

Dental Plans

After completing this section, students should be able to:

- Make rough estimates of the probability of dental care events from available data.
- Make rough estimates of the average cost of health care procedures from available data.
- Estimate expected health care costs on various dental insurance plans, under simplifying assumptions.

Introduction

UNC’s Dental insurance provides three possible dental plans to employees, with the following monthly fees. It is also possible to opt out and get no plan.

Coverage Level	High Option	Classic Option	Low Option
Employee Only	\$49.86	\$35.90	\$22.68

The Low Option covers:

- Diagnostic and preventive services, such as oral exams, cleanings and x-rays.
- Basic services, such as fillings, extractions, root canal therapy and treatment of gum disease.

The Classic Option plan and High Option plan also cover:

- Major services, such as crowns, dentures and bridges, as detailed below.

Health plan benefits are described here: <https://oshr.nc.gov/2022-ncflex-enrollment-guide-universities/open>

Benefit Category	High Option	Classic Option	Low Option
Annual Deductible (per person/per family)	\$50/\$150	\$25/\$75	\$25/\$75
Annual Maximum (per covered person; does not include orthodontic services under the Classic and High Option plans)	\$5,000	\$1,500	\$1,000
Lifetime Orthodontic Maximum ¹ (per covered person)	\$1,500	\$1,500	N/A
Benefit Category	Plan Pays ³	Plan Pays ³	Plan Pays ³
Diagnostic and Preventive²			
Oral exams, preventive cleanings, X-rays, fluoride treatments, sealants, and space maintainers	100%	100%	100% after deductible
Basic²			
Fillings, simple extractions, endodontics, re-cement crowns, inlays and bridges, repair of removable dentures	80% after deductible	60% after deductible	50% after deductible
Periodontal services, oral surgery, and general anesthesia	50% after deductible		
Major²			
Includes crowns, dentures, bridges, fixed bridge repairs, denture adjustments/relining, implants	50% after deductible	50% after deductible	Not Covered
Orthodontics²			
Orthodontic services for dependent children up to age 19	50%	50%	Not Covered

For simplicity, we will only consider routine exams, cleaning, x-rays, fillings, crowns, extractions, and root canals. E.g. we will ignore bridges, and orthodontics.

Here are average costs of dental procedures, according to the insurance brokerage company Member Benefits

Procedure	Includes	Cost	Probability/ Freq
Check-up	exam, x-rays, and cleaning	\$288	
	x-rays only	\$140	
	exam and cleaning only	\$148	
Filling	single, silver amalgam filling	\$50 to \$150	
	single, tooth-colored composite filling	\$90 to \$250	
	single, cast-gold or porcelain filling	\$250 to \$4,500	
Extraction	non-surgical, gum-erupted tooth extraction	\$75 to \$300	
	surgical extraction utilizing anesthesia	\$150 to \$650	
	soft-tissue and complicated surgical extractions	\$185 to \$600	
	wisdom tooth extraction	\$75 to \$200	
Crown	single resin crown	\$328	
	single porcelain-fused crown	\$821	
	single full cast high noble metal crown	\$776	
Root canal	single, exposed root removal procedure	\$120	
	single, residual tooth root removal procedure	\$185	

According to www.authoritydental.org, bitewings cost \$35 each on average and there are 4 to a standard set.

Estimation

Here are some numbers to help you estimate the annual probability or frequency of some of these procedures.

- U.S. adults age 50 - 64 had an average of 5.30 missing permanent teeth. NIH
- U.S. adults age 50 - 64 had 27.35 filled surfaces on average. NIH (1999 - 2004)
- 5 million people in the US have 10 million wisdom teeth removed each year. Vox.com
- About 15.1 million root canals are performed in the US every year American Association of Endodontists
- About 2.3 million crowns are made annually. American College of Prosthodontists

The following charts contain some of the information summarized above.

1999–2004

Characteristic	Decayed permanent teeth (DT)	Missing permanent teeth (MT)	Filled permanent teeth (FT)	Total decayed, missing, or filled permanent teeth (DMFT)
<i>Age</i>				
20 to 34 years	0.93	0.62	4.61	6.16
35 to 49 years	0.75	2.39	7.78	10.91
50 to 64 years	0.55	5.30	9.20	15.05

Characteristic	Decayed permanent surfaces (DS)	Missing permanent surfaces (MS)	Filled permanent surfaces (FS)	Total decayed, missing, or filled permanent surfaces (DMFS)
<i>Age</i>				
20 to 34 years	1.73	3.04	8.62	13.39
35 to 49 years	1.55	11.52	18.38	31.46
50 to 64 years	1.22	25.31	27.35	53.87

Given that adults age 50 - 64 have an average of 27.35 filled surfaces in permanent teeth, about how many fillings does a person get on average per year?

Given that adults age 50 - 64 have an average of 5.3 missing permanent teeth, about how many permanent teeth does a person lose on average per year? (PollEv)

Separately estimate the probability / frequency of a wisdom tooth extraction in a given year,

Use your two answers above to estimate how many non-wisdom tooth extractions a person can expect in a given year.

What assumptions are we making that may not be correct?

Use similar reasoning to estimate the frequency / probability of a person having a root canal in a given year. (PollEv)

Use similar reasoning to estimate the frequency / probability of a crown in a given year.

Expected costs

Use these estimates, and the explanations of insurance benefits, to estimate the expected cost of a person under each dental insurance plan and the no insurance option. Use the spreadsheet in <https://tinyurl.com/math115unc> to organize information.

For simplicity, we will ignore annual maximums and deductibles for procedures, and just charge everyone the deductible separately at the end.

Which dental plan saves you the most money, or is it cheapest to "insure yourself" and not buy one at all?