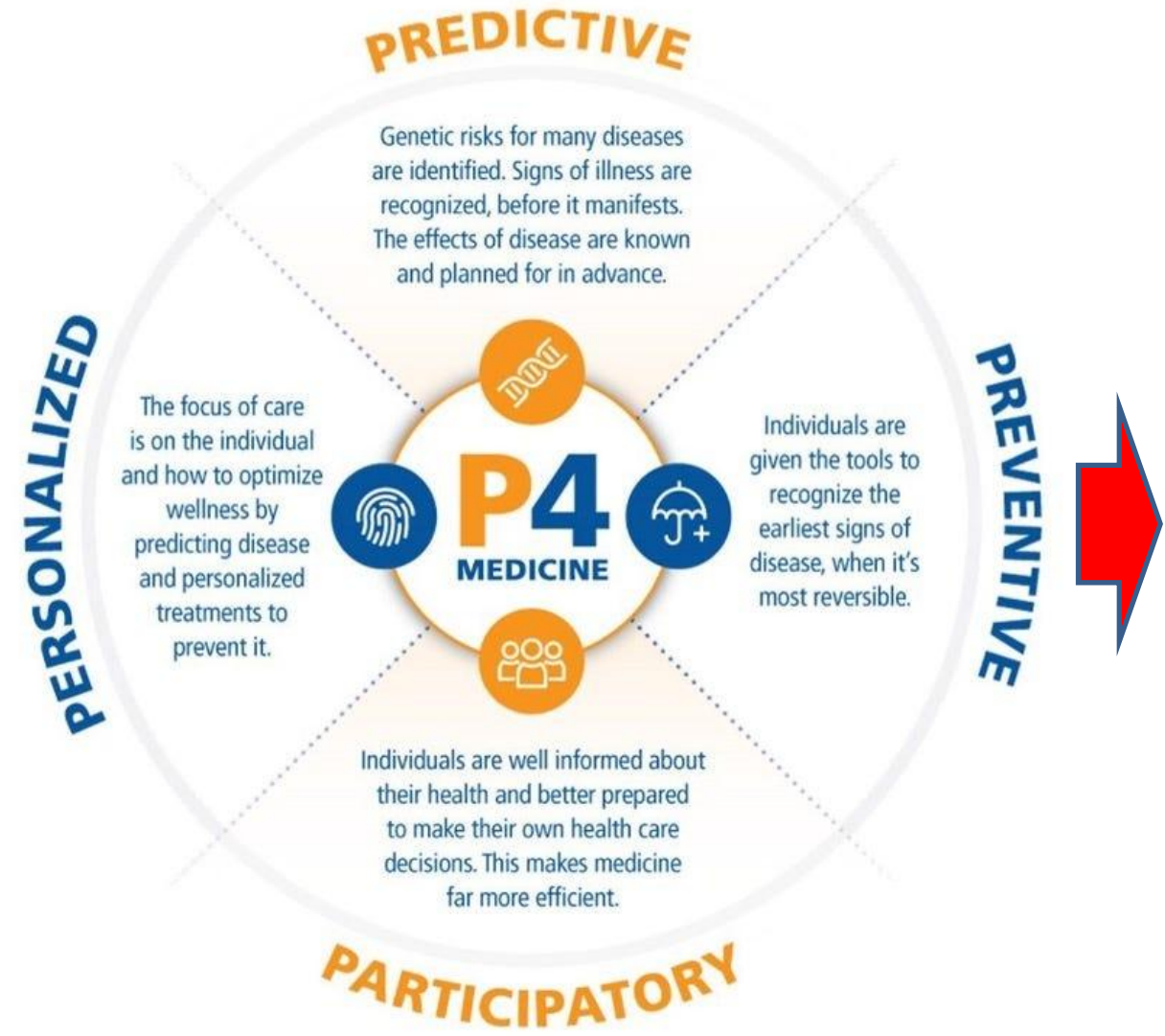


[New Homomorphic Encryption Method]

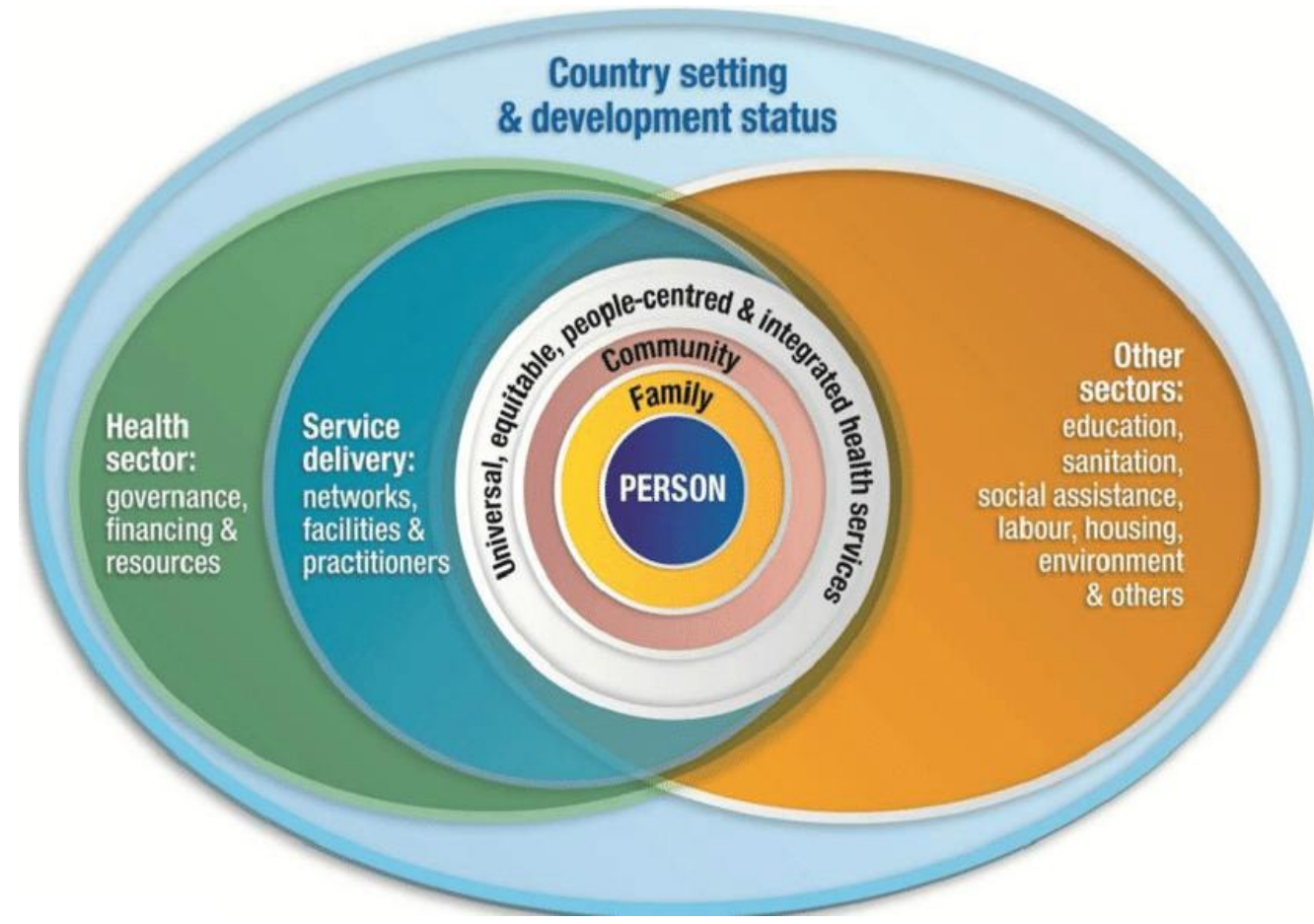


※ It is impossible for server to interpret personal location encrypted by Homomorphic Encryption.

4 P Medicine + 1 P People-Centered Approach



WHO framework on integrated people-centered health services



미래 보건의료의 비전과 목표

1

질병예방과 관리를 위하여 개인 및 가정용 헬스케어 디바이스를 통한
데이터 수집 및 전문의 수준의 가이드를 제공하는
미래형 예방의료 개념과 건강관리서비스 솔루션 개발

2

미래의 보건의료서비스를 주도하기 위한 실현방안으로써
사람중심 보건의료 및 주치의 기반 원격의료의 솔루션 개발

PATIENT CENTEREDNESS THROUGH AI POWERED COORDINATION AND INTEGRATION OF CARE

AI-POWERED MDT



AI-SUPPORTED PATIENT COMMUNICATION



AI-ENABLED CARE REMINDERS



Patient



AI-SUPPORTED CLINICAL COMMUNICATION



AI-COORDINATED HOME CARE