1.Consider the following tests:

i. H0: p=0.50 vs. Ha: p > 0.50 , n = 360, p-hat =0.56.
ii. H0: p=0.50 vs. Ha: p ≠ 0.50 , n = 360, p-hat = 0.56.
iii. H0: p=0.37 vs. Ha: p < 0.37 , n = 1200, p-hat = 0.35.

a. The assumptions are that the under which the test statistic can be performed.
   1.the sample size is adequate: convention states the sample size should be at least 30, with 10 subjects in each category.
   least 10 in each category **np0 and n(1 − p0))**:

   i.(360)(0.5) = 180
   (360)(1-0.5)=180

   ii.(360)(0.5)=180
   (360)(1-0.5)=180

   iii(1200)(0.37)=444
   (1200)(1-0.37)=756

   2. that the the sample is representative of the population, meaning that the sample that is drawn is unbiased and random.
   3. that the subjects in the sample of been measured independent of each other, meaning the subjects in the sample are not influenced or depend upon the measurements or values for other subjects.

At this time, the assumptions have been met and we can move forward with the test statistic.

b. The test statistic takes on standard normal distribution.

test statistic by hand: i. ii iii.	

c.

p-value by “hand”* and comparison to a=0.05 i. ii.	

iii. *(distribution table used)	

Decision based on p-value made:

i

ii

iii

d.

critical value by “hand”* and comparison to a=0.05 i. ii. iii. *(distribution table used)	critical value in R:

Decision based on critical value

i.

ii.

iii.

e.

confidence interval by hand i. ii. iii.	

Decision based on confidence interval

i.

ii.

iii.

2.

Ho = 0.90 Ha <0.90	x=689 p0 = 0.90 n = 850 ^p = 0.81

a.

test statistic by hand:	

b.

p-value by “hand”* and comparison to a=0.01 0.00 *(distribution table used)	

c.Decision:

In our hypothesis test there are two claims. The first claim is that the proportion of smokers who began smoking at a young age was 0.90. The second claim is that the proportion of smokers who began smoking at a young age was less than 0.9. We conducted our hypothesis testing with the p-value method, which is the convention among statisticians. The p-value method allows us to calculate and assess how likely is it to get data like that observed or more than what was observed when claim one is true. Our hypothesis testing concluded that with a test statistic of -8.746 and an alpha level of 0.01 the probability of the proportion of smokers who started smoking at a young age was 0.90 is 0.0009. Meaning, it would be very unlikely to find this data if the first claim was true. Therefore, it more likely that the proportions of smokers who started smoking at a young age is less than 0.90.

d.

critical value by “hand”* and comparison to a=0.01 -2.32 *(distribution table used)	

Decision based on critical value

e.

confidence interval by hand	

Decision based on confidence interval

3.

Ho=0.72 Ha <0.72	x = 674 p0 = 0.72 n=900 ^p = 0.748

a.

test statistic by hand:	

b.

p-value by “hand”* and comparison to a=0.05 *(distribution table used)	

c.Decision based on p-value made:

In our hypothesis test there are two claims. The first claim is that the residents who participate in recycling household waste is 72% and the second claim is that the proportion of recyclers has increased since a new campaign was launched. We conducted our hypothesis testing with the p-value method, which is the convention among statisticians. The p-value method allows us to calculate and assess how likely is it to get data like that observed or more than what was observed when claim one is true. Our hypothesis testing concluded that with a test statistic of 1.939 and an alpha level of 0.05 the probability of household recycling greater than 72% after the campaign was launched is high. Meaning, it would be very unlikely to find this data if the first claim was true. Therefore, it more likely that the percentages of household recycling has increased since the campaign was launched.

d.

critical value by “hand”* and comparison to a=0.05 *(distribution table used)	critical value in R: 2.326348

Decision based on critical value

e.

confidence interval by hand	confidence interval in R: 0.7269699 - 0.7530301

Decision based on confidence interval

4.

Introduction

In the country of A. it is believed based on previous reports that only 12% of the population does not have health insurance. It would be important to know the true proportion of those with health insurance in order to determine how much money to allocate to the Department of Health which among other agencies, helps enforce that all citizens of A receive health insurance. We believe that based on recent reporting the true proportion is less than 12%. We will being using a variety of methods to determine this proportion of citizens with health insurance, including the p-value method, the critical value method and a confidence interval to further determine the true proportion.

Methods

In a government database of uninsured citizens, 1550 were polled and 164 stated they did not have health insurance.The assumptions of the sample include that it is representative, that the measurements are independent and that it is large enough:

$$(1550)(0.12)=186$$
$$(1550)(1-0.12) = 1240$$

After we determine the test statistic we will test our claim with a 5% alpha level with the P-value method, the critical value method, and we will further assess our claim with a confidence interval. We used R Studio version **{.....}** and the test statistic is recorded at -1.69696. The critical value is -1.64 and the P-value is 0.455. We will compare our Z score to the critical value and then compare our alpha level to our P-value. Then we will find the confidence interval by multiplying our critical value by the standard error and then adding and subtracting our sample mean to that product in order to asses the range of values. Our confidence interval is: 0.1016011- 0.1103989

Results

The propotation displays a standard normal curve. Our Z-score, when compared to our critical value indicates that the results observed in our study do not support the original claim that 12% of the population do not have health insurance. We then assess our p-value, and compared it to our alpha level. The p-value indicates that it would be unlikely that the probability of 12% of the population not having health insurance is unlikely, and that is more than likely that less than 12% are uninsured. Our confidence interval indicates that the true value of our proportion is within the noted range.

Discussion

The results indicate that if the true proportion of uninsured citizens is 12% then that would be unlikely, and it is more likely that uninsured adults is less than 12%. We are 95% confident that the true proportion of uninsured citizens is 10% and 11%.

R codes:

1.b. Test statistics:

```
> zi=(0.56-0.50)/sqrt(0.50*(1-0.50)/360)
> zi
[1] 2.27684
> zii=(0.56-0.50)/sqrt(0.50*(1-0.50)/360)
> zii
[1] 2.27684
> ziii=(0.35-0.37)/sqrt(0.37*(1-0.37)/1200)
> ziii
[1] -1.434992
```

1.c P-value

```
prop.test(x=0.56,n=360,p=0.50,alternative="greater", conf.level=0.95, correct=FALSE)
prop.test(x=0.56,n=360,p=0.50,alternative="two.sided", conf.level=0.95, correct=FALSE)
prop.test(x=0.35,n=1200,p=0.37,alternative="less", conf.level=0.95, correct=FALSE)
```

1.d Critical Value

```
alpha=0.05
zi.alpha=qnorm(1-alpha)
zii.alpha=qnorm(1-alpha/2)
ziii.alpha=qnorm(alpha)#negative
zi.alpha
zii.alpha
ziii.alpha
```

1.e. Confidence Interval

```
zi=1.644854*(0.50*(1-0.50))/sqrt(360)
zii=1.959964*(0.50*(1-0.50))/sqrt(360)
ziii=1.644*(0.37*(1-0.37))/sqrt(1200)
zciupper=0.56 + zi
zcilower=0.56 - zi

zciiupper=0.56 + zii
zciilower=0.56 - zii

zciiiupper=0.35 + ziii
zciiilower=0.35 - ziii
```

2.b Test statistic
z2=(0.81-0.90)/sqrt(0.90*(1-0.90)/850)

2.c P-value
prop.test(x=0.81,n=850,p=0.90,alternative="less", conf.level=0.99, correct=FALSE)

2.d Critical Value
z2c.alpha=qnorm(alpha)#negative

2e Confidence Interval
e=ziii-2.346*(0.90*(1-0.90))/sqrt(850)
zciupper=0.81 + ziii
zcilower=0.81 - ziii

3.b Test Statistic
3.bzi=(0.7489-0.72)/sqrt(0.72*(1-0.72)/900)
3.c P-value
prop.test(x=0.748,n=900,p=0.72,alternative="greater", conf.level=0.95, correct=FALSE)
3.d Critical value
zi.alpha=qnorm(1-alpha)
3.e Confidence Interval
ziii=1.644854*(0.72*(1-0.72))/sqrt(900)
zciupper=0.748 + ziii
zcilower=0.748 - ziii