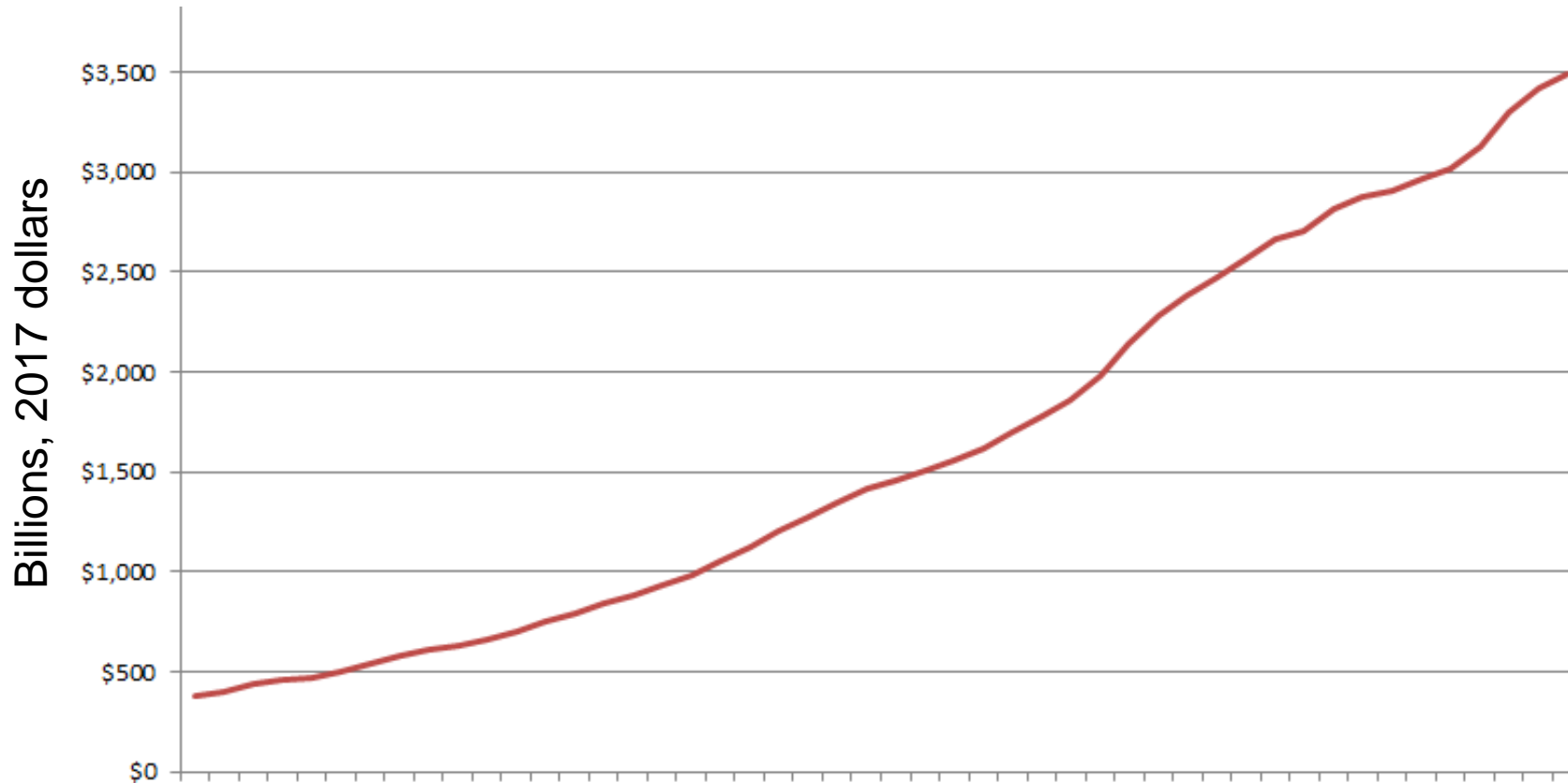




Extending Fitness Clubs into Virtual Healthcare to Prevent and Manage Chronic Diseases

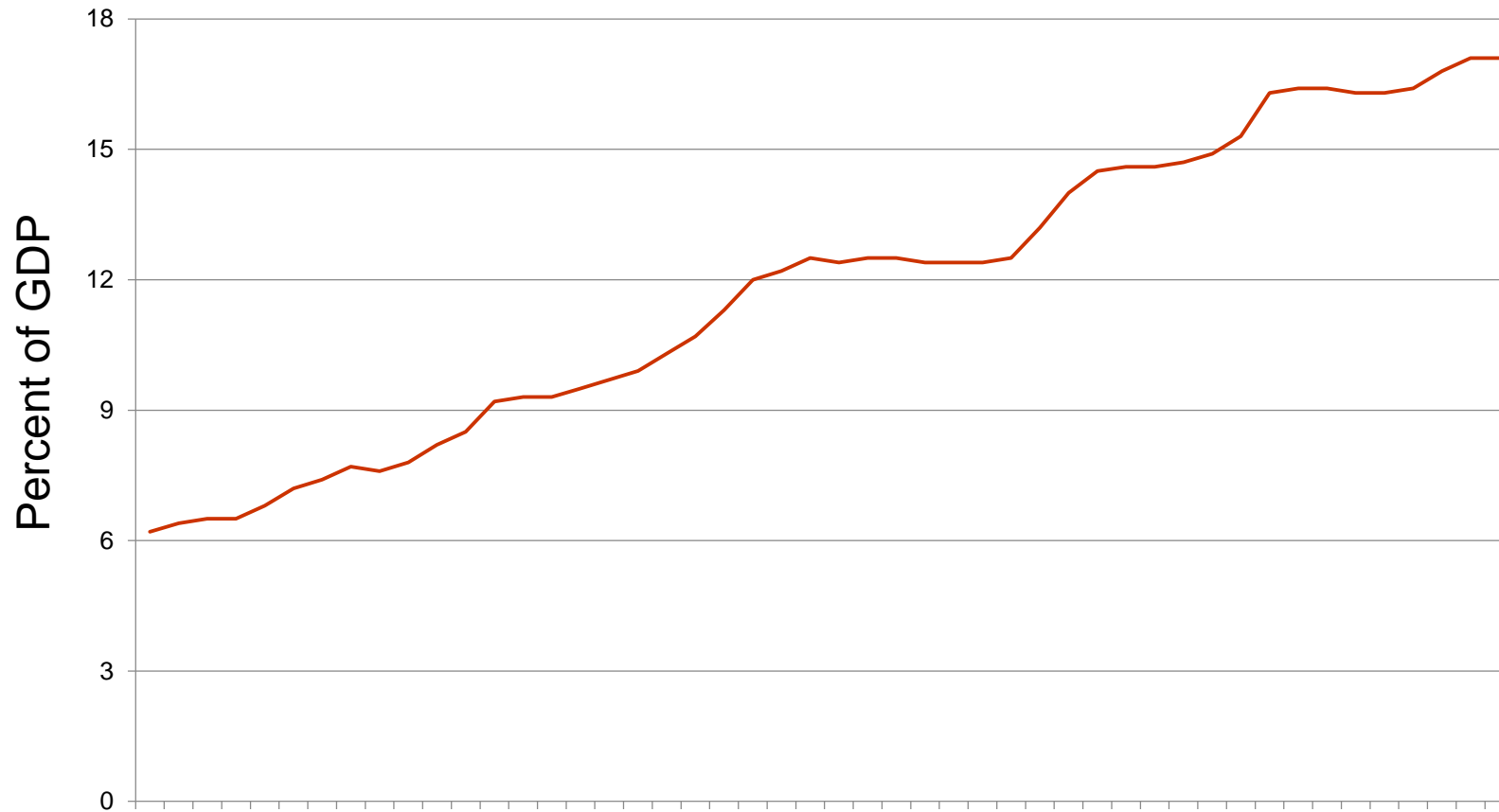
Anupam Goel, MD MBA
October 10, 2019

Total National Health Expenditures, 1970-2017



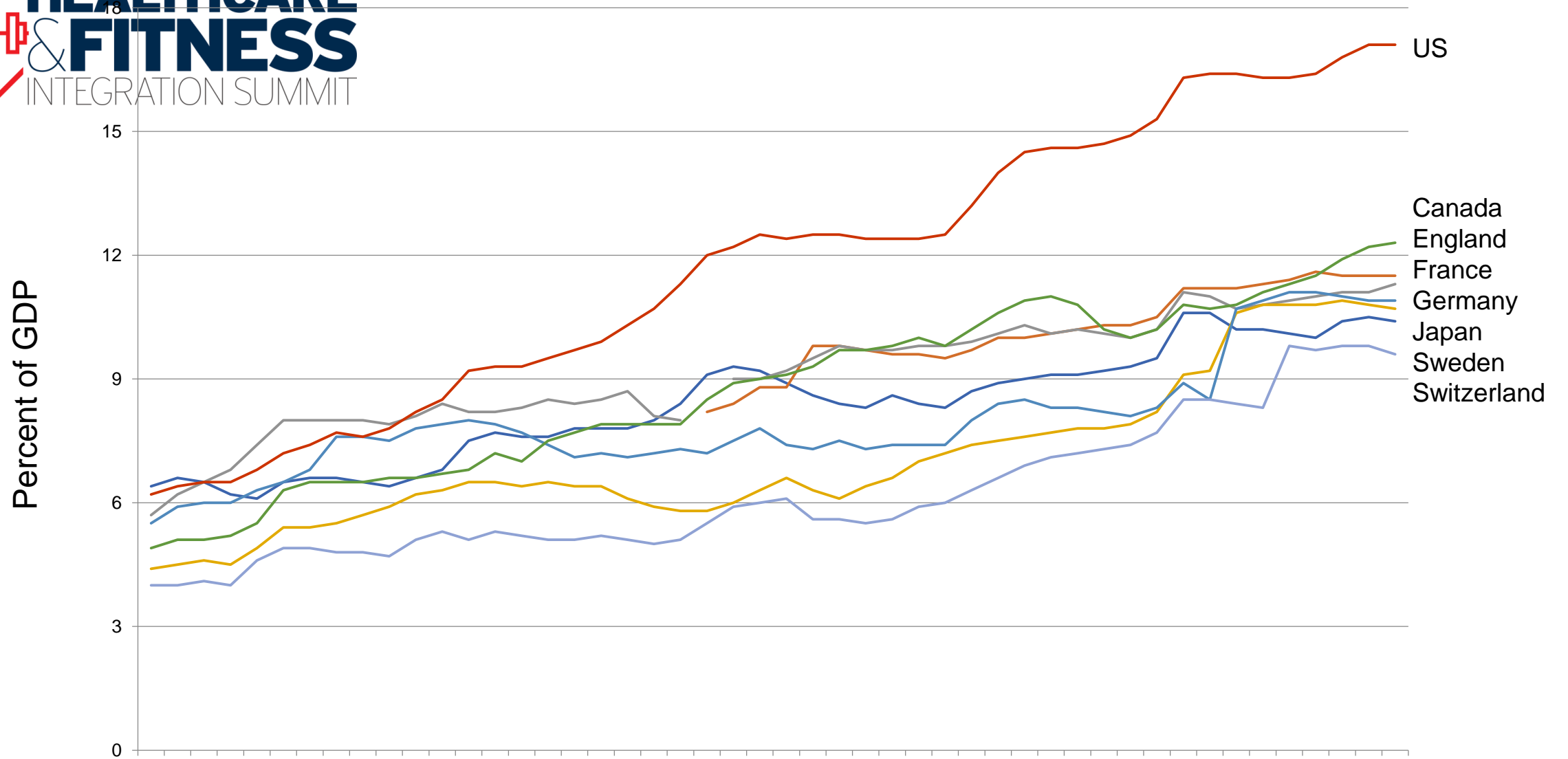
<https://www.healthsystemtracker.org/chart-collection/u-s-spending-healthcare-changed-time/>. Accessed 2019.9.5

Health Consumption Expenditures as a Percent of GDP, 1970-2017^{US}



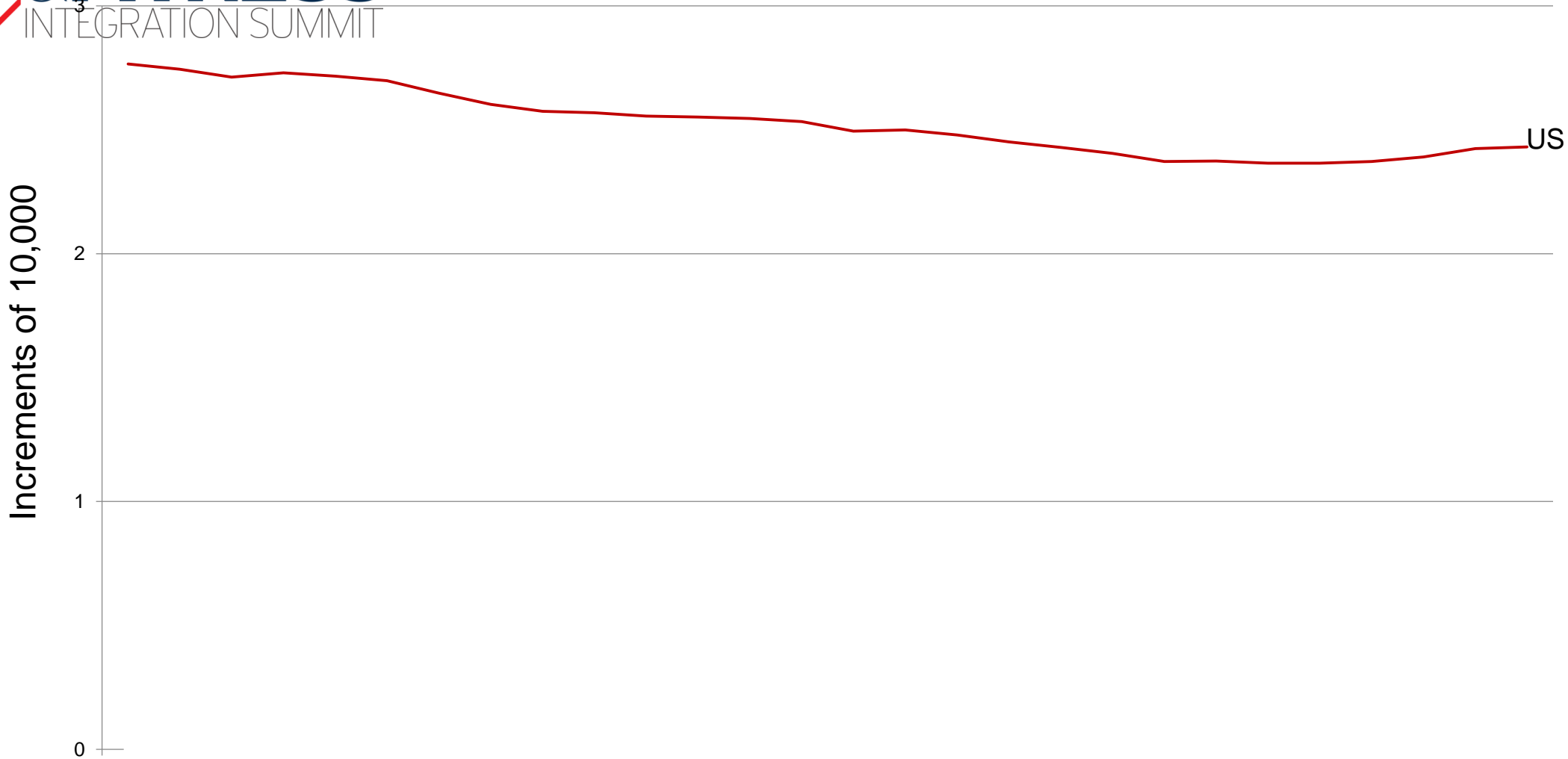
<https://www.healthsystemtracker.org/indicator/spending/health-expenditure-gdp/>. Accessed 2019.9.6

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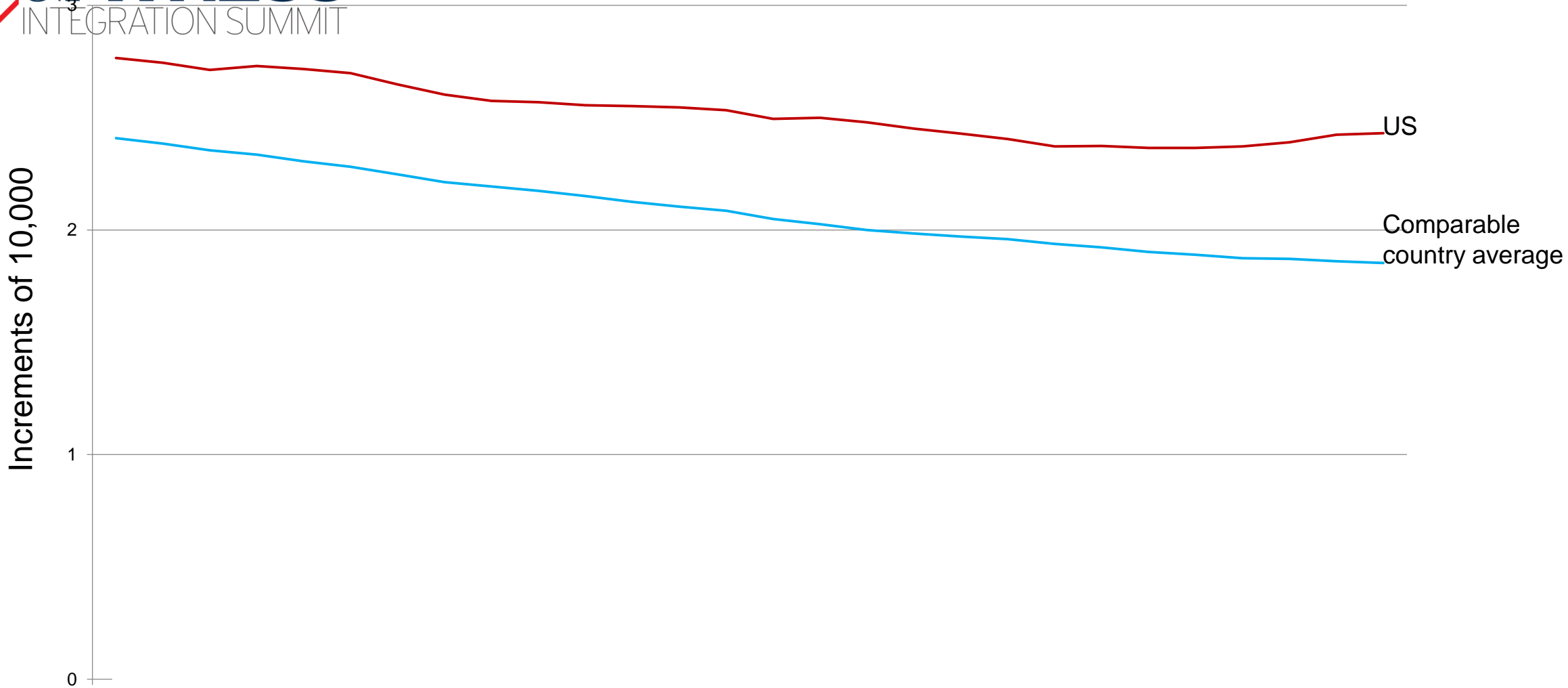
<https://www.healthsystemtracker.org/indicator/spending/health-expenditure-gdp/>. Accessed 2019.9.6

Age standardized disability adjusted life year rate per 100,000 people, 1990-2017



<https://www.healthsystemtracker.org/indicator/health-well-being/disability-adjusted-life-years/>. Accessed 2019.9.6

Age standardized disability adjusted life year rate per 100,000 people, 1990-2017



<https://www.healthsystemtracker.org/indicator/health-well-being/disability-adjusted-life-years/>. Accessed 2019.9.6

Age standardized years of life lost rate per 100,000 people, 2017

	Drug use disorders	Ischemic heart disease	Low back pain	COPD	Neonatal disorders	Headache disorders	Diabetes	Road injuries	Depressive disorders	Lung cancer
United States	1,695.5	1,519.1	1,064.0	883.0	842.2	801.3	787.8	763.1	736.9	709.1
Comparison group mean (High SDI)	699.9	1,065.0	1,199.1	548.0	707.4	766.8	580.5	509.4	596.5	593.1
France	254.9	598.0	1,280.6	232.4	544.0	785.2	375.9	420.3	663.7	706.8
Germany	241.9	1,242.4	1,550.6	562.6	653.2	778.5	469.6	351.0	569.4	637.8
Japan	176.9	554.6	1,440.1	235.0	504.8	540.7	306.6	288.0	518.7	372.7
South Korea	175.7	452.3	1,244.0	389.1	681.0	619.3	724.1	437.5	498.0	421.7
Taiwan	298.3	778.4	692.8	918.4	540.5	581.8	935.5	693.5	408.4	549.6

Significantly lower than mean

Statistically indistinguishable from mean

Significantly higher than mean

<http://www.healthdata.org/united-states>. Accessed 2019.9.5

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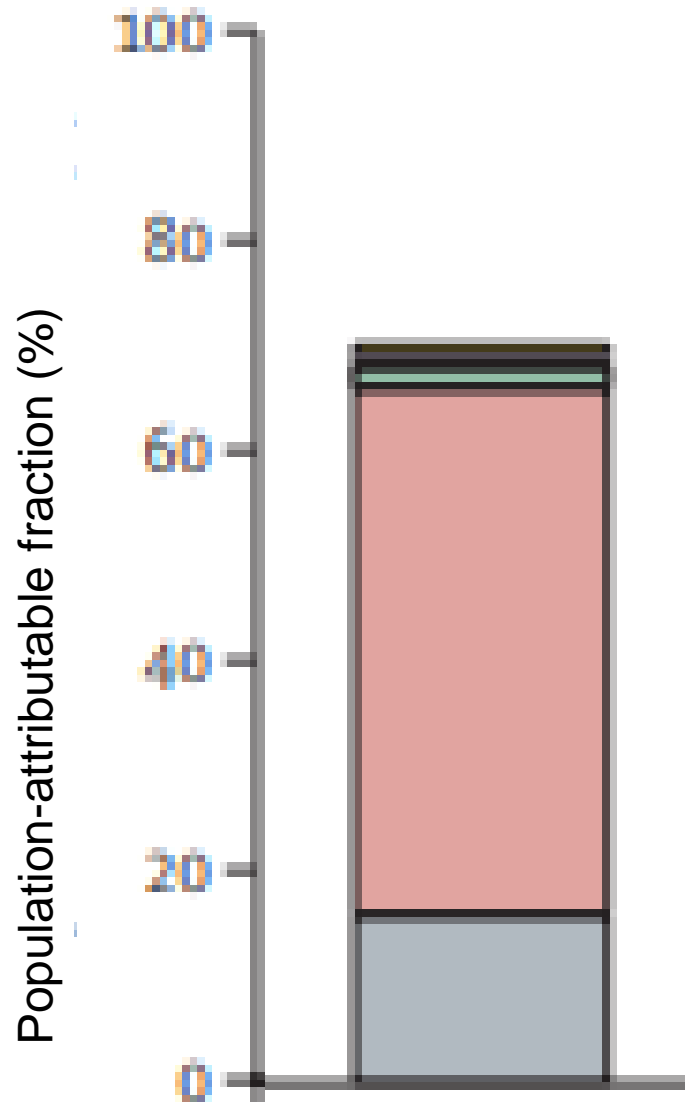
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Modifiable Risk Factors for Cardiovascular Disease in High-Income Countries



- Low education
- Metabolic risk factors
- Behavioural risk factors

Metabolic risk factors

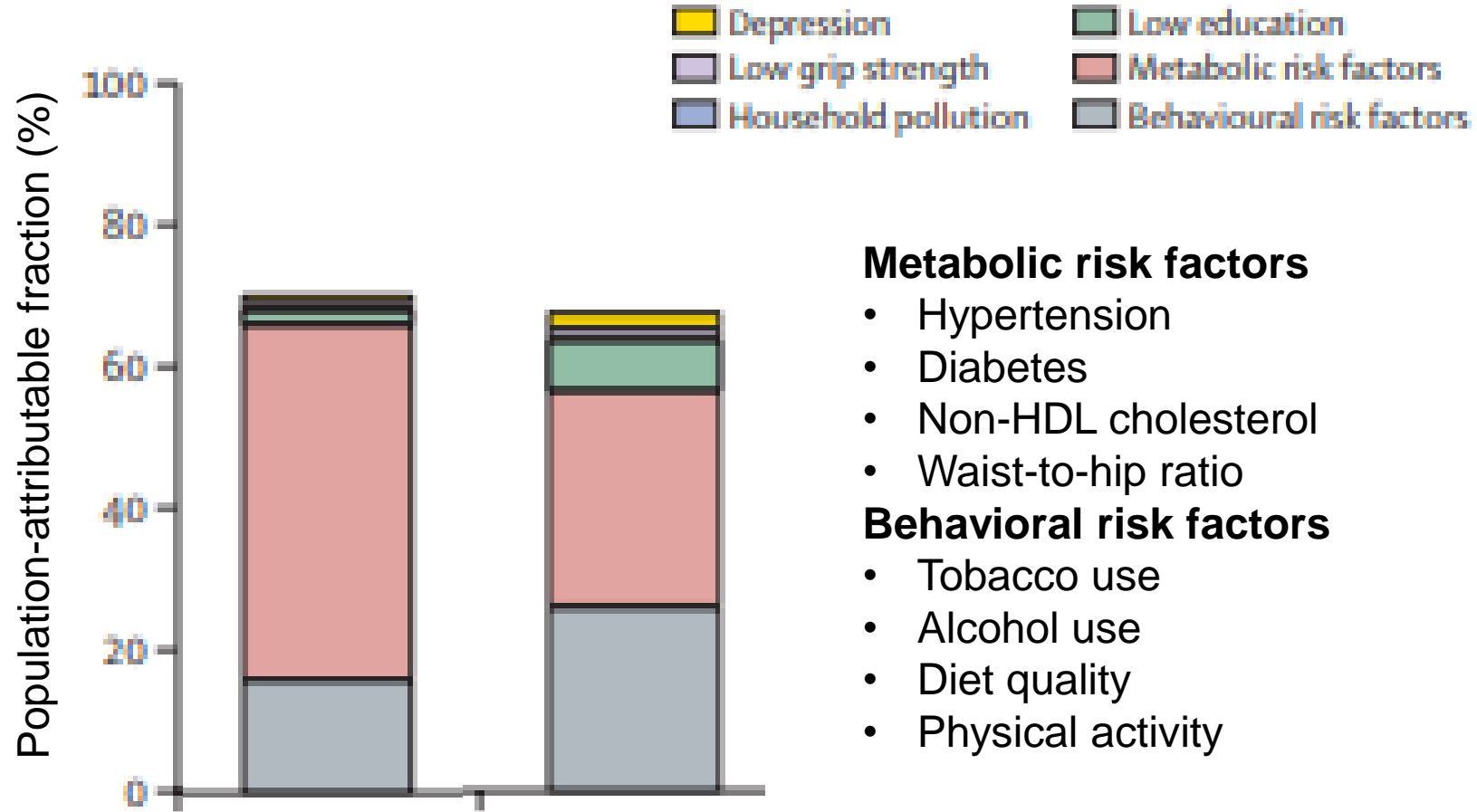
- Hypertension
- Diabetes
- Non-HDL cholesterol
- Waist-to-hip ratio

Behavioral risk factors

- Tobacco use
- Alcohol use
- Diet quality
- Physical activity

Yusuf S. Lancet [http://dx.doi.org/10.1016/S0140-6736\(19\)32008-2](http://dx.doi.org/10.1016/S0140-6736(19)32008-2) Published online 2019.9.3.

Modifiable Risk Factors for Cardiovascular Disease and Overall Mortality in High-Income Countries



Metabolic risk factors

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- Diabetes
- Non-HDL cholesterol
- Waist-to-hip ratio

Behavioral risk factors

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- Alcohol use
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- Physical activity

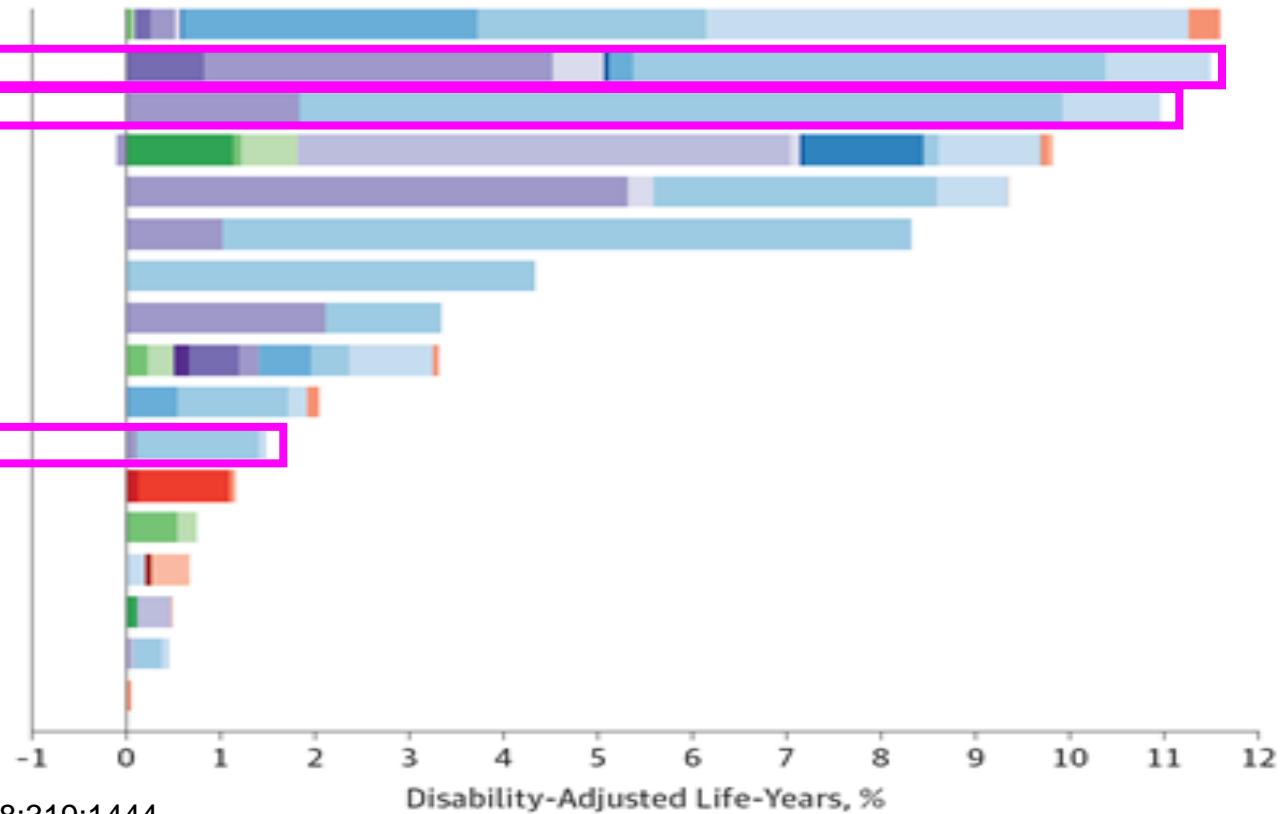
Yusuf S. Lancet [http://dx.doi.org/10.1016/S0140-6736\(19\)32008-2](http://dx.doi.org/10.1016/S0140-6736(19)32008-2) Published online 2019.9.3.

Risk factors affecting population health (DALYs)

B Risk factors as a percentage of disability-adjusted life-years

Risk factors

- Tobacco use
- High body mass index
- Dietary risks
- Alcohol and drug use
- High fasting plasma glucose
- High systolic blood pressure
- High total cholesterol
- Impaired kidney function
- Occupational risks
- Air pollution
- Low physical activity
- Child and maternal malnutrition
- Low bone mineral density
- Unsafe sex
- Sexual abuse and violence
- Residential radon and lead exposure
- Unsafe water, sanitation, and handwashing



Communicable, maternal, neonatal, and nutritional diseases

- HIV/AIDS and tuberculosis
- Diarrhea, lower respiratory tract, and other common infectious diseases
- Maternal disorders
- Neonatal disorders
- Nutritional deficiencies
- Other communicable maternal, neonatal, and nutritional diseases

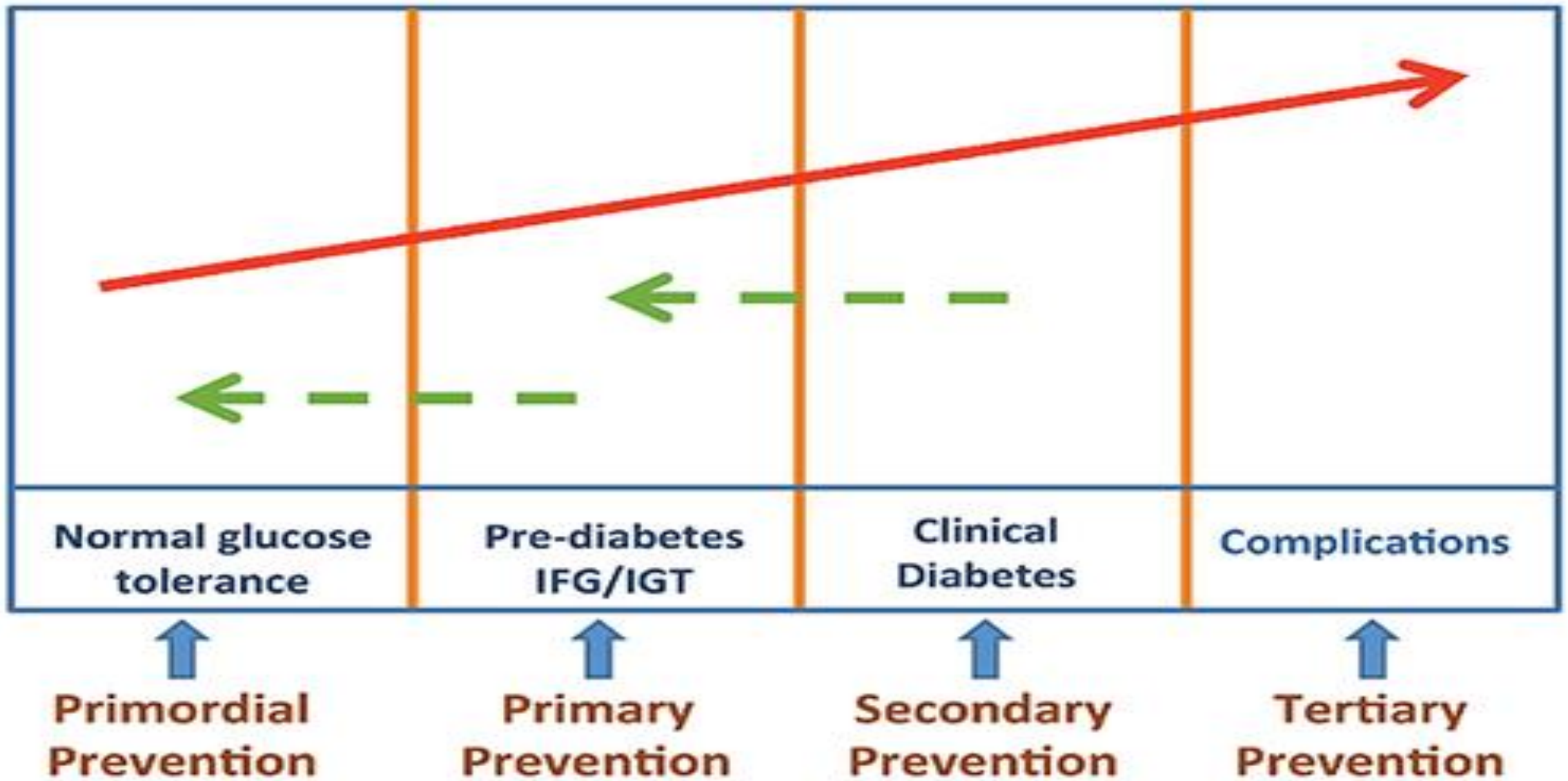
Noncommunicable diseases

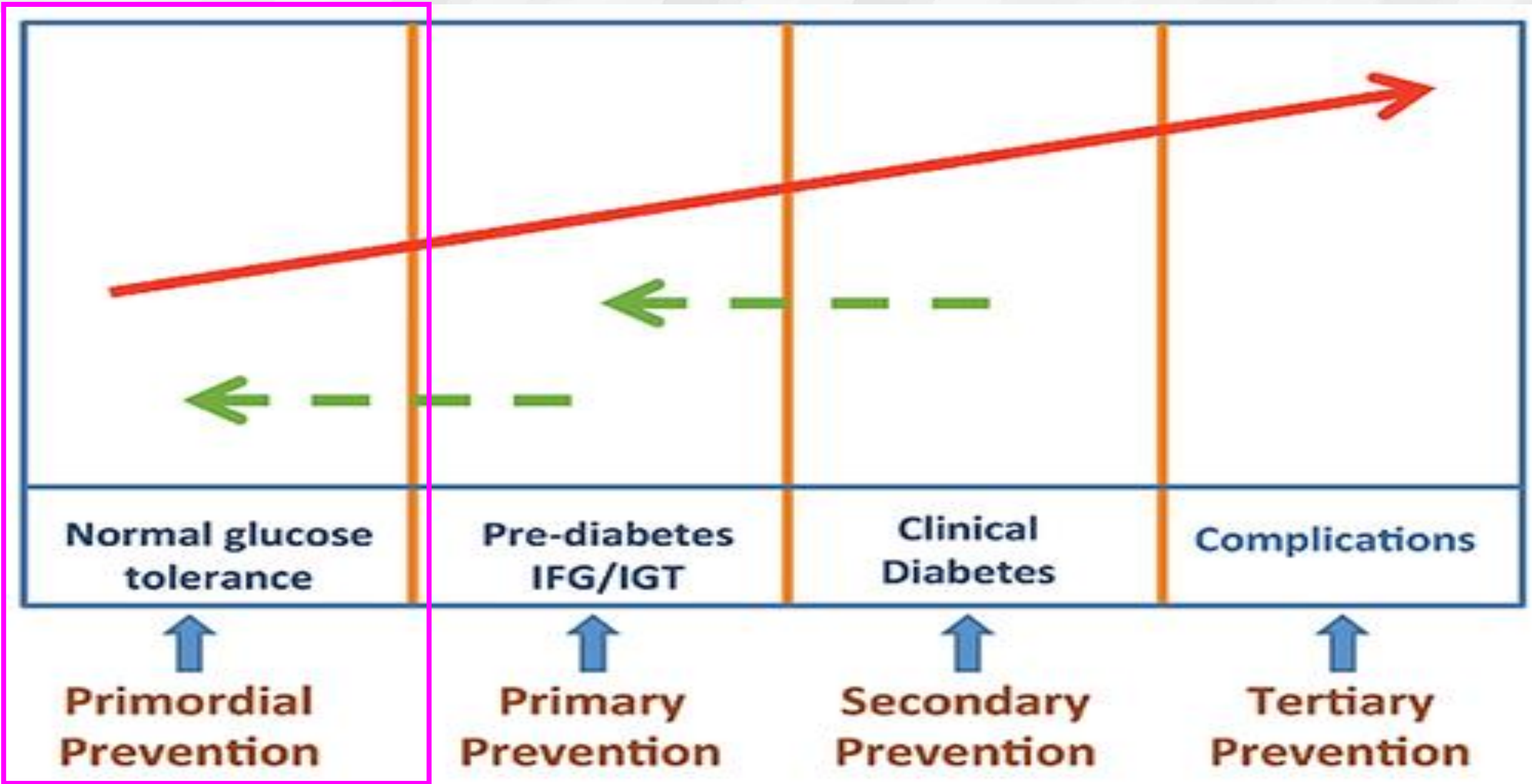
- Neoplasms
- Cardiovascular diseases
- Chronic respiratory diseases
- Cirrhosis and other chronic liver diseases
- Digestive diseases
- Neurological disorders
- Mental and substance use disorders
- Diabetes, urogenital, blood, and endocrine diseases
- Musculoskeletal disorders
- Other noncommunicable diseases

Injuries

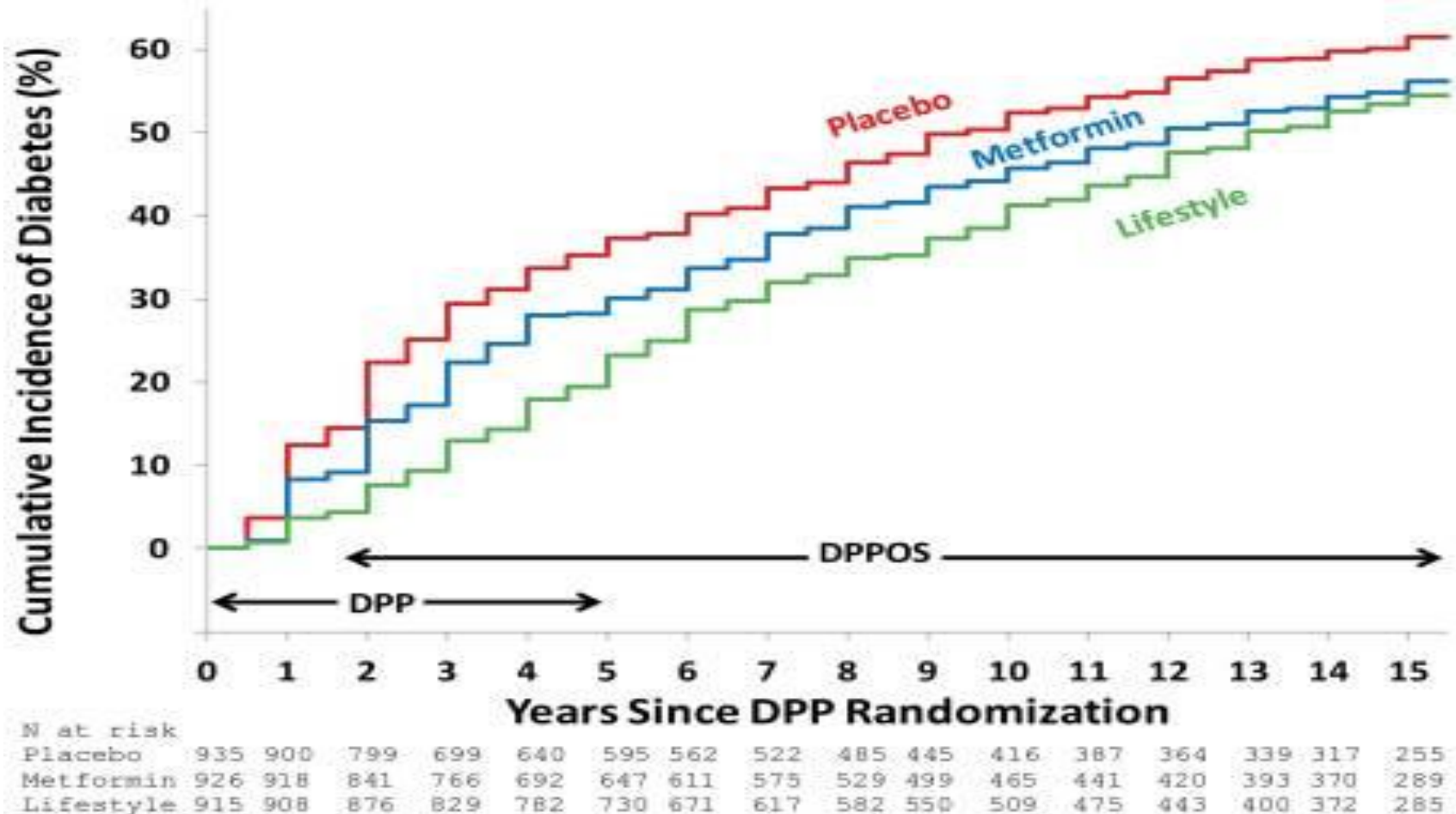
- Transport injuries
- Unintentional injuries
- Self-harm and interpersonal violence
- Force of nature, conflict and terrorism, and executions and police violence

US Burden of Disease Collaborators. JAMA 2018;319:1444.





Diabetes Prevention Study, 15 years after enrollment



**BMJ Open
Diabetes
Research
& Care**

Engagement and outcomes in a digital Diabetes Prevention Program: 3-year update

Table 2A Changes from baseline in body weight and A1c for participants who completed four or more lessons (n=187)

Time point	Weight change (lb)	
	Mean (SE)*	p Value
16 weeks	-11.1 (0.7)	<0.0001
1 year	-10.0 (0.8)	<0.0001
2 years	-8.3 (1.4)	<0.0001
3 years	-6.7 (2.0)	0.0009

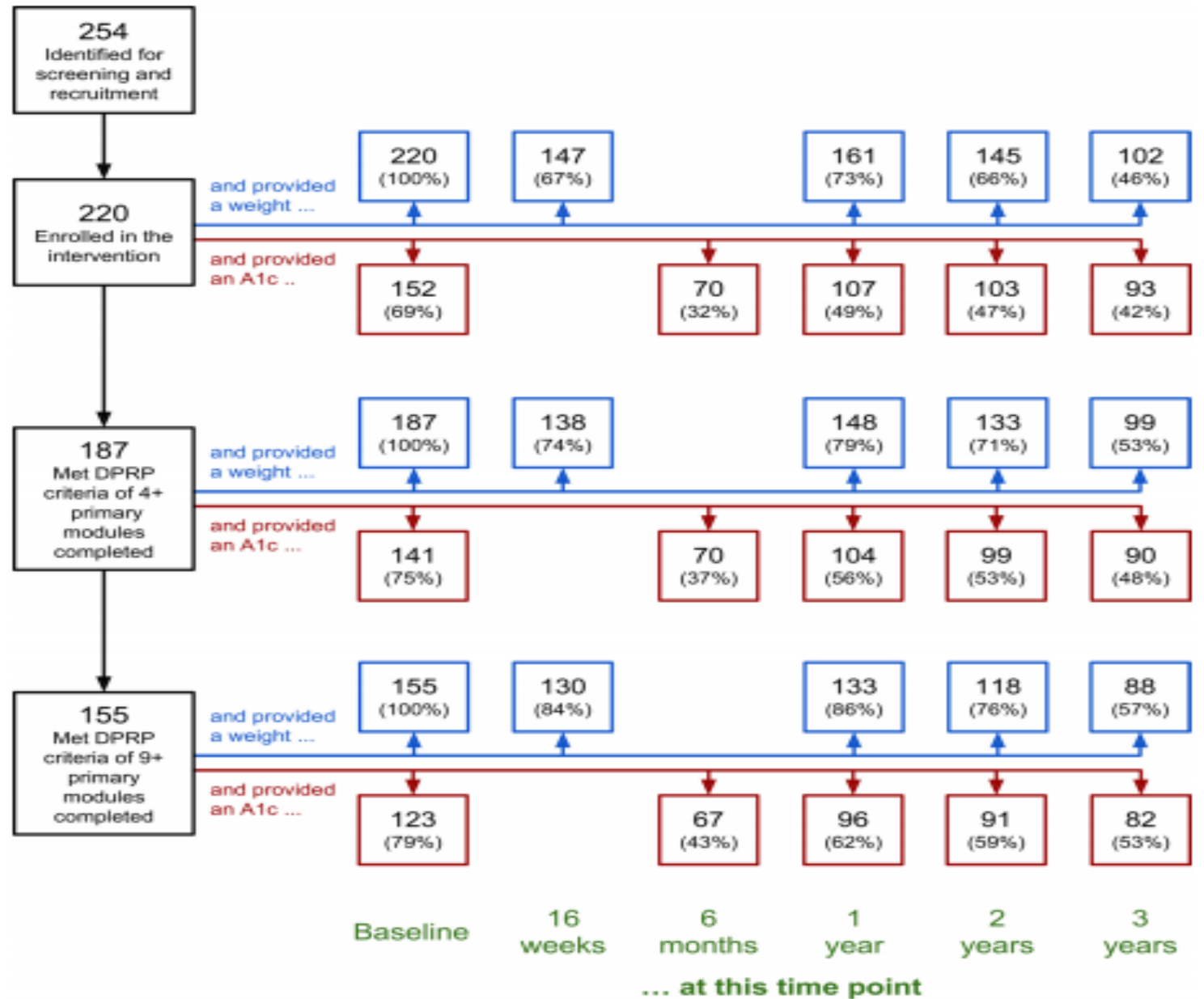
*Adjusted mean and SE values from linear mixed models. At baseline, these participants had an adjusted mean (SE) weight of 221.4 (3.5) lb and an adjusted mean (SE) A1c of 5.99 (0.08).

Table 2B Changes from baseline in body weight and A1c for participants who completed nine or more lessons (n = 155)

Time point	Weight change (lb)	
	Mean (SE)*	p Value
16 weeks	-11.6 (0.7)	<0.0001
1 year	-10.2 (0.9)	<0.0001
2 years	-8.3 (1.4)	<0.0001
3 years	-6.3 (2.1)	0.0024

*Adjusted mean and SE values from linear mixed models. At baseline, these participants had an adjusted mean (SE) weight of 219.8 (3.9) lb and an adjusted mean (SE) A1c of 6.02 (0.08).

Sepah SC. BMJ Open Diab Res Care 2017;5:e000422.



Sepah SC. BMJ Open Diab Res Care 2017;5:e000422.

Updating or communicating your strategy

- How do you move beyond fitness to improve health?
- What's the marginal value of a diet + fitness program above and beyond a virtual Diabetes Prevention Program (CDC has already credentialed seven distance learning programs and 14 online programs)?

Six in ten adults in the US have a chronic disease and four in ten adults have two or more.



- HEART DISEASE
- CANCER
- CHRONIC LUNG DISEASE
- STROKE
- ALZHEIMER'S DISEASE
- DIABETES
- CHRONIC KIDNEY DISEASE



Chronic diseases are defined broadly as conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both. Chronic diseases such as [heart disease](#), [cancer](#), and [diabetes](#) are the leading causes of death and disability in the United States. They are also leading drivers of the nation's \$3.3 trillion in annual [health care costs](#).

Many chronic diseases are caused by a short list of risk behaviors:

- [Tobacco use](#) and exposure to [secondhand smoke](#).
- [Poor nutrition](#), including diets low in fruits and vegetables and high in sodium and saturated fats.
- [Lack of physical activity](#).
- [Excessive alcohol use](#).



Health and Economic Costs of Chronic Diseases



How You Can Prevent Chronic Diseases

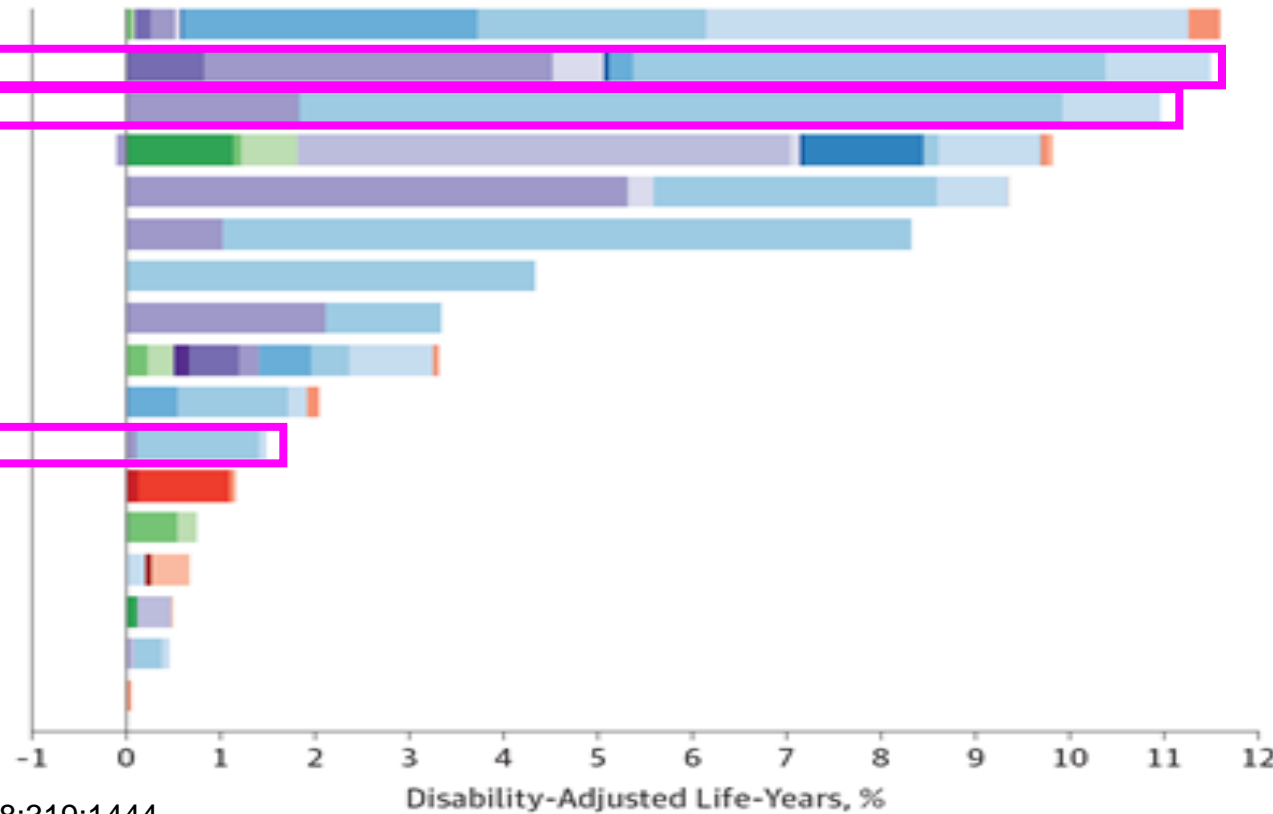
<https://www.cdc.gov/chronicdisease/about/index.htm>. Accessed 2019.8.28.

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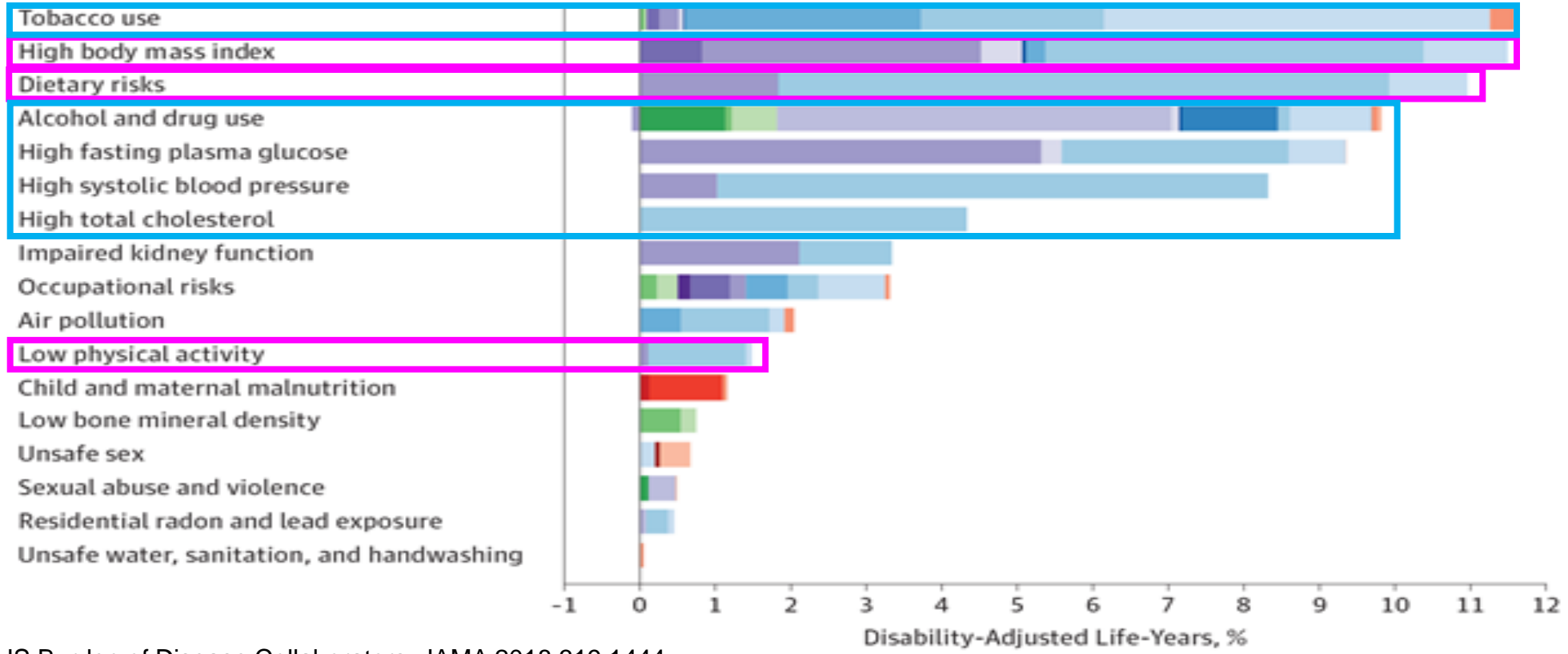
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Key Information and Communication Technology Capabilities

- Collection and Display of Information
- Customization of Information
- Education
- Mediation of Communication
- Support of Workflows and Activities
- Framing and Support of Decisions
- Social Coordination
- Optimization of Resource Allocation
- Identification of Patterns and Anomalies
- Prediction of Outcomes

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	Internet	Mobile	Sensors
Improving physical activity	I/A	I/A	I/A
Diet/Adiposity	I/A	I/A	
Smoking cessation	I/A	IIb/A	
Reducing alcohol use	I/A		

Class I: There is evidence for and/or general agreement that the intervention is beneficial, useful, and effective. The intervention should be performed.

Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy. It is reasonable to perform this intervention.

Class IIb: Usefulness/efficacy is less well established by evidence/opinion. The intervention may be considered.

Level of evidence A: Data derived from multiple randomized clinical trials



<https://www.wearabletechnologylife.com/quantified-self-movement/>. Accessed 2019.9.9.



Updating or communicating your strategy

- How do you move beyond fitness to improve health?
- What's the marginal value of a diet + fitness program above and beyond a virtual Diabetes Prevention Program (seven distance learning programs, 14 online programs with full recognition status by the CDC)?
- Are you doing anything innovative to increase engagement?
Can you publish it?

In many countries, there is enthusiasm for 'healthy heart programmes' that use counselling and educational methods to encourage people to reduce their risks for developing heart disease. These risk factors include high cholesterol, excessive salt intake, high blood pressure, excess weight, a high-fat diet, smoking, diabetes and a sedentary lifestyle. This review is an update of all relevant randomised trials that have evaluated an intervention that aimed to reduce more than one risk factor (multiple risk factor intervention) in people without evidence of cardiovascular disease. The findings are from 55 trials of between six months and 12 years duration conducted in several countries over the course of four decades. The median duration of follow up was 12 months (with a range of six months to 12 years). Multiple risk factor intervention does result in small reductions in risk factors including blood pressure, cholesterol and smoking. Contrary to expectations, multiple risk factor interventions had little or no impact on the risk of coronary heart disease mortality or morbidity. This could be because these small risk factor changes were not maintained in the long term. Alternatively, the small reductions in risk factors may be caused by biases in some of the studies. The methods of attempting behaviour change in the general population are limited and do not appear to be effective. Different approaches to behaviour change are needed and should be tested empirically before being widely promoted, particularly in developing countries where cardiovascular disease rates are rising. Further trials may be warranted.

Ebrahim S. Cochrane Database of Systematic Reviews 2011;1:Art No CD001561.

Intensive Lifestyle Changes for Reversal of Coronary Heart Disease

- Intervention: 10% fat whole foods vegetarian diet, aerobic exercise, stress management training, smoking cessation, group psychosocial support for five years
- 20/28 patients in the intervention arm maintained comprehensive lifestyle changes for five years
- 15/20 patients in control arm completed five year follow-up

Table 2.—Adherence to Exercise, Stress Management, and Dietary Guidelines

	Mean (SEM) at Baseline		Mean (SEM) at 1 Year			Mean (SEM) at 5 Years		
	Experimental (n = 20)	Control (n = 15)	Experimental (n = 20)	Control (n = 15)	<i>P</i> Value* Baseline-1 Year	Experimental (n = 20)	Control (n = 15)	<i>P</i> Value* Baseline-5 Years
Exercise								
Times per week	2.66 (0.84)	2.38 (0.77)	4.97 (0.35)	2.87 (0.70)	.06	4.34 (0.49)	3.57 (0.56)	.64
Hours per week	2.26 (0.85)	2.42 (0.99)	5.02 (0.61)	2.52 (0.70)	.12	3.56 (0.56)	2.90 (0.65)	.50
Stress management								
Times per week	0.70 (0.41)	0.15 (0.10)	8.22 (0.73)	0.49 (0.25)	<.001	4.93 (1.02)	0.74 (0.39)	<.001
Minutes per day	6.01 (3.56)	1.71 (1.19)	87.25 (7.85)	4.47 (2.79)	<.001	48.53 (10.36)	8.44 (6.11)	.001
Fat intake								
Grams per day	63.67 (4.35)	57.42 (5.94)	12.71 (1.06)	52.38 (5.31)	<.001	17.34 (2.30)	44.09 (6.66)	<.001
% of Energy intake	29.71 (1.8)	30.52 (2.9)	6.22 (0.3)	28.76 (2.3)	<.001	8.51 (1.0)	25.03 (2.7)	<.001
Dietary cholesterol, mmol/L [mg/dL]	5.47 (0.672)	5.49 (0.908)	0.08 (0.002)	4.69 (0.636)	<.001	0.48 (0.140)	3.59 (0.641)	.002
	[211.4 (26.0)]	[212.5 (35.1)]	[3.3 (0.8)]	[181.3 (24.6)]		[18.6 (5.4)]	[138.7 (24.8)]	
Energy intake, J/d	8159 (473)	7159 (489)	7623 (473)	7004 (489)	.64	7724 (485)	6581 (489)	.86
Total adherence score†	0.62 (0.08)	0.60 (0.07)	1.29 (0.08)	0.64 (0.07)	<.001	1.06 (0.08)	0.72 (0.07)	<.001

*All *P* levels are 2-tailed and each is a result of a test of the null hypothesis that the change between 2 particular visits (eg, baseline and 1 year) does not differ between the experimental and control groups.

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75.74 kg

77.18 kg

Table 4.—Changes in Risk Factors

Risk Factor	Mean (SEM) at Baseline		Mean (SEM) at 1 Year	
	Experimental (n = 20)	Control (n = 15)	Experimental (n = 20)	Control (n = 15)
Serum lipids, mmol/L [mg/dL]				
Total cholesterol	5.83 (0.31) [225.1 (11.9)]	6.42 (0.24) [247.9 (9.4)]	4.22 (0.22) [162.9 (8.4)]	6.33 (0.38) [244.3 (14.7)]
Low-density lipoprotein	3.72 (0.29) [143.80 (11.21)]	4.30 (0.19) [166.40 (7.46)]	2.24 (0.24) [86.56 (9.41)]	4.25 (0.38) [164.13 (14.85)]
High-density lipoprotein	1.04 (0.07) [40.05 (2.78)]	1.36 (0.14) [52.36 (5.54)]	0.94 (0.10) [36.28 (3.81)]	1.34 (0.10) [51.87 (3.81)]
Triglyceride	5.90 (0.69) [227.8 (26.5)]	5.78 (1.63) [223.3 (63.0)]	6.69 (0.75) [258.2 (29.1)]	4.30 (0.40) [166.1 (15.5)]
Apolipoproteins, g/L				
A-I	1.331 (0.046)	1.575 (0.092)	1.308 (0.057)	1.761 (0.121)
B	1.000 (0.054)	1.024 (0.062)	0.7685 (0.046)	1.085 (0.053)
Blood pressure, mm Hg				
Systolic	135.3 (4.0)	137.2 (4.5)	126.4 (3.9)	128.8 (4.5)
Diastolic	81.70 (2.05)	80.27 (3.15)	77.03 (2.01)	75.07 (8.15)
Weight, kg	91.40 (3.42)	75.74 (4.37)	80.64 (2.48)	77.18 (4.73)

*All *P* levels are 2-tailed and each is a result of a test of the null hypothesis that the change between 2 particular visits (eg, baseline and 1 year) does not differ between the experimental and control groups.

Ornish D. JAMA 1998;280:2001,

91.40 kg

80.64 kg

Table 4.—Changes in Risk Factors

Risk Factor	Mean (SEM) at Baseline		Mean (SEM) at 1 Year	
	Experimental (n = 20)	Control (n = 15)	Experimental (n = 20)	Control (n = 15)
Serum lipids, mmol/L [mg/dL]				
Total cholesterol	5.83 (0.31) [225.1 (11.9)]	6.42 (0.24) [247.9 (9.4)]	4.22 (0.22) [162.9 (8.4)]	6.33 (0.38) [244.3 (14.7)]
Low-density lipoprotein	3.72 (0.29) [143.80 (11.21)]	4.30 (0.19) [166.40 (7.46)]	2.24 (0.24) [86.56 (9.41)]	4.25 (0.38) [164.13 (14.85)]
High-density lipoprotein	1.04 (0.07) [40.05 (2.78)]	1.36 (0.14) [52.36 (5.54)]	0.94 (0.10) [36.28 (3.81)]	1.34 (0.10) [51.87 (3.81)]
Triglyceride	5.90 (0.69) [227.8 (26.5)]	5.78 (1.63) [223.3 (63.0)]	6.69 (0.75) [258.2 (29.1)]	4.30 (0.40) [166.1 (15.5)]
Apolipoproteins, g/L				
A-I	1.331 (0.046)	1.575 (0.092)	1.308 (0.057)	1.761 (0.121)
B	1.000 (0.054)	1.024 (0.062)	0.7685 (0.046)	1.085 (0.053)
Blood pressure, mm Hg				
Systolic	135.3 (4.0)	137.2 (4.5)	126.4 (3.9)	128.8 (4.5)
Diastolic	81.70 (2.05)	80.27 (3.15)	77.03 (2.01)	75.07 (8.15)
Weight, kg	91.40 (3.42)	75.74 (4.37)	80.64 (2.48)	77.18 (4.73)

*All *P* levels are 2-tailed and each is a result of a test of the null hypothesis that the change between 2 particular visits (eg, baseline and 1 year) does not differ between the experimental and control groups.

Ornish D. JAMA 1998;280:2001.

91.40 kg

85.64 kg

Table 4.—Changes in Risk Factors

Risk Factor	Mean (SEM) at Baseline		Mean (SEM) at 5 Years	
	Experimental (n = 20)	Control (n = 15)	Experimental (n = 20)	Control (n = 15)
Serum lipids, mmol/L [mg/dL]				
Total cholesterol	5.83 (0.31) [225.1 (11.9)]	6.42 (0.24) [247.9 (9.4)]	4.87 (0.20) [188.0 (7.8)]	5.62 (0.20) [217.0 (7.9)]
Low-density lipoprotein	3.72 (0.29) [143.80 (11.21)]	4.30 (0.19) [166.40 (7.46)]	2.99 (0.20) [115.35 (7.59)]	3.47 (0.21) [133.80 (8.25)]
High-density lipoprotein	1.04 (0.07) [40.05 (2.78)]	1.36 (0.14) [52.36 (5.54)]	0.90 (0.05) [34.75 (2.03)]	1.28 (0.12) [49.27 (4.47)]
Triglyceride	5.90 (0.69) [227.8 (26.5)]	5.78 (1.63) [223.3 (63.0)]	6.11 (0.59) [236.1 (22.9)]	5.48 (0.78) [211.5 (30.2)]
Apolipoproteins, g/L				
A-I	1.331 (0.046)	1.575 (0.092)	1.302 (0.092)	1.839 (0.139)
B	1.000 (0.054)	1.024 (0.062)	1.014 (0.072)	0.991 (0.083)
Blood pressure, mm Hg				
Systolic	135.3 (4.0)	137.2 (4.5)	130.0 (3.9)	123.3 (4.7)
Diastolic	81.70 (2.05)	80.27 (3.15)	76.63 (2.01)	73.61 (3.25)
Weight, kg	91.40 (3.42)	75.74 (4.37)	85.64 (2.88)	77.09 (4.5)



Ornish D. JAMA 1998;280:2001.

Table 6.—Cardiac Events During 5-Year Follow-up

	No. of Events		Risk Ratio	95% Confidence Interval	P Value
	Experimental* (n = 28)	Control† (n = 20)			
Myocardial infarction	2	4	2.74	0.393-30.3	.26
Percutaneous transluminal coronary angioplasty	8	14	2.40	0.939-6.60	<.05
Coronary artery bypass graft	2	5	3.43	0.561-36.0	.14
Cardiac hospitalizations‡	23	44	2.62	1.55-4.55	<.001
Deaths	2	1	0.685	0.012-13.2	.81
Any event	25	45	2.47	1.48-4.20	<.001

*Person-years of observation was 108.04.

†Person-years of observation was 78.81.

‡Includes myocardial infarction, percutaneous transluminal coronary angioplasty, and coronary artery bypass graft.

Ornish D. JAMA 1998;280:2001.



Original Investigation

ONLINE FIRST

September 9, 2019

Effectiveness of Behaviorally Designed Gamification Interventions With Social Incentives for Increasing Physical Activity Among Overweight and Obese Adults Across the United States

The STEP UP Randomized Clinical Trial

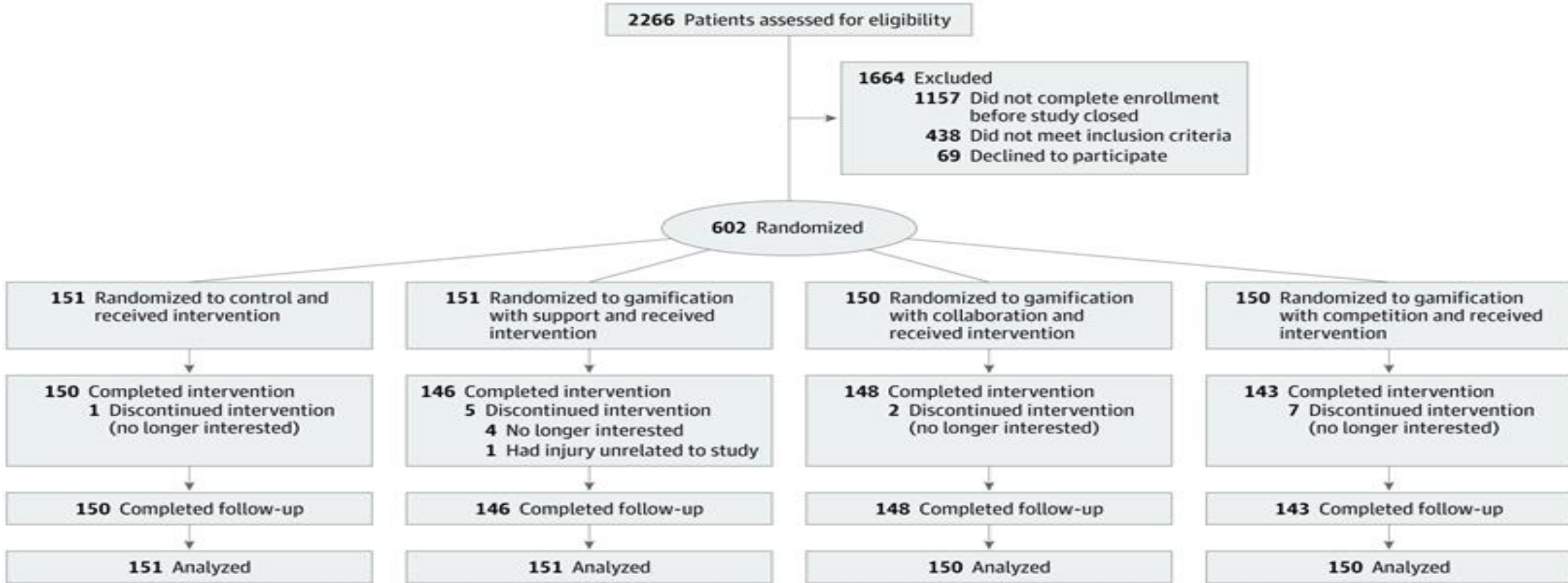
Mitesh S. Patel, MD, MBA, MS^{1,2,3,4}; Dylan S. Small, PhD^{3,5}; Joseph D. Harrison, BS³; [et al](#)

[» Author Affiliations](#) | [Article Information](#)

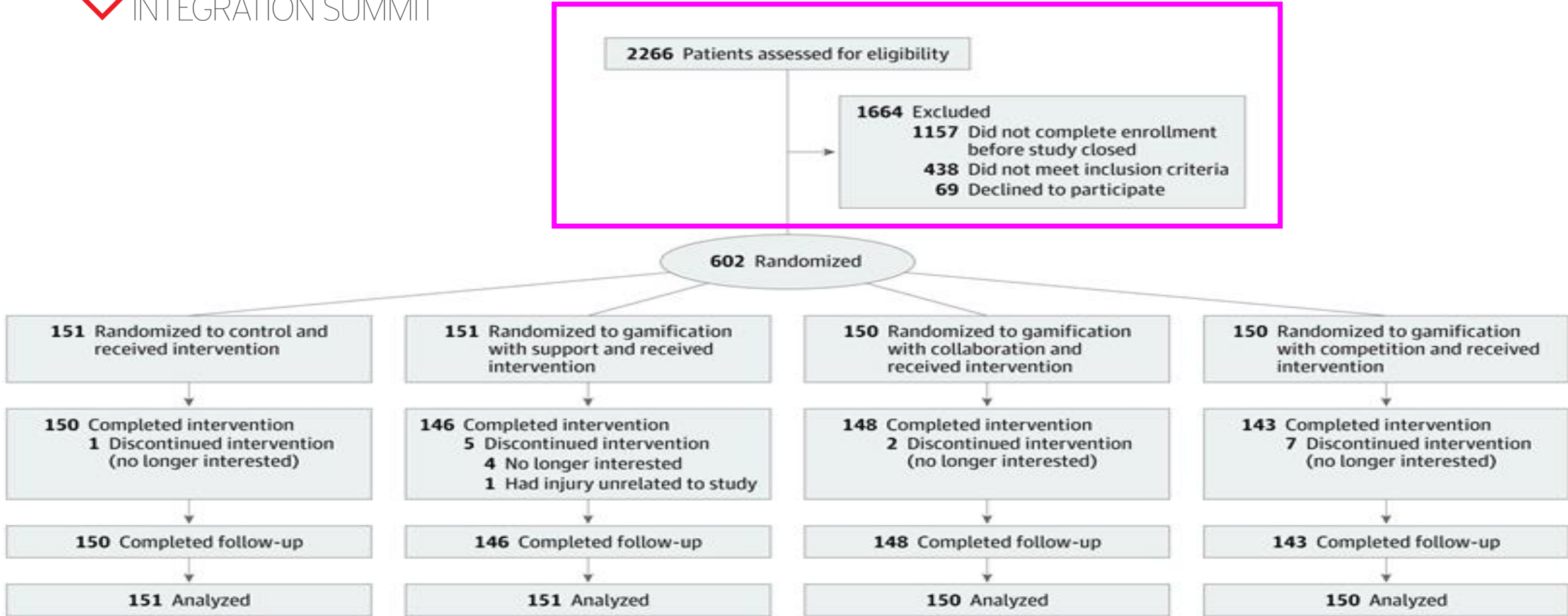
JAMA Intern Med. Published online September 9, 2019. doi:10.1001/jamainternmed.2019.3505

Study arms

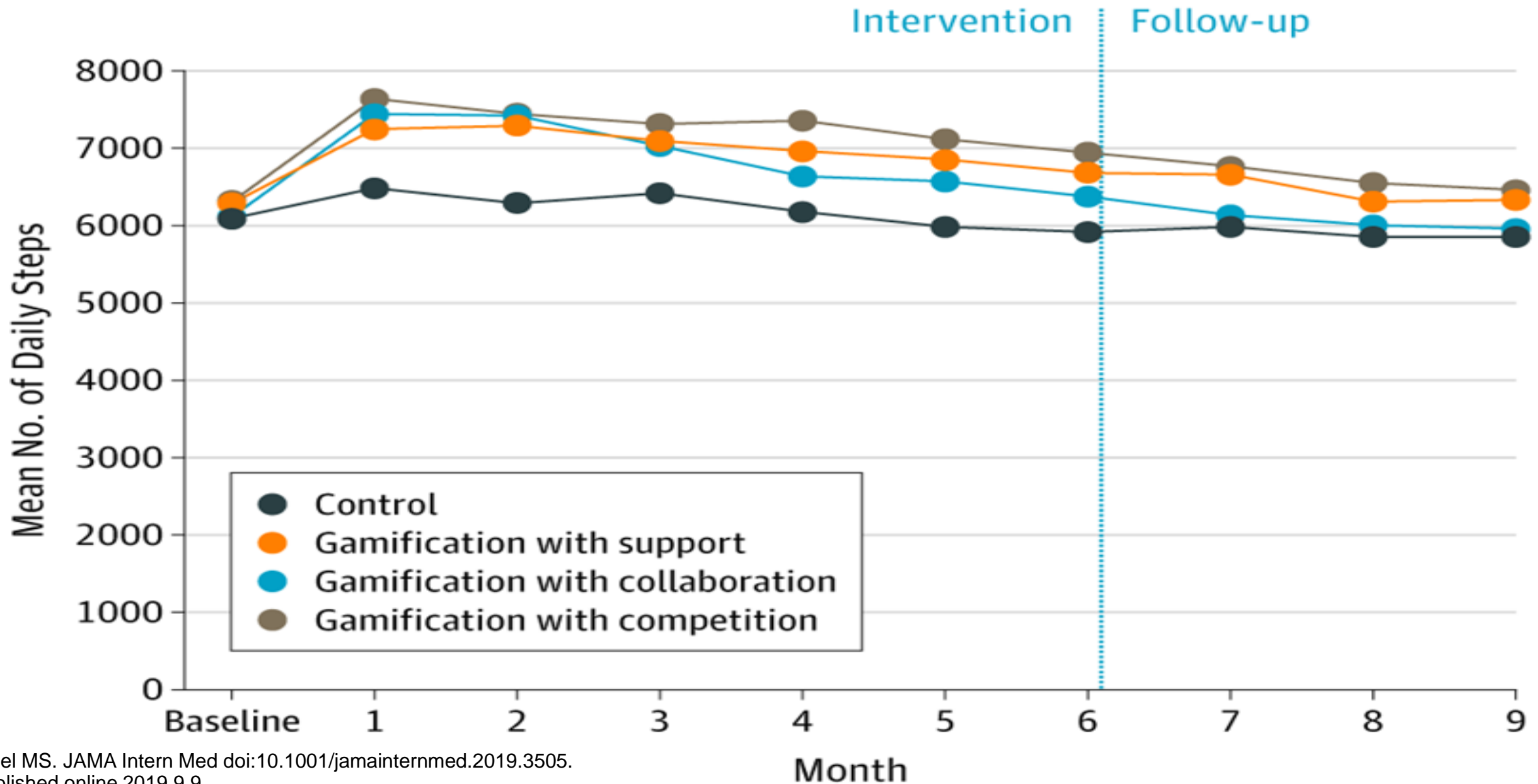
- Control: use the wearable device and strive for daily step goal for 36 weeks.
- Other arms: game with points and five levels with a pre-commitment pledge with each week starting with 70 points
 - Support: identify a family member or friend
 - Collaboration: accountability among teams of 3
 - Competition: competition among groups of 3



Patel MS. JAMA Intern Med doi:10.1001/jamainternmed.2019.3505. Published online 2019.9.9.



Patel MS. JAMA Intern Med doi:10.1001/jamainternmed.2019.3505. Published online 2019.9.9.



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 Published online 2019.9.9.

Table 2. Adjusted Differences in Daily Steps Among the Study Arms

Variable	Control	Gamification With Support	Gamification With Collaboration	Gamification With Competition
Steps per day at baseline, mean (SD)	6086 (2631)	6297 (2571)	6120 (2583)	6313 (2812)
Steps per day in the main intervention period, mean (SD) ^a	6162 (2142)	6975 (2403)	6814 (2197)	7237 (2934)
Main adjusted model^b				
Difference compared with control and adjusted for baseline (95% CI)	NA	689 (267 to 977)	637 (258 to 1017)	920 (513 to 1328)
P value	NA	<.001	.001	<.001
Fully adjusted model^c				
Difference compared with control and adjusted for baseline (95% CI)	NA	710 (316 to 1104)	645 (262 to 1027)	936 (516 to 1356)
P value	NA	<.001	.001	<.001
Follow-up period				
Steps per day, mean (SD)	5899 (2128)	6432 (2320)	6038 (1640)	6592 (2685)
Main adjusted model^b				
Difference compared with control and adjusted for baseline (95% CI)	NA	428 (19 to 837)	126 (-235 to 488)	569 (142 to 996)
P value	NA	.04	.49	.009
Fully adjusted model^c				
Difference compared with control and adjusted for baseline (95% CI)	NA	482 (71 to 893)	110 (-248 to 468)	553 (116 to 990)
P value	NA	.02	.55	.01

Abbreviation: NA, not applicable.

^a The main intervention period included weeks 5 to 24 and excluded the ramp-up phase. The follow-up period included weeks 25 to 36.

^b The main adjusted model adjusted for baseline step count and repeated measures and had fixed effects for calendar month and study arm.

^c The fully adjusted model also adjusted for age, sex, race/ethnicity, marital status, annual household income, and body mass index.

Patel MS. JAMA Intern Med doi:10.1001/jamainternmed.2019.3505. Published online 2019.9.9.

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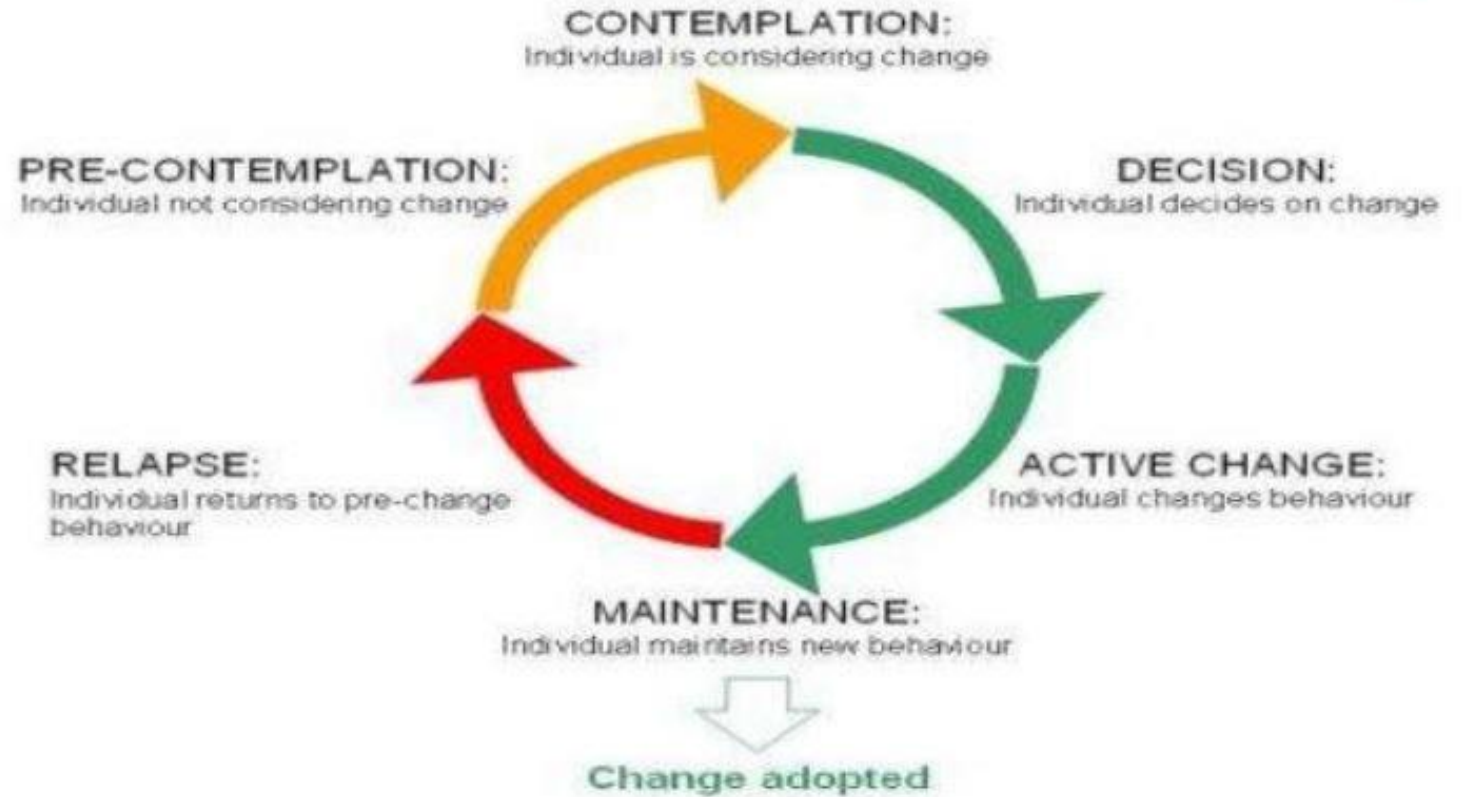
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Trans-theoretical Model of Change



Adapted from Prochaska and Di Clemente's cycle of change model.

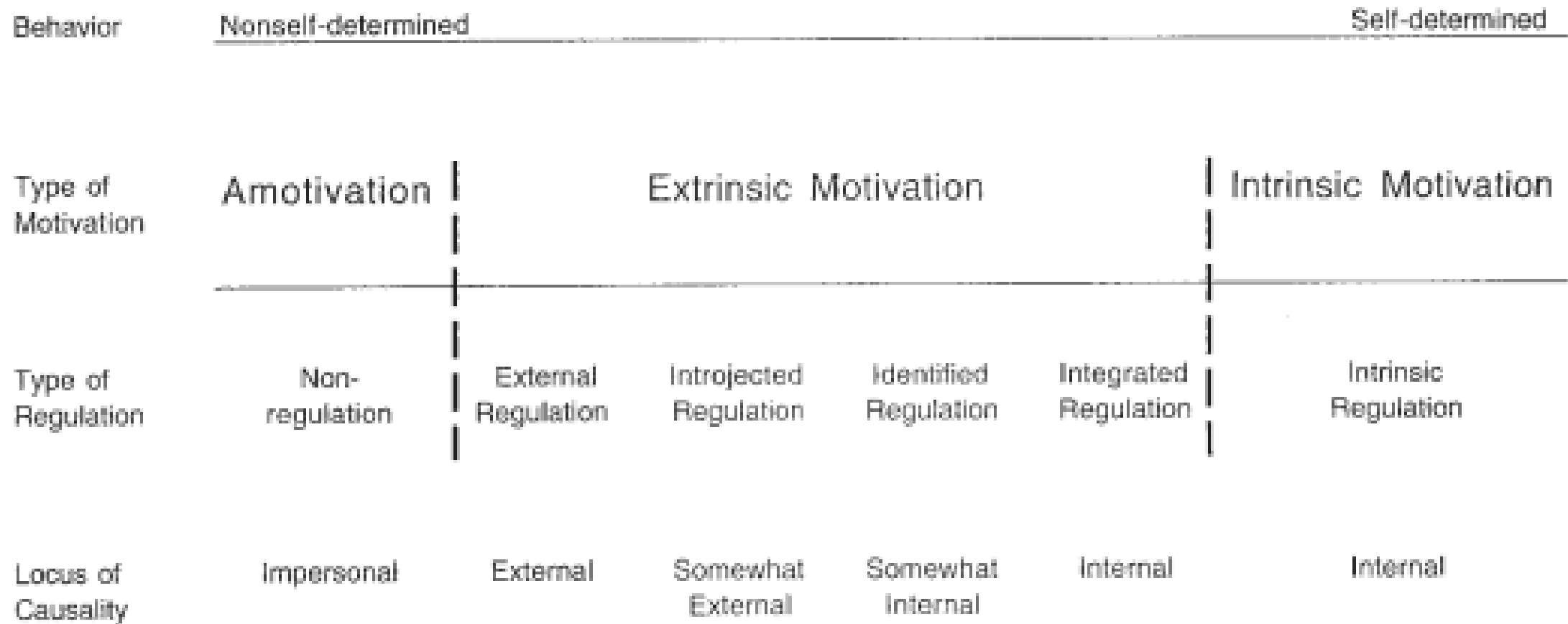
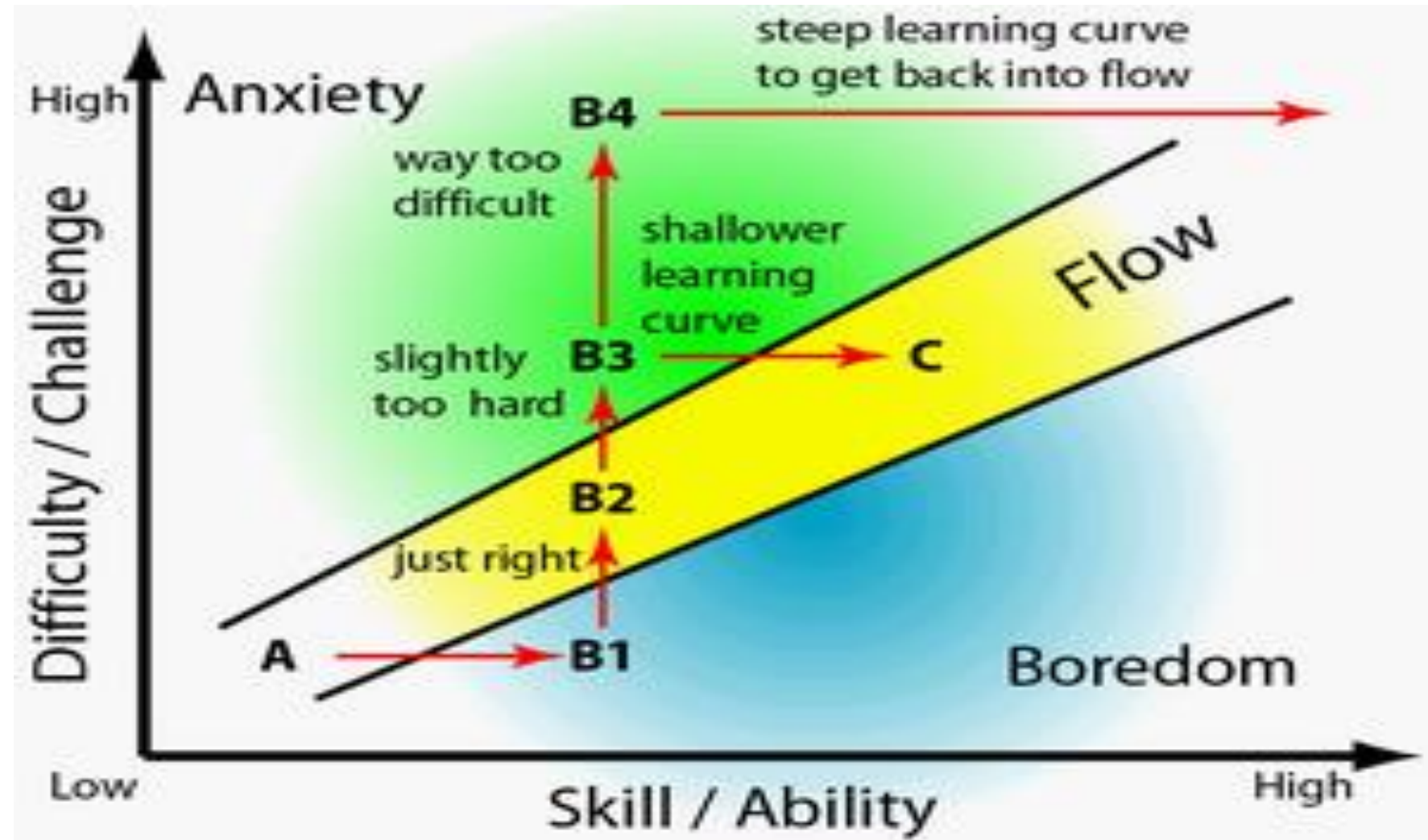


Figure 1. *The self-determination continuum, showing the motivational, self-regulatory, and perceived locus of causality bases of behaviors that vary in the degree to which they are self-determined.*

Deci EL Psychological Inquiry 2000;11:227.

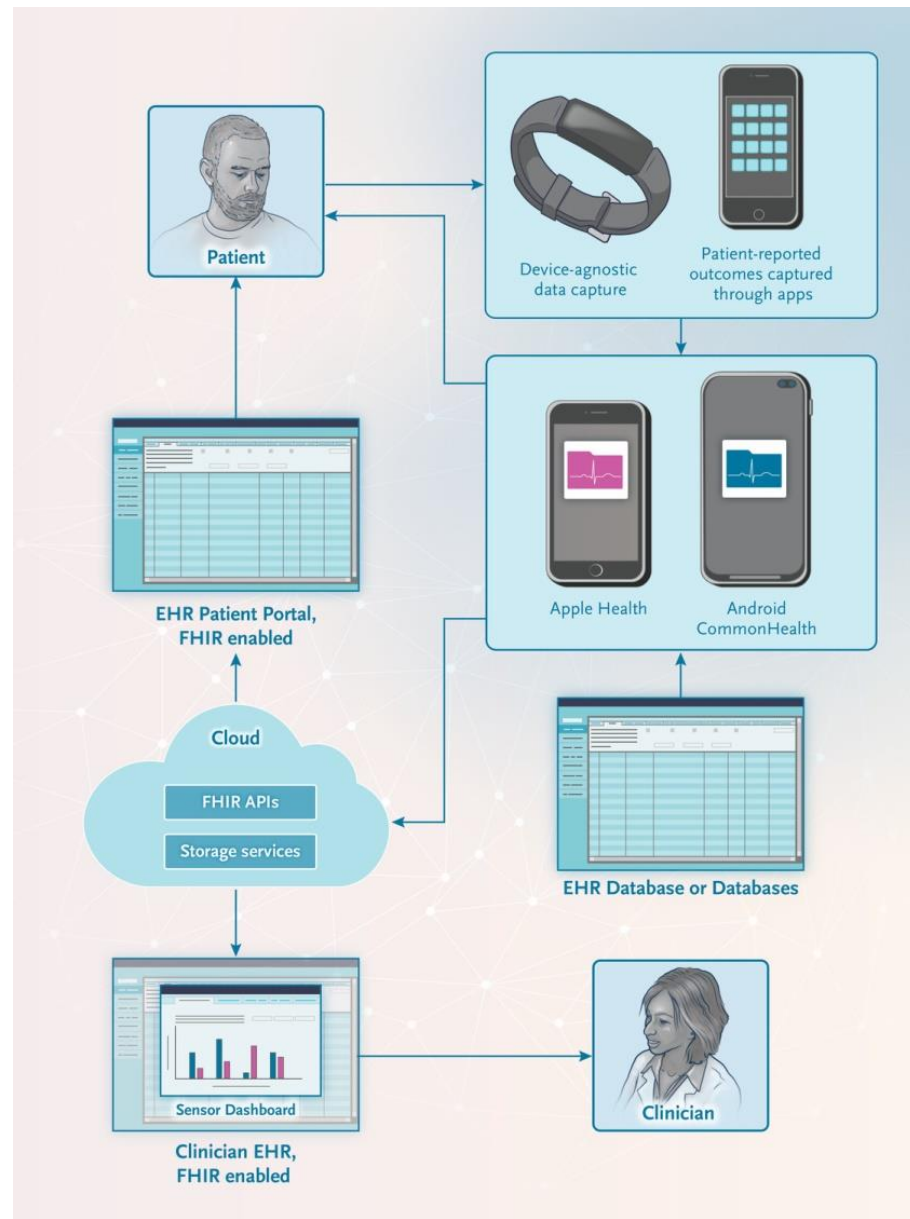


<https://community.khoros.com/t5/Science-of-Social-Blog/Flow-Gamers-and-Superusers/ba-p/2644>. Accessed 2019.9.8.

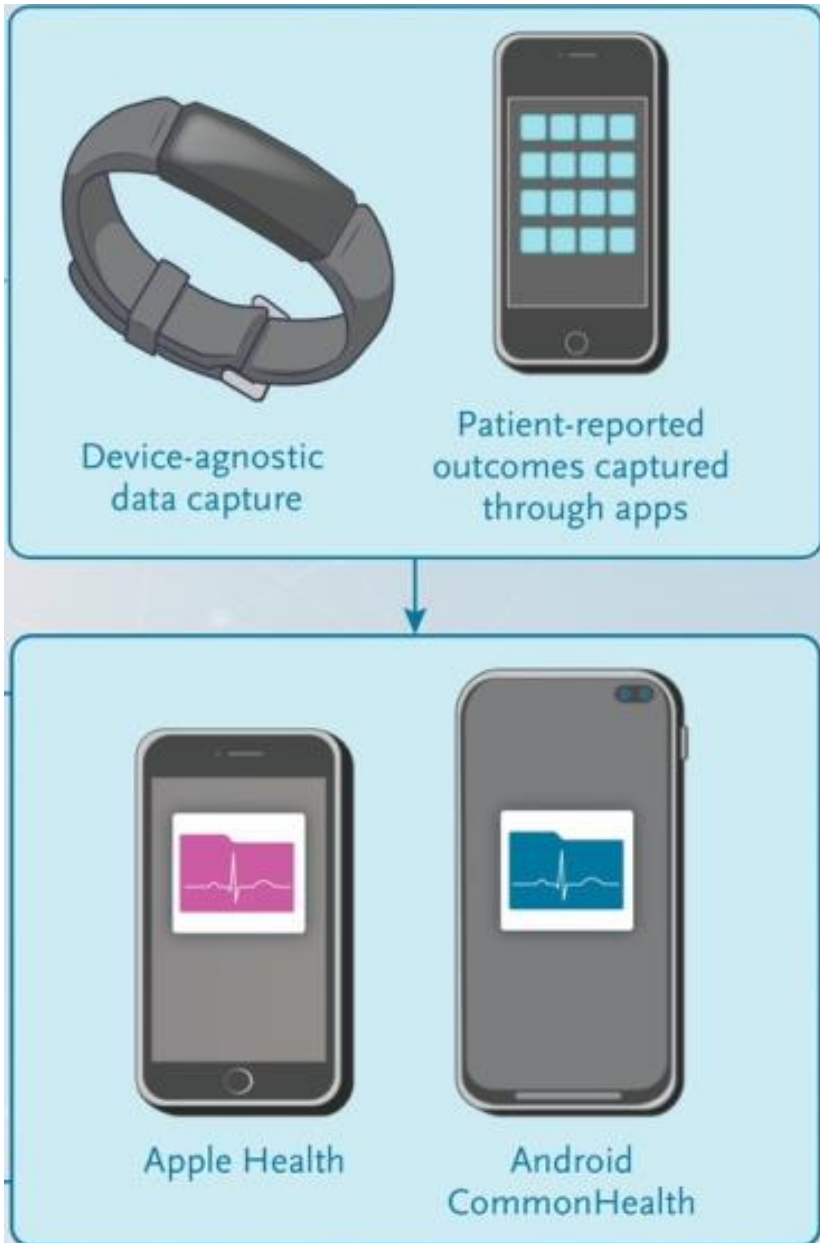
Key Information and Communication Technology Capabilities

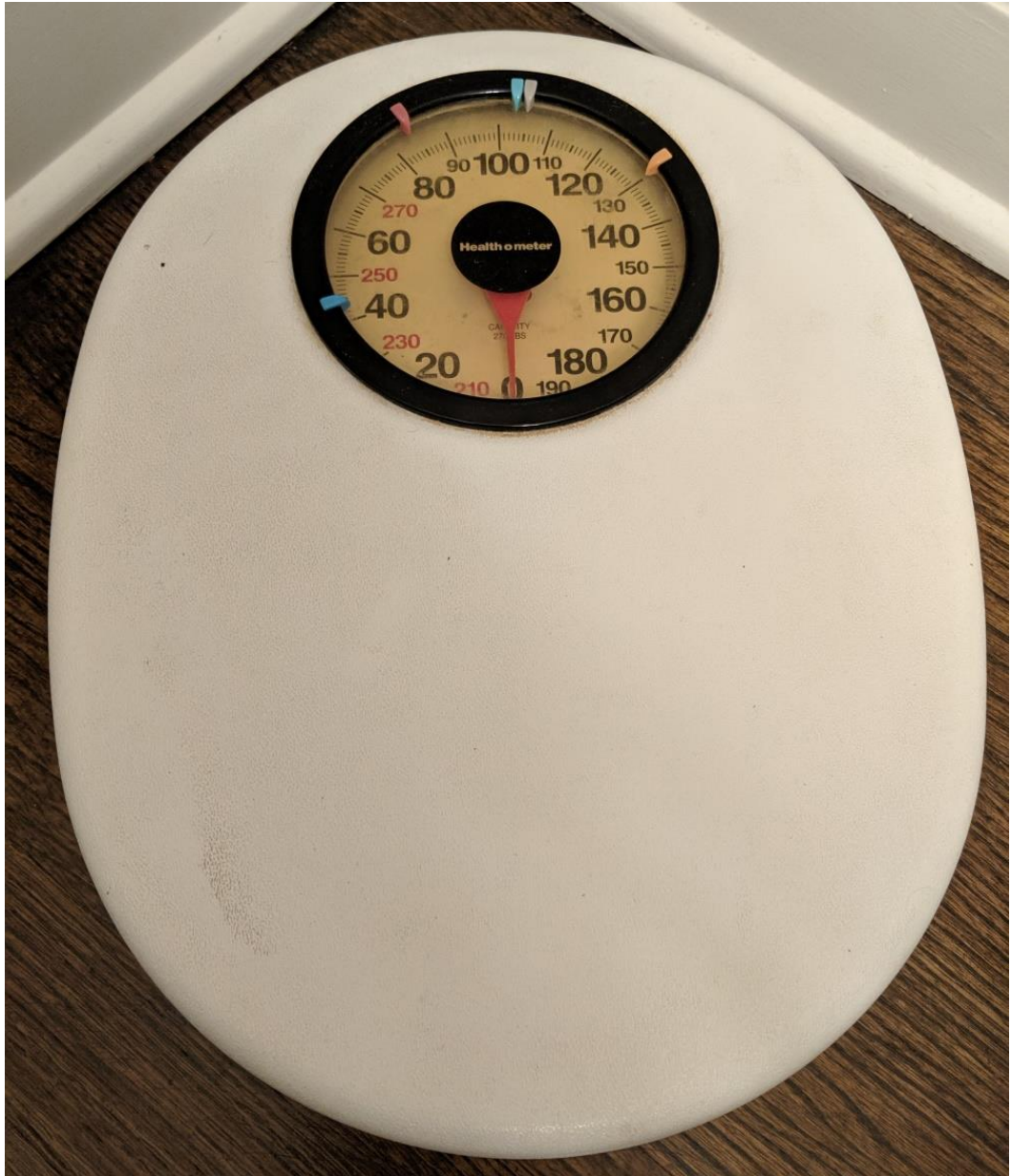
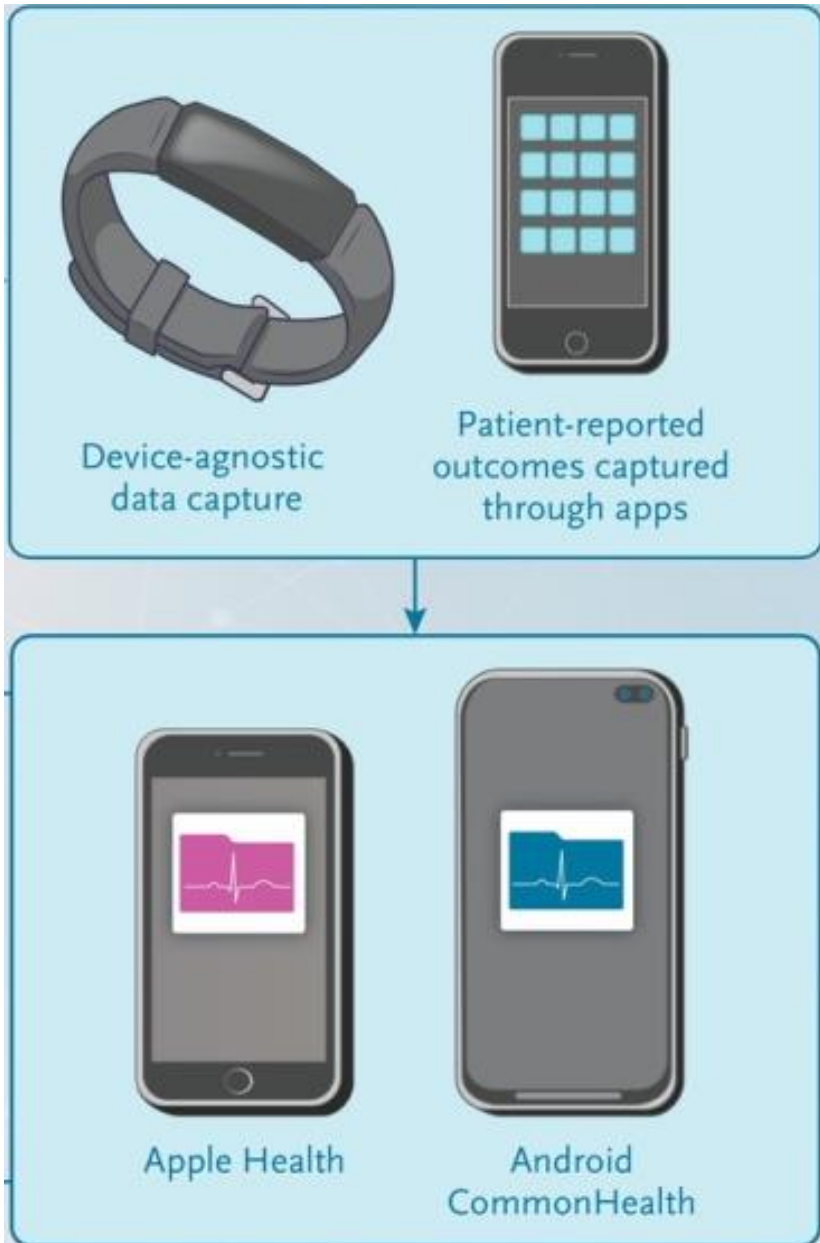
- Collection and Display of Information
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- Framing and Support of Decisions
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HEALTHCARE & FITNESS INTEGRATION SUMMIT

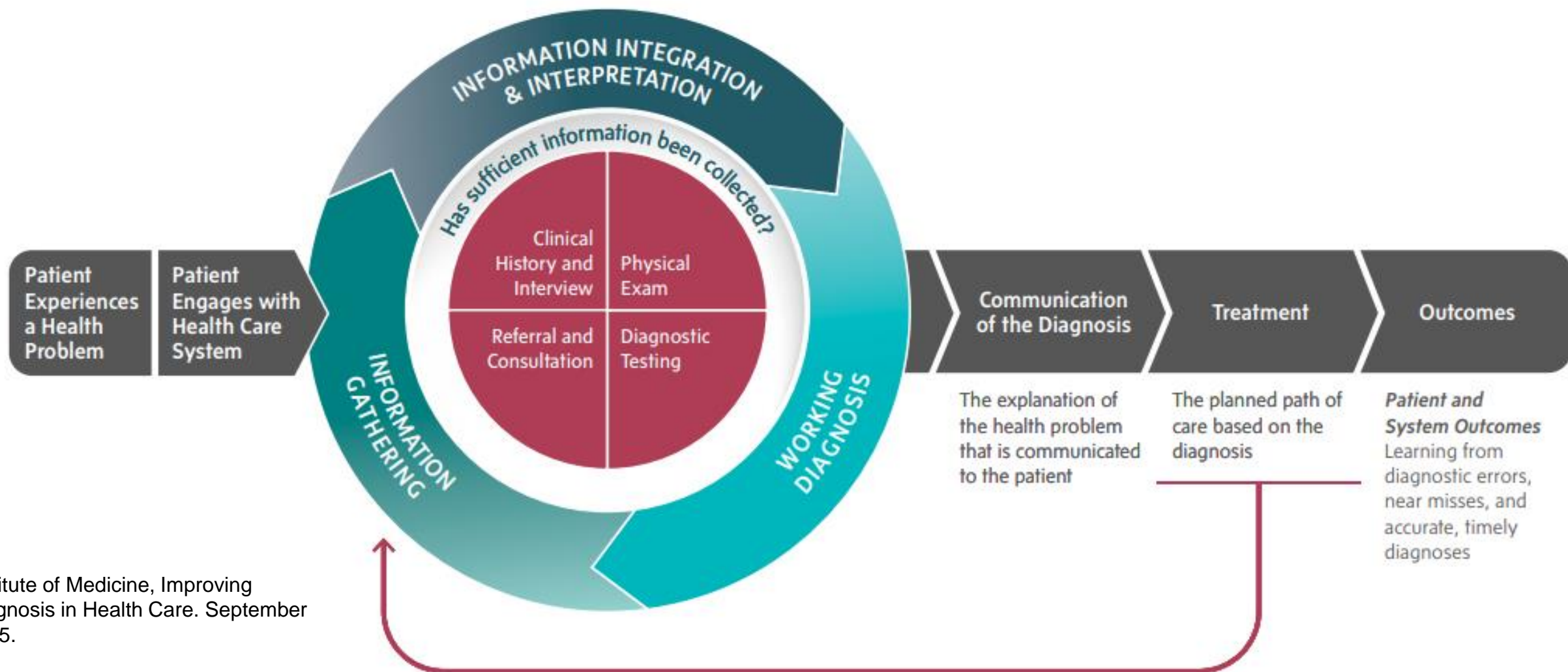


I Sim. N Engl J Med 2019;381:956-968.



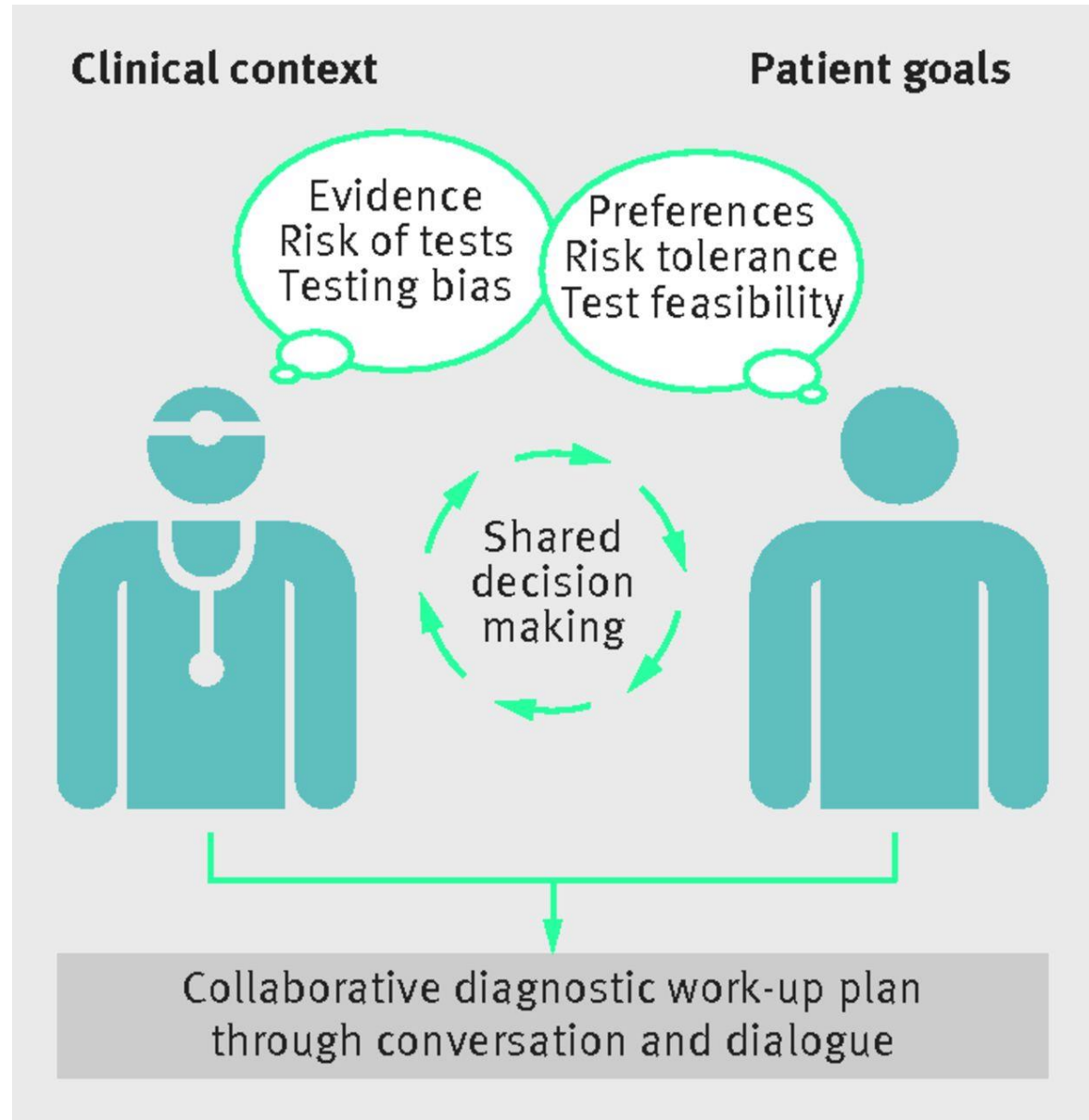


The Diagnostic Process



Institute of Medicine, Improving Diagnosis in Health Care. September 2015.

TIME →



Berger ZD BMJ 2017;359:j4218.

Localised prostate cancer

Key:

✓ preferred treatment

◆ treatment option

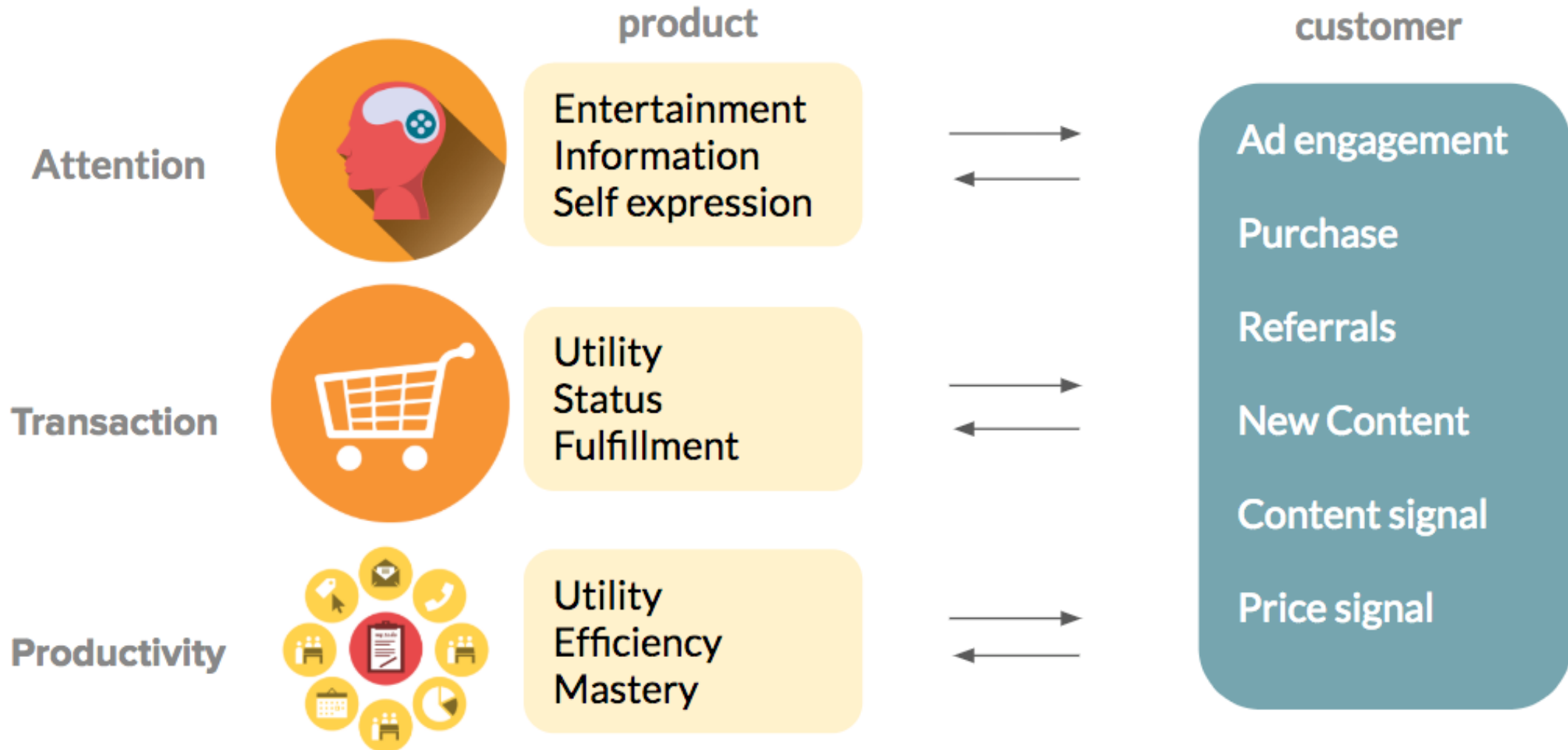
✗ not recommended

Table 2 Treatment and management options for men with localised prostate cancer.

		Low risk	Intermediate risk	High risk
Watchful waiting		◆	◆	◆
Active surveillance		✓	◆	✗
Radical treatments	Prostatectomy	◆	✓	✓*
	Brachytherapy	◆	◆	✗
	Conformal radiotherapy†	◆	✓	✓*
	Cryotherapy	✗‡	✗‡	✗‡
	High-intensity focused ultrasound	✗‡	✗‡	✗‡
<p>* Offer if there is a realistic prospect of long-term disease control</p> <p>† Conformal radiotherapy should be given at a minimum dose of 74 Gy (at a maximum of 2 Gy per fraction)</p> <p>‡ Unless as part of a clinical trial comparing use with established interventions</p>				

Guidelines for the Management of Prostate Cancer: West Midlands Expert Advisory Group for Urologic Cancer. NHS England. Published December 2016.

The Customer Value Exchange Model



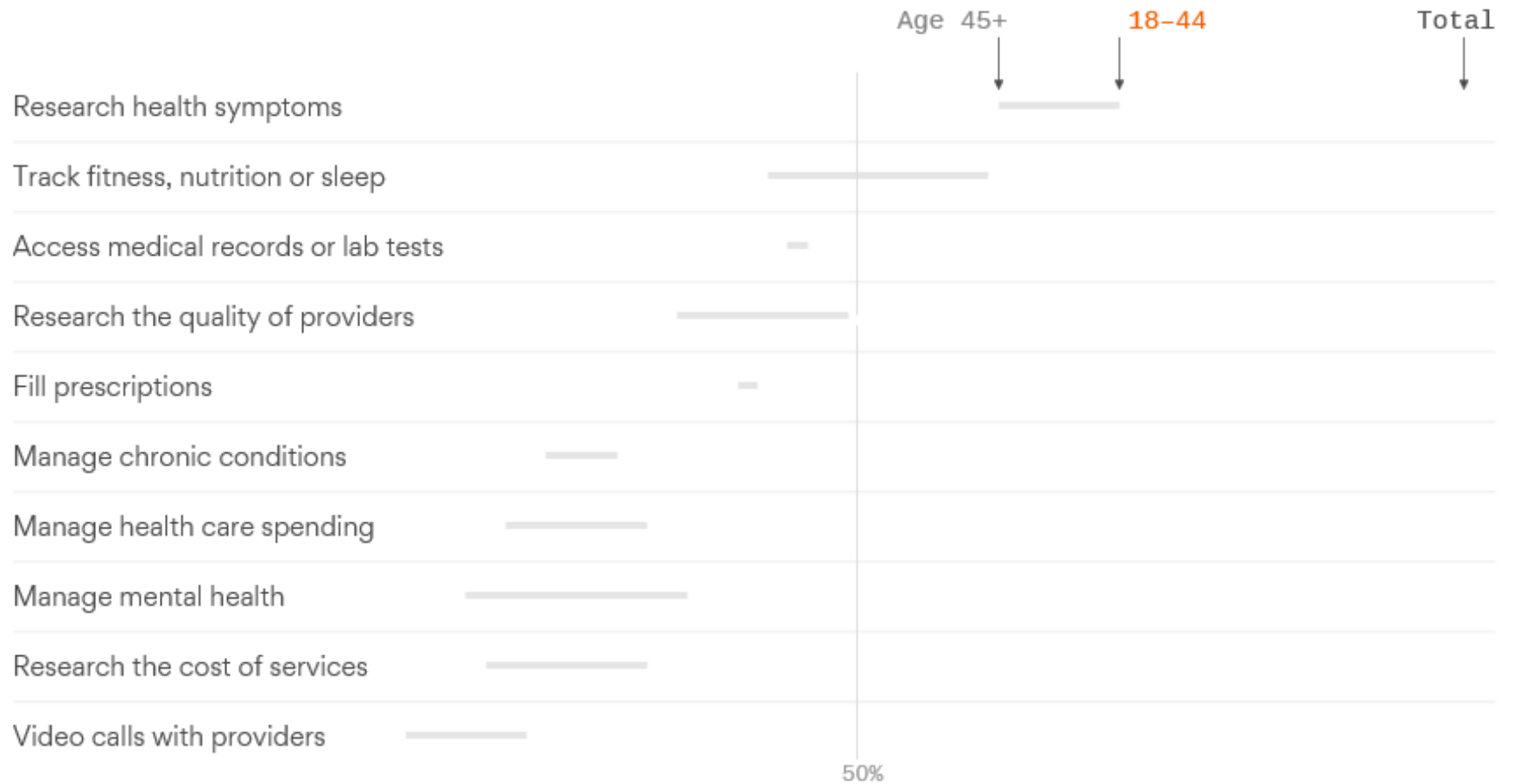
A non-marketer's view of consumer engagement

- Create useful content
- Develop a tremendous user experience
- Humanize your brand
- Listen and respond to feedback



Percent who say they use the internet or smartphone to do these tasks at least a few times a year

Survey of U.S. adults, Aug. 16-19, 2019



Data: Kaiser Family Foundation Health Apps and Information Survey; Chart: Andrew Witherspoon/Axios

Table. Sample of Direct-to-Consumer Telemedicine Companies

Company	Examples of Issues Addressed	Capital Raised (in Millions), \$ ^a	Quotes From Website
Curology	Acne	20.7	"It's easy as uploading a no-makeup selfie, and in just a few days you have a customized cream delivered right to your door."
Hims	Erectile dysfunction, premature ejaculation, hair loss, cold sores, genital herpes, performance anxiety, sleep	197.0	"Thanks to Hims, men now have easier, more affordable access to the prescriptions, products and medical advice they need. Especially about the things they find hard to talk about."
Keeps	Hair loss	23.0	"Doctor-supported, FDA-approved." "Delivered to your door." "Half the cost."
Lemonaid Health	Erectile dysfunction, urinary tract infection, sinus infection, cold sores, smoking cessation, acid reflux, acne, influenza	21.7	"We're an online doctor's office. After a consultation, get medicines delivered by our partner pharmacy or pick them up at a local drug store."
Nurx	Birth control, HIV screening, pre-exposure prophylaxis	41.4	"Get your prescriptions and home testing kits delivered right to your door. No hassle, no big spend. With automatic refills and renewals so you're always covered."
Roman	Erectile dysfunction, premature ejaculation, hair loss, genital herpes, cold sores	91.1	"E.D. meds prescribed online, delivered to your door."
The Pill Club	Birth control	68.1	"We're on a mission to be a trusted healthcare partner for women, empowering them through access, choice, and education."

^a Data collected by Pitchbook (<https://pitchbook.com/media>).



Playing to our strengths

- Interactions with experts to increase trust in diagnostic/treatment plan
- Interactions with other members of the team to implement the diagnostic/treatment plan

Playing to our strengths

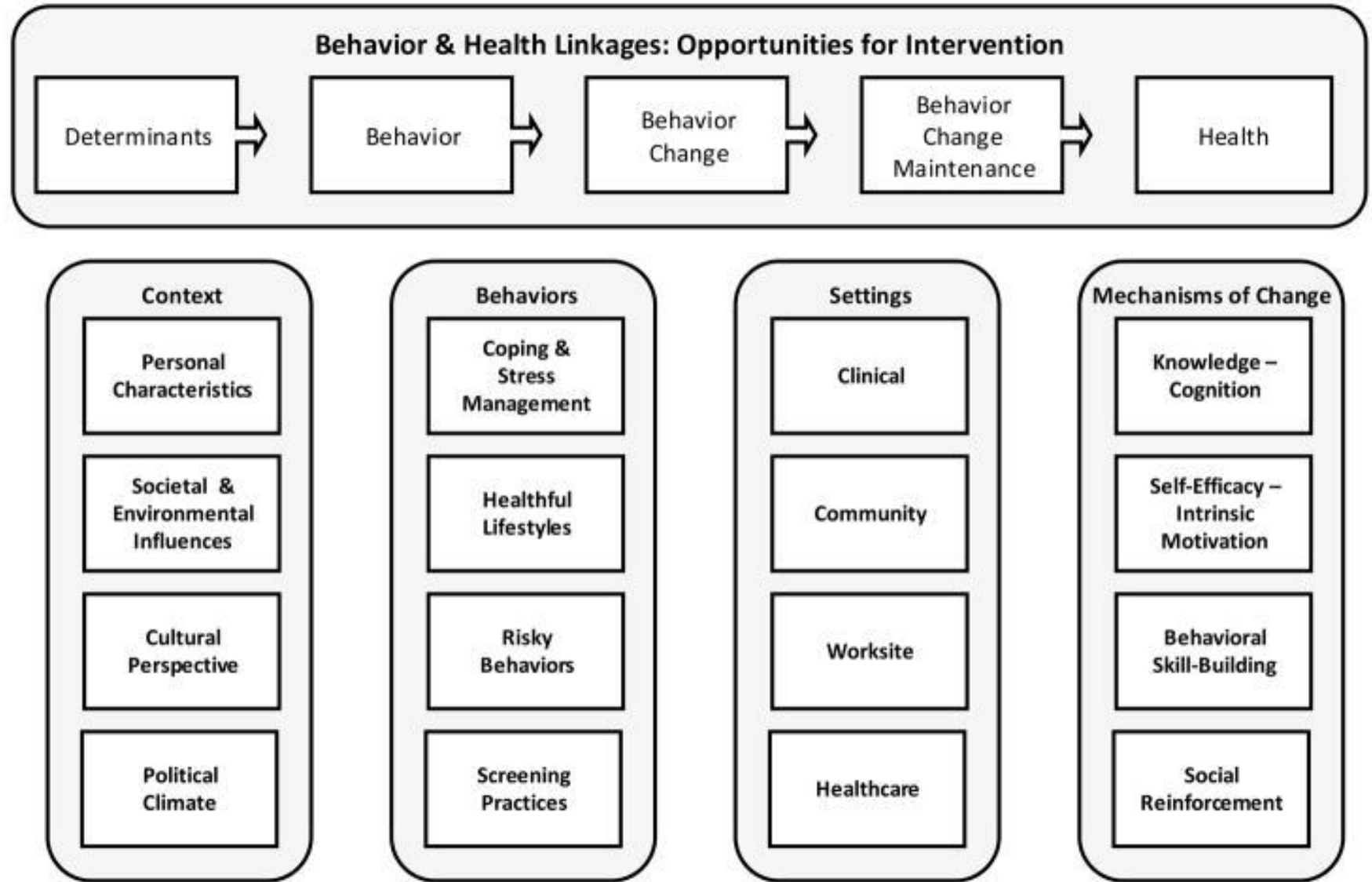
- Interactions with experts virtually (after initial face-to-face evaluation) to increase trust in diagnostic/treatment plan
- Interactions with other members of the team (or a bot or an algorithm) to implement the diagnostic/treatment plan



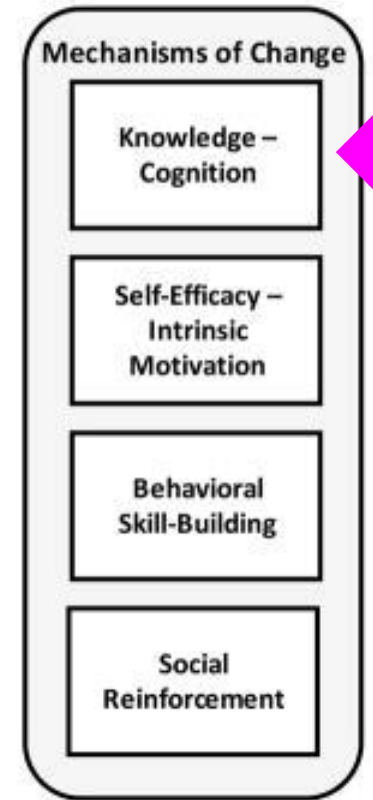
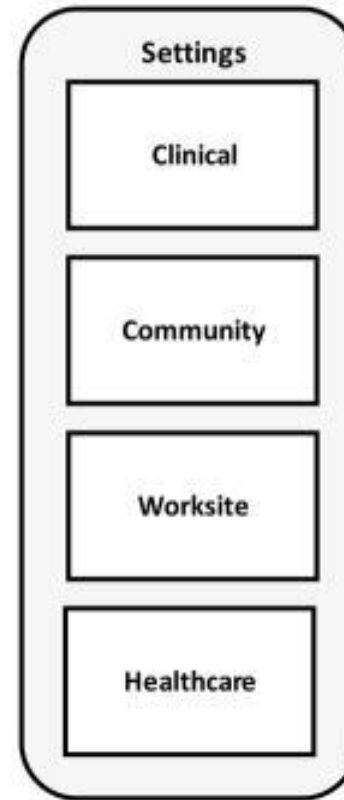
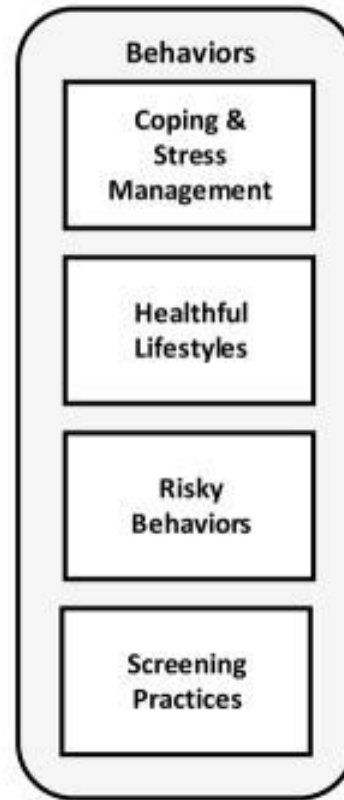
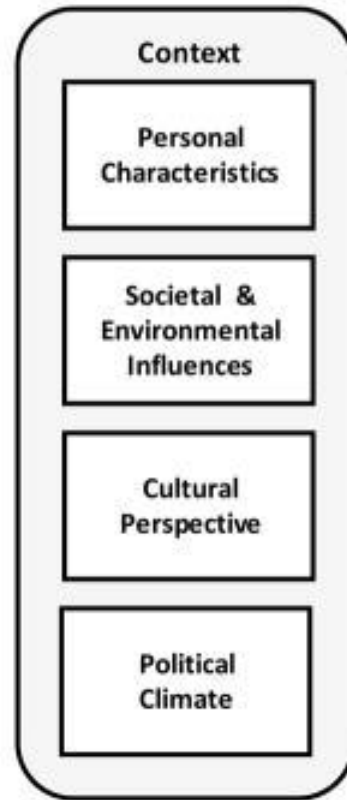


CLUB INDUSTRY





Ory MG Am J Health Behav 2010;34:647.



Ory MG Am J Health Behav 2010;34:647.

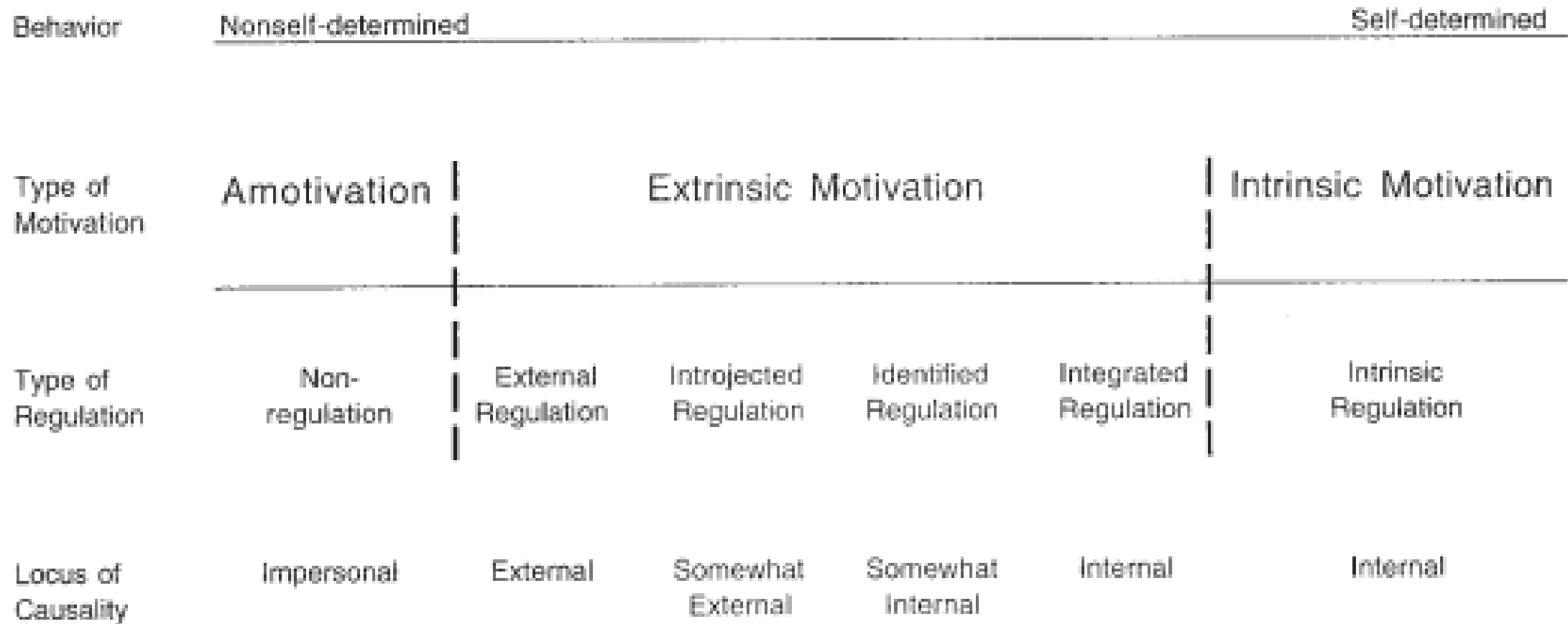


Figure 1. *The self-determination continuum, showing the motivational, self-regulatory, and perceived locus of causality bases of behaviors that vary in the degree to which they are self-determined.*

Deci EL Psychological Inquiry 2000;11:227.

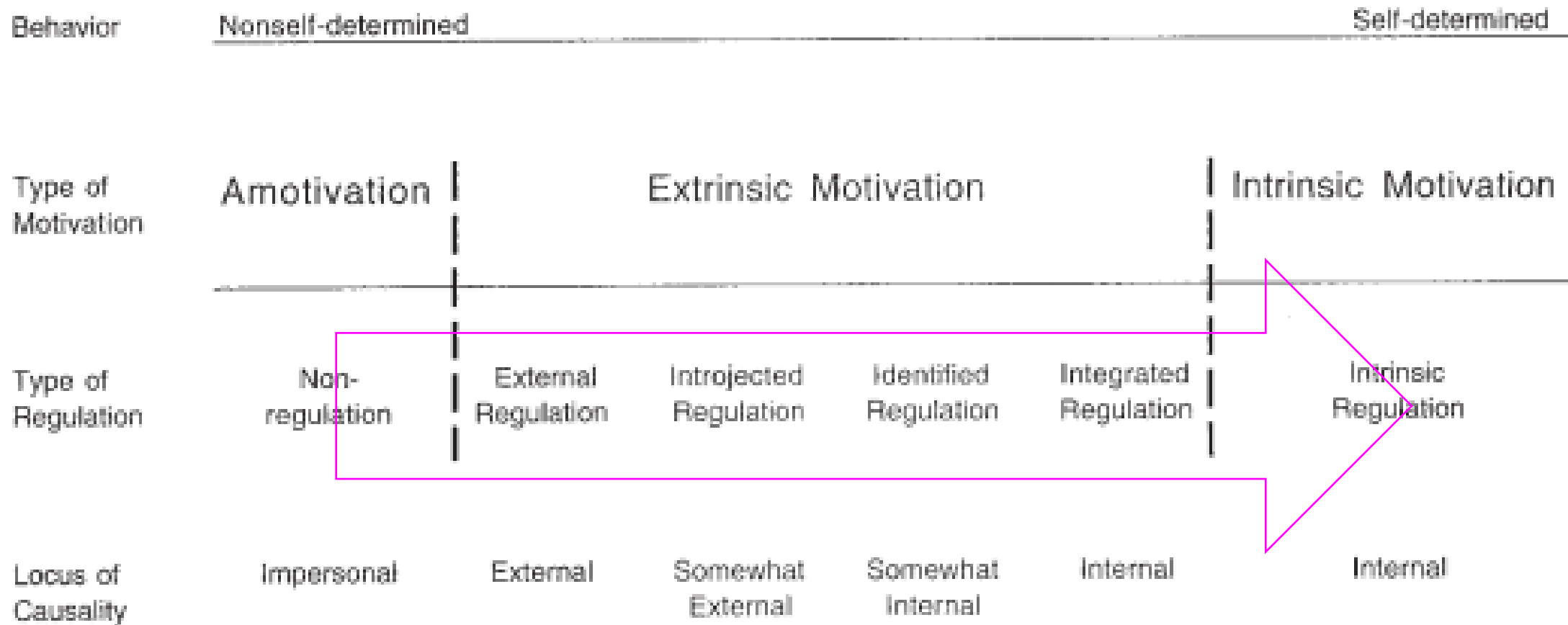
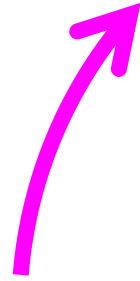


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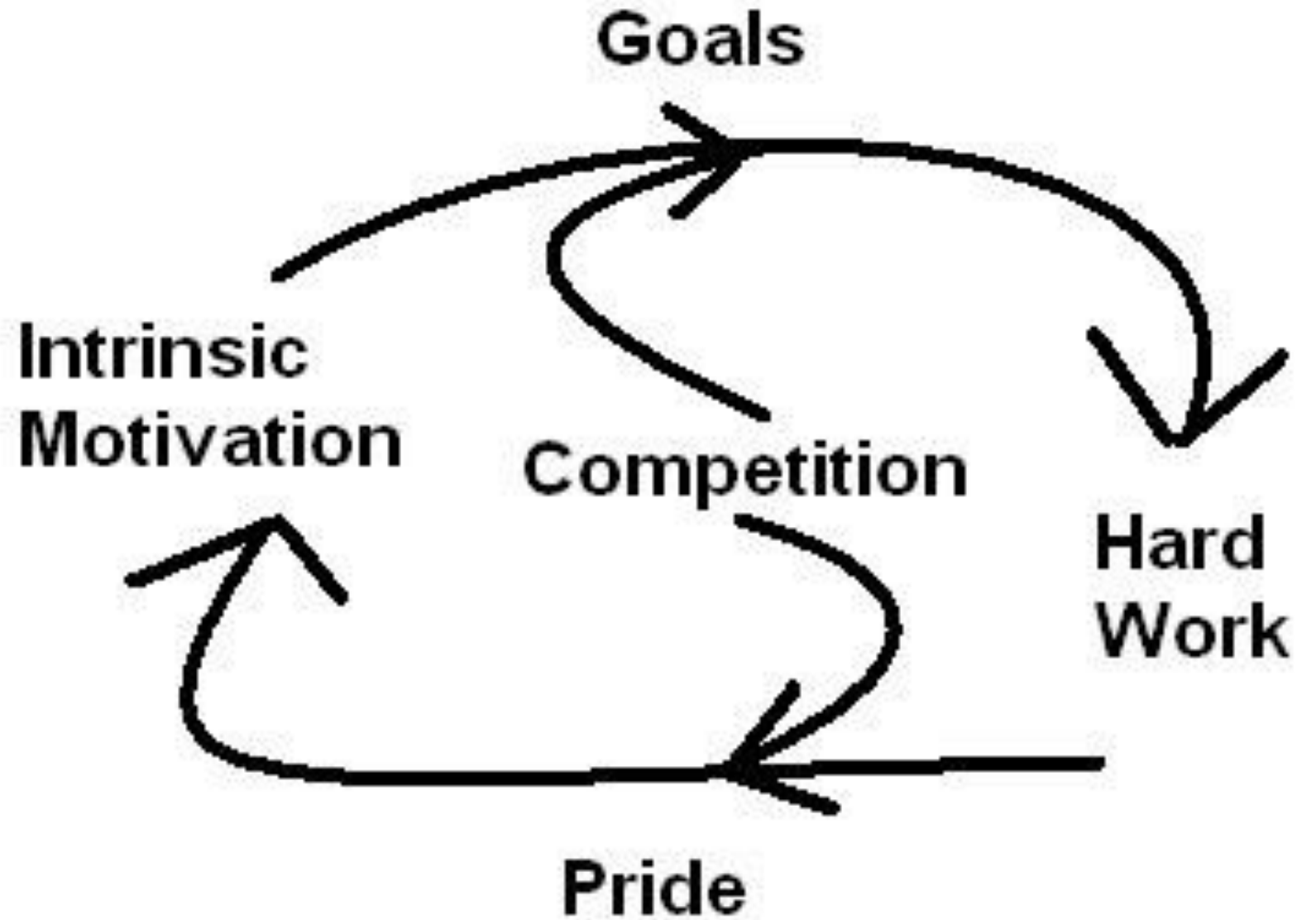
Goals



Identity

Behaviors





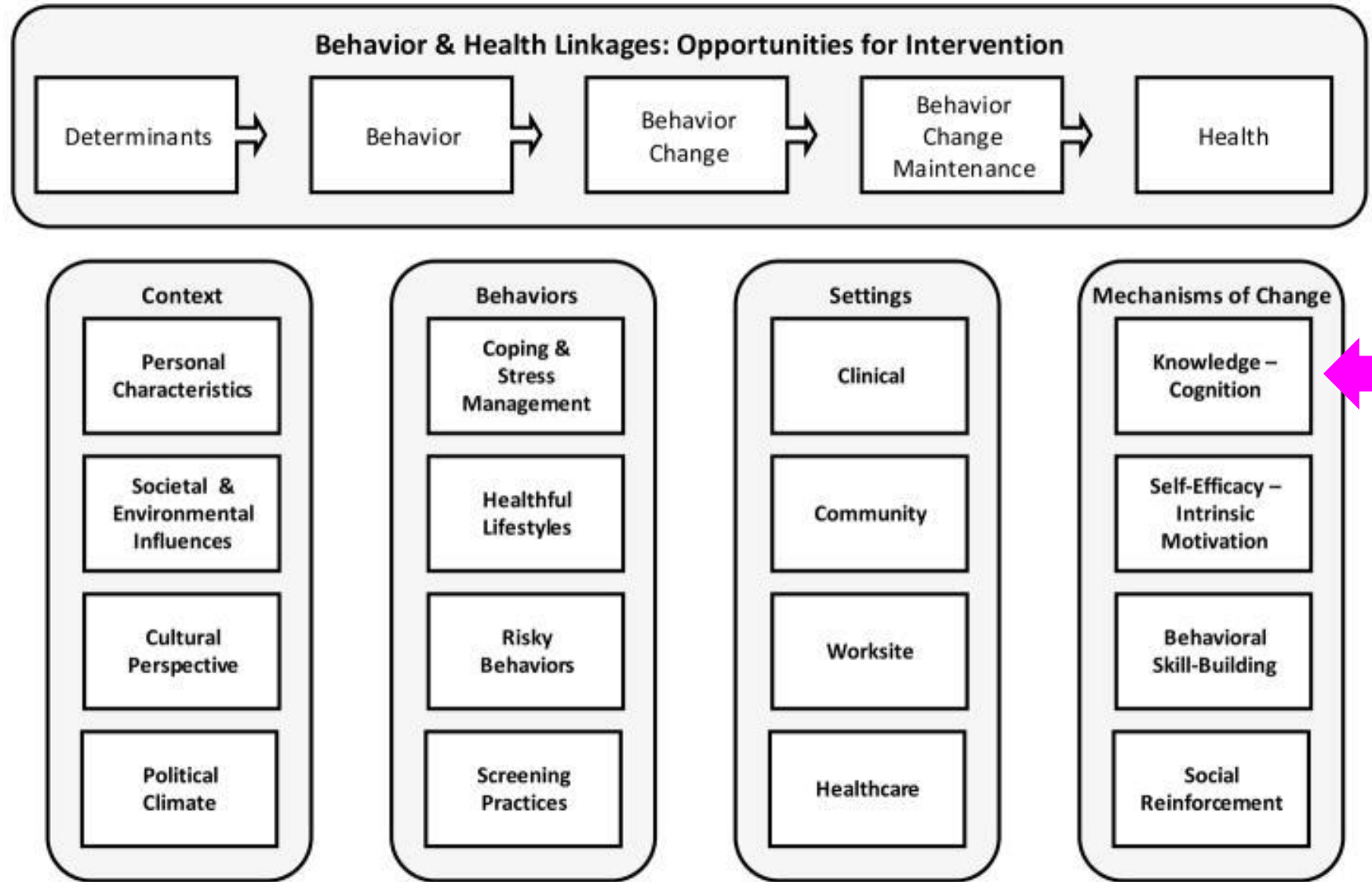
http://www.dominicgrossman.com/2011_08_23_archive.html. Accessed 2019.9.17.



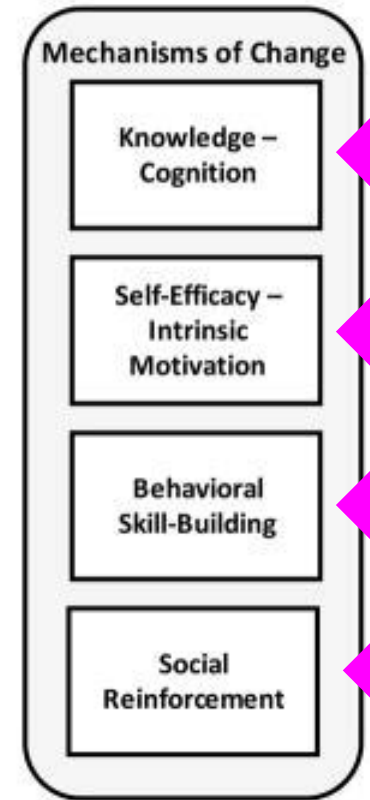
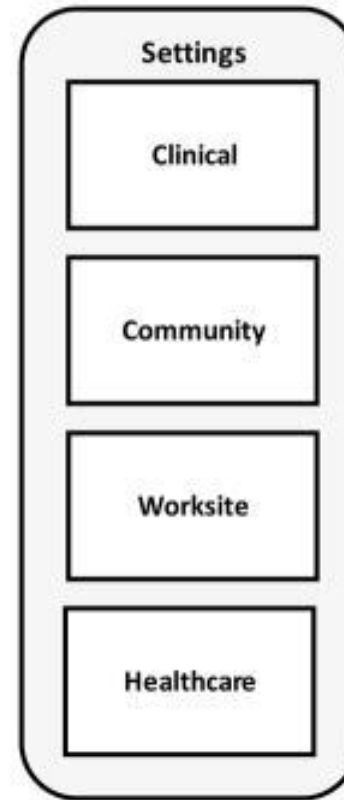
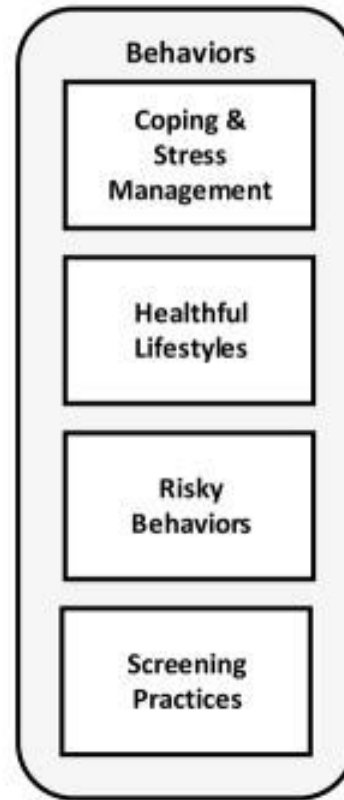
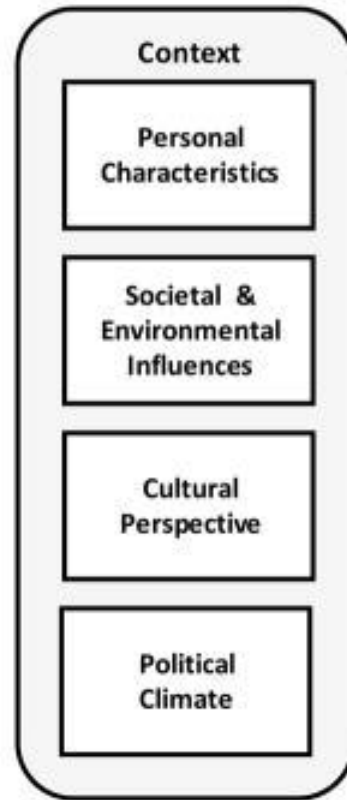
“We need to help kids gain a healthy sense of self-motivation in between the extremes of ‘excessively driven’ and ‘what’s the point in trying?’”

William Stixrud, PhD

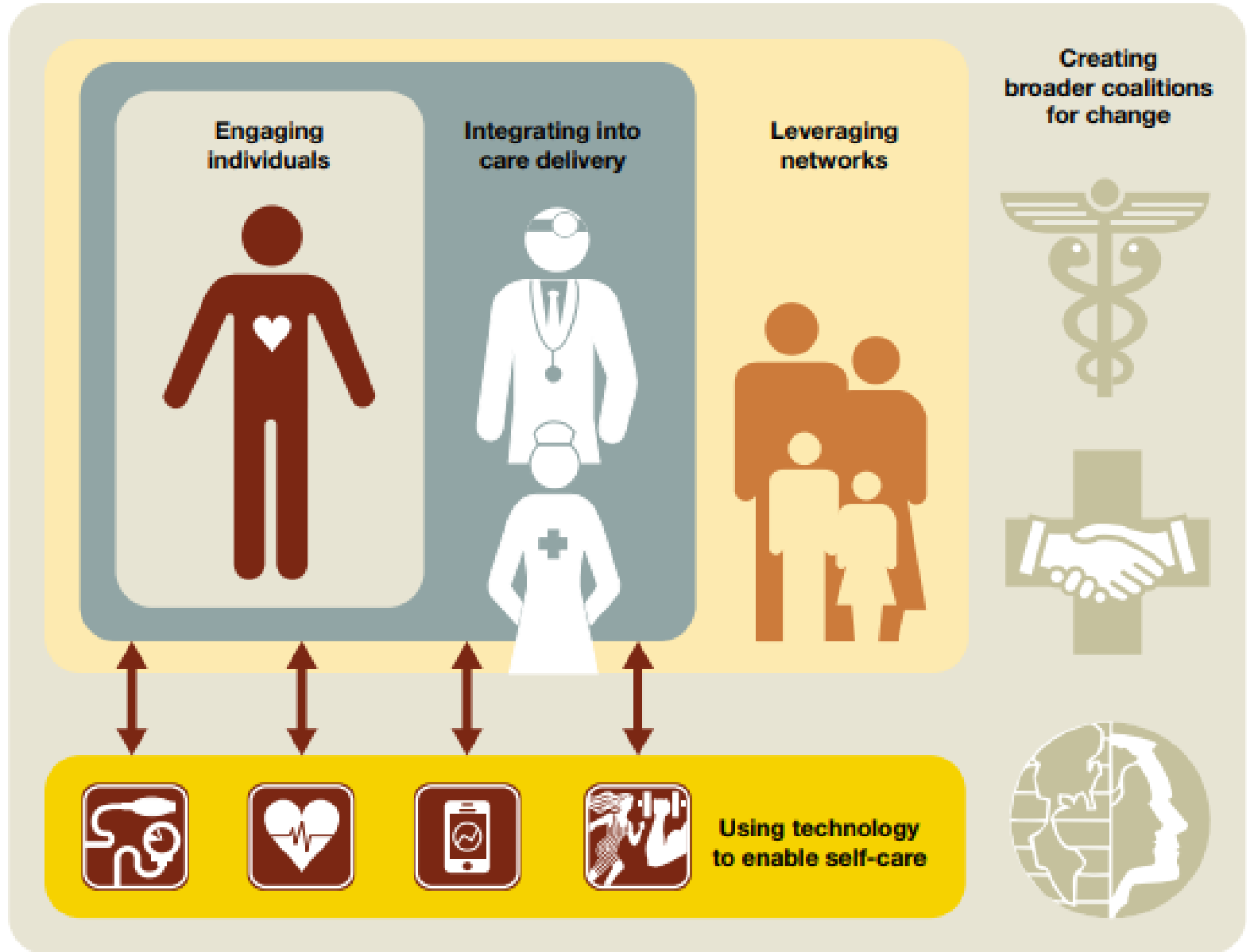
<https://drrobysilverman.com/how-to-talk-to-kids-about-being-self-driven-self-motivated-self-controlled-with-dr-william-stixrud/>. Accessed 2019.9.17.



Ory MG Am J Health Behav 2010;34:647.



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https://healthcare.mckinsey.com/sites/default/files/791750_Changing_Patient_Behavior_the_Next_Frontier_in_Healthcare_Value.pdf. Accessed 2019.9.17.

Key Information and Communication Technology Capabilities

- Collection and Display of Information
- Customization of Information
- Education
- Mediation of Communication
- Support of Workflows and Activities
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- Engaging with health systems
- Engaging with providers
- Engaging with caregivers, family members
- Engaging with payers, unions, employers
- Engaging with state governments

What were we talking about again?

- We are not getting the best value for our healthcare dollar (lives, quality-of-life)
- Health behaviors are a big part of chronic disease
- Current Health IT offerings aren't strongly engaging consumers
- Patient confidence/trust in medical plan may support virtual care



Thank you

[linkedin.com/in/goelanupam](https://www.linkedin.com/in/goelanupam)
anupam.goel@uhc.com