Faculty of Health Sciences

Impact of Risk Factor Modifications on Coronary Heart Disease Mortality in Turkish Adults for 2025

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Background

- CVDs are the leading cause of death in the world
- Low-middle income countries are disproportionally affected from
- More than 80% of global CVD deaths take place in these countries
- 80% of premature deaths from CVDs can be prevented

Background

- 24000 CHD deaths were prevented or postponed by risk factor changes in Turkey between 1995 and 2008 *(Unal B, et al. 2013)*

- CHD mortality rates in Turkey can be decreased much more by interfering to the policies.

Objectives

- To appraise the potential reductions in CHD mortality achievable by modest and optimistic decreases in
  - smoking,
  - diabetes,
  - physical inactivity,
  - BMI,
  - consumption of saturated fat,
  - salt
- and increases in
  - consumption of fruit and vegetables

Methods

IMPACT-CHD mortality model

- Previously developed and validated in Turkey was extended to predict potential reductions in CHD mortality from 2008 (baseline year) to 2025.
- Using risk factor trends data from recent surveys as a baseline, we modelled alternative future risk factor scenarios.

Estimating future trends in CHD mortality to 2025

- CHD mortality trends
  - TURKSTAT's CHD mortality data between 1995-2008
- Population projections
  - from TURKSTAT's projections for 2025
- Analysis presented by assumptions
  - the indirect standardized mortality rates ("no change in mortality")
  - the exponential decay model counterfactual ("continuing decline in mortality")

Table 1. **Predicted** Scenarios in Risk Factor Changes for 2025, in Turkey

	Risk Factors	Modest	Optimistic
REDUCTIONS 	Dietary salt	20 %	30 %
	Saturated fat by energy intake	2 %	3 %
	BMI	5 %	10 %
	Diabetes	5 %	10 %
	Smoking	10 %	15 %
	Physical inactivity	5 %	10 %
INCREASING 	F/V intake	5 %	10 %

- Probabilistic sensitivity analyses
  - were conducted to overcome uncertainties on model parameters.

Probabilistic sensitivity analyses

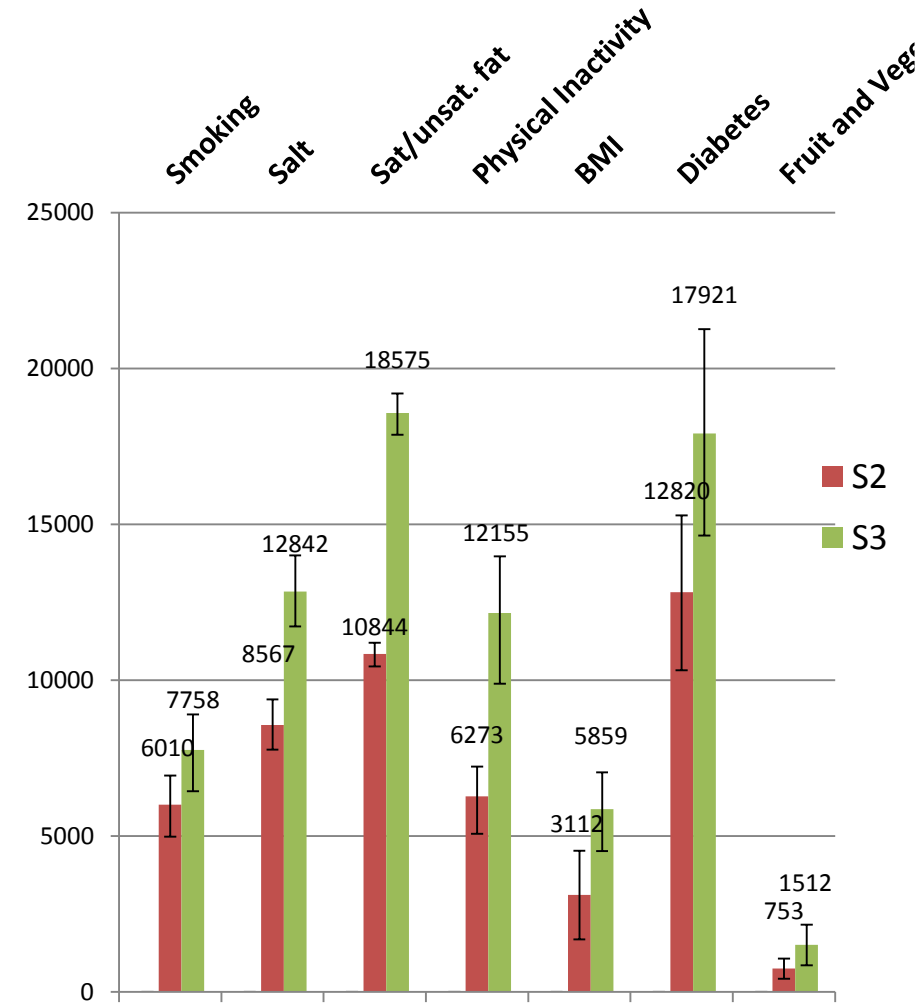
- The uncertainty intervals based on 1,000 draws taking the 95% uncertainty intervals as the 2.5th and 97.5th percentiles.
- Input variables taken from external sources (e.g. beta coefficients and relative risk reductions) were randomly drawn from specified distributions.

Results

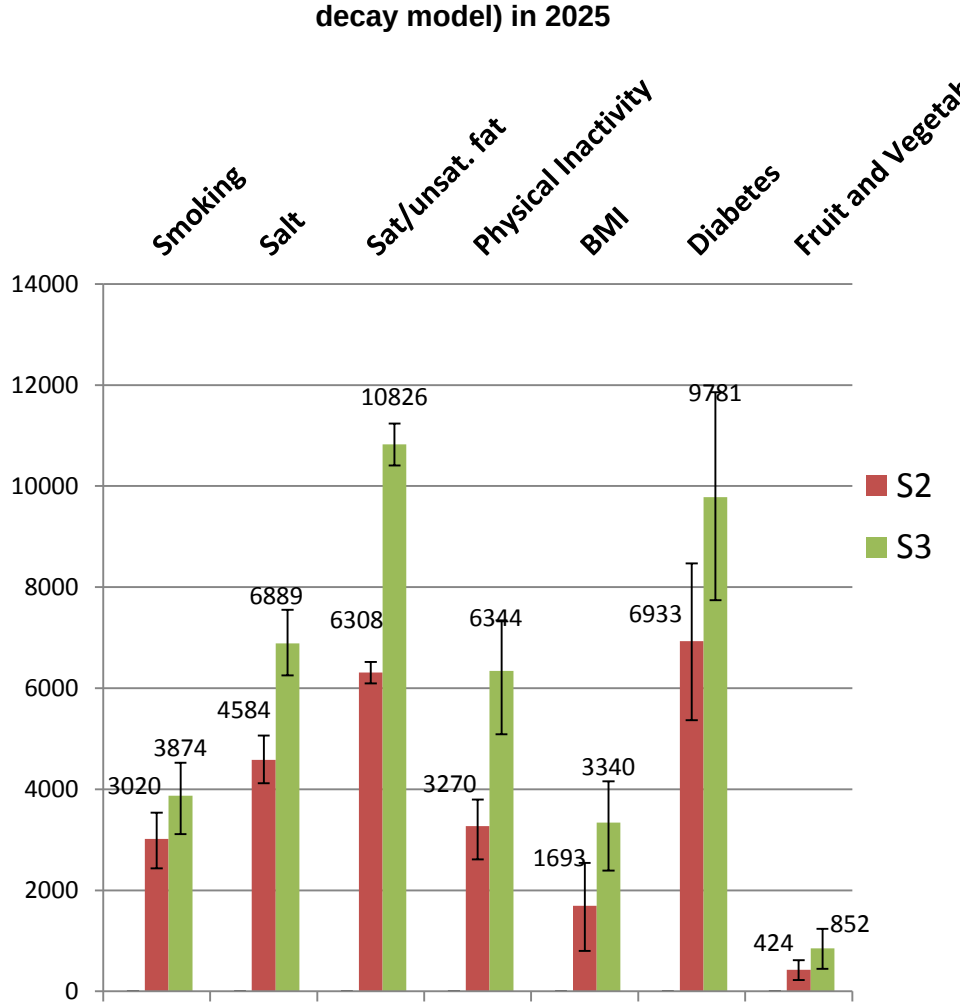
- Projected populations in 2025 (adults aged 25-84) were 54 million in Turkey
- If no risk factor changes – increase in mortality due to population ageing (of about 30%)
- With modest changes in risk factors about 50,000 deaths prevented and optimistic 76,000
- The half of these deaths prevented were due to
  - diabetes
  - sat/unsaturated fat intake

Predicted Decreases in Deaths

Graph 1. Assumed no mortality change in 2025



Graph 2. Assumed mortality decline (exponential decay model) in 2025



S2-Modest scenario S3-Optimistic scenario

Table 1. Estimated CHD deaths prevented by achieving risk factor policy options for no mortality change scenario, by sex, in Turkey

	Modest scenario				Optimistic scenario			
Risk factors	**Men (95% CI)**	**Women (95% CI)**	**Total (95% CI)**	**%**	**Men (95% CI)**	**Women (95% CI)**	**Total (95% CI)**	**%**
Diabetes	6270 (5199-7434)	6550 (5154-7884)	12820 (10353-15317)	**26.5**	8728 (7300-10251)	9193 (7279-10952)	17921 (14579-21203)	**23.4**
Sat/unsat fat	7160 (6918-7418)	3684 (3567-3828)	10844 (10484-11246)	**22.4**	11033 (10649-11446)	7541 (7306-7828)	18575 (17954-19274)	**24.2**
Salt intake	3737 (3469-4002)	4829 (4279-5363)	8567 (7747-9365)	**17.7**	5757 (5375-6109)	7085 (6305-7852)	12842 (11680-13961)	**16.8**
Physical inactivity	3885 (3239-4692)	2389 (2078-2785)	6273 (5317-7477)	13.0	7525 (6295-9050)	4631 (4039-5372)	12155 (10335-14422)	15.9
Smoking	4221 (3613-4883)	1788 (1461-2158)	6010 (5074-7040)	12.4	5936 (5138-6848)	1822 (1475-2225)	7758 (6613-9073)	10.1
BMI	1703 (1066-2363)	1409 (632-2177)	3112 (1698-4540)	6.4	3356 (2743-4049)	2503 (1925-3144)	5859 (4669-7194)	7.6
Fruit and vegetables	410 (255-566)	343 (177-515)	753 (432-1082)	1.6	824 (512-1138)	688 (355-1036)	1512 (867-2174)	2.0
Total	27387 (23758-31358)	20993 (17347-24709)	**48379 (41106-56067)**	100.0	43158 (38012-48891)	33464 (28685-38409)	**76622 (66697-87301)**	100.0

Table 2. Estimated CHD deaths prevented by achieving risk factor policy options for lower mortality change scenario, by sex, in Turkey

	Modest scenario				Optimistic scenario			
Risk factors	**Men (95% CI)**	**Women (95% CI)**	**Total (95% CI)**	**%**	**Men (95% CI)**	**Women (95% CI)**	**Total (95% CI)**	**%**
Diabetes	3512 (2824-4228)	3421 (2571-4270)	6933 (5394-8498)	**26.4**	4882 (3972-5806)	4899 (3731-6013)	9781 (7703-11818)	**23.3**
Sat/unsat fat	4186 (4039-4349)	2122 (2059-2175)	6308 (6098-6524)	**24.0**	6455 (6202-6733)	4371 (4210-4509)	10826 (10412-11242)	**25.8**
Salt intake	1921 (1771-2065)	2663 (2333-2980)	4584 (4104-5045)	**17.5**	2980 (2777-3167)	3909 (3450-4359)	6889 (6227-7527)	**16.4**
Physical inactivity	2082 (1719-2535)	1188 (1028-1396)	3270 (2747-3930)	12.5	4036 (3346-4898)	2308 (2000-2705)	6344 (5346-7603)	15.1
Smoking	2204 (1841-2622)	816 (663-987)	3020 (2504-3609)	11.5	3043 (2552-3620)	831 (669-1014)	3874 (3221-4634)	9.2
BMI	918 (548-1318)	775 (295-1267)	1693 (843-2585)	6.5	1811 (1444-2236)	1529 (1077-2052)	3340 (2522-4288)	8.0
Fruit and vegetables	232 (142-326)	193 (90-300)	424 (232-625)	1.6	465 (284-655)	386 (181-602)	852 (465-1257)	2.0
Total	15055 (12883-17443)	11178 (9039-13374)	**26233 (21922-30817)**	100.0	23673 (20577-27115)	18234 (15318-21254)	**41907 (35895-48369)**	100.0

Strengths-limitations

- Country specific data
- Multiple risk factors evaluated
- First study of policy scenarios for CHD in Turkey

- Uncertainty in model parameters e.g. Mortality trends (probabilistic uncertainty analyses used)
- Uncertainty in model assumptions e.g. Lag times
- Trends in treatment not included

Conclusion

- Only modest risk factor reductions in
  - diabetes,
  - sat/unsat fat
  - salt reduction

32000 CHD deaths

- Population based,
- Multisectoral interventions (to reduce diabetes, saturated fat and salt consumption) should be scaled up

The government + Food industry

Main messages

1900 CHD deaths per year

Modest scenario options

Policies on **diabetes** and **healthy food consumption** were the most effective options for preventing CHD mortality.

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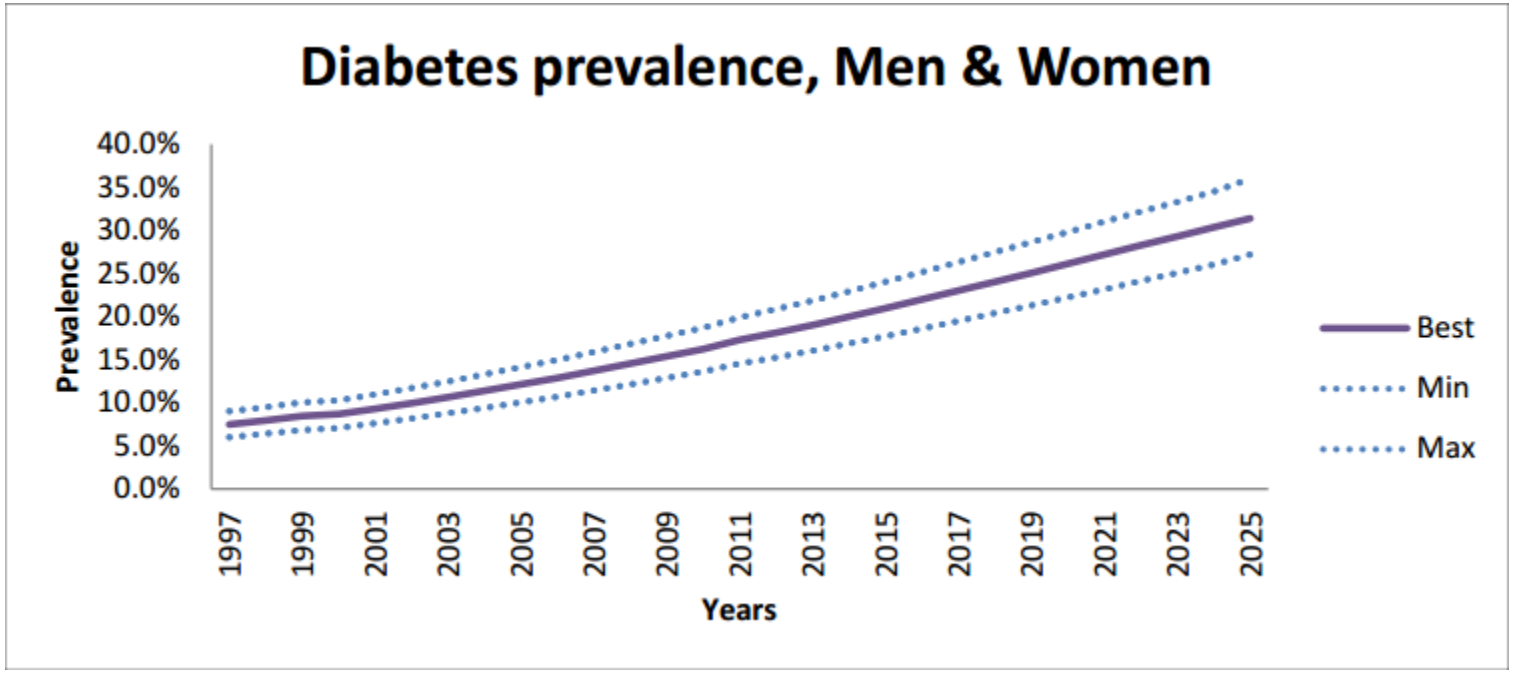
Thank you for your attention



Sozmen K, et al. Estımatıng dıabetes prevalence ın turkey ın 2025 wıth and wıthout possıble ınterventıons to reduce obesıty and smokıng prevalence usıng a modellıng approach. INT J PUBLIC HEALTH DEC 2014