

# Report Appendices for:

*Key Findings about NDQuits*

*In fiscal year 2020 (July 1, 2019-June 30, 2020)*



## *Appendix List:*

- *Reference Appendix (p. 24)*
- *Table Appendix (p. 34)*
- *Methods Appendix (p. 39)*

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## Reference Appendix

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This appendix contains supplementary metrics to facilitate comparison to past reports or provide full breakdowns of some metrics cited in the report. This section should not be used in isolation, as key findings on each topic are included in the main body and not repeated here. The appendix is structured by the following evaluation questions, which were at the heart of the inquiry for this report:

1. What were the program **quit** outcomes?
2. To what extent were participants **satisfied** with NDQuits?
3. What is the **cost-benefit** of the NDQuits program?
4. How many people does **NDQuits serve**?
5. How many **referrals** does NDQuits receive?
6. **What services** did participants use?
7. To what extent was **NRT** provided and used?
8. **Who** is using NDQuits?
9. What are **patterns in tobacco and ENDS use** among participants?

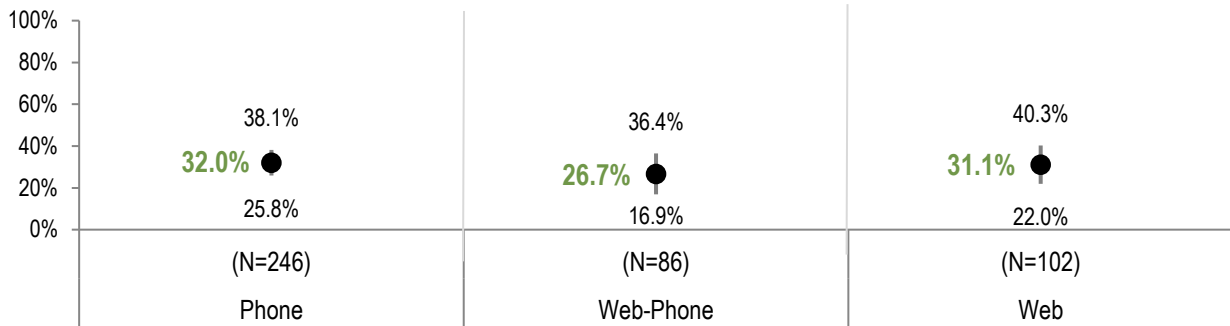
### 1. What were the program quit outcomes?

- **80.5%** of eligible participants (N=2,734) consented to be contacted for the follow-up survey, meeting the 80% NAQC benchmark.
- Certain groups were **more likely to respond to the survey than others**. See summary below and details in the Methods Appendix. These categories found no statistically significant differences in quit rates. However, they still likely mean that the quit rates included here are inflated due to response bias.

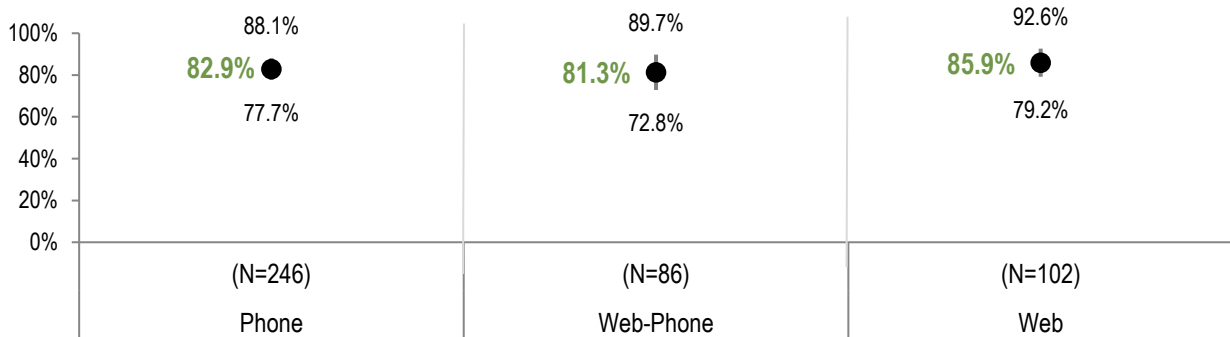
NDQuits survey respondents tend to differ in the following ways from all NDQuits participants:

- More likely to enroll in the Phone program
- Older at intake
- More likely to have Medicare or private insurance and less likely to be uninsured at intake
- Less nicotine-dependent at intake
- More likely to have received evidence-based treatments (NRT or phone counseling) or text messaging from NDQuits

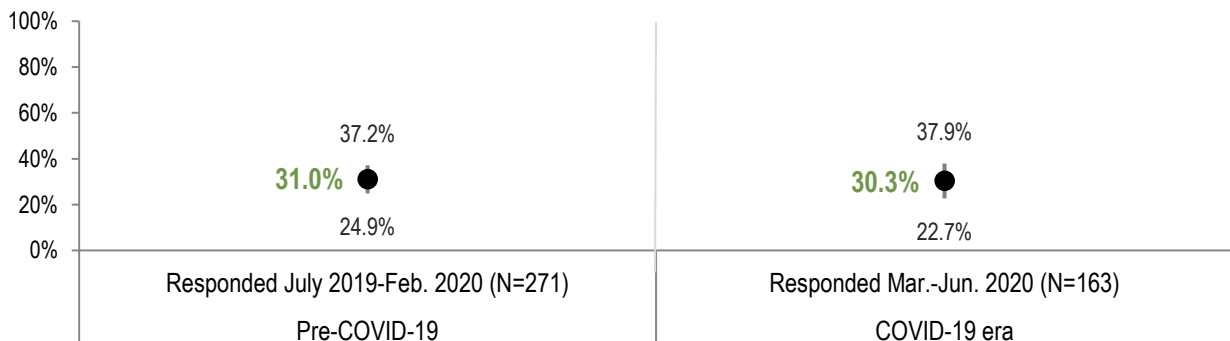
- In recent years, PDA had calculated two types of quit rates: NAQC (which includes only individuals receiving NRT or phone counseling) and basic (which also included individuals who logged in to the web program). Given the similarity between the rates and the relatively low rate of web use, this year we moved towards NAQC rates only as those are the standard among quitlines. Basic rates can be calculated upon request.
- 30-day abstinence was similar by the program, **lower among Web-Phone participants.**



- 24-hour quit rates were similar by the program, **highest among Web participants.**



- 30-day abstinence did **not appear to change once the COVID-19 pandemic began.**

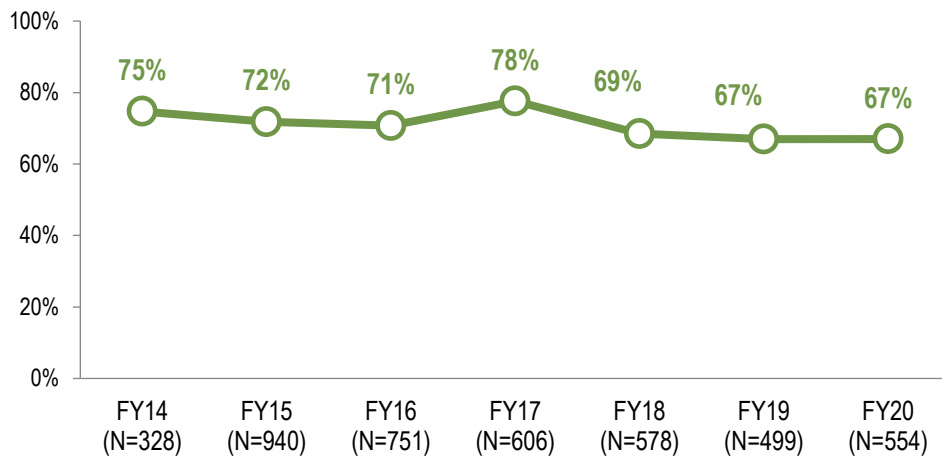


- 30-day abstinence did **not significantly differ between individuals with or without a behavioral health (BH) condition.**

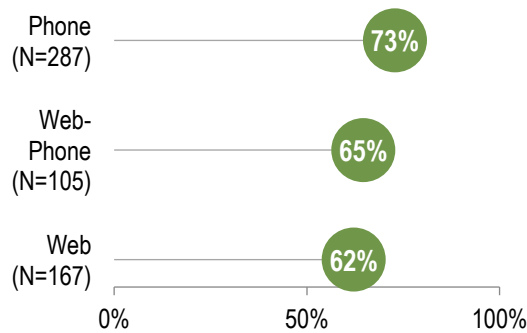


## 2. To what extent were participants satisfied with NDQuits?

- Overall satisfaction was **similar to last year, lower than previous years.**



- Phone participants showed the highest satisfaction.**



- Satisfaction was **higher among enrollees receiving minimal treatment: 73%** (among N=451) versus 39% among those who did not receive minimal treatment (N=103).
- Five-year satisfaction rates among priority populations (similar to the quit rates shown on page 7) were **similar to overall satisfaction**. Overall satisfaction for this period was **70.7%** (among N=2,948; 95% confidence interval 69.0%-72.3%). Looking at individuals with the following priority population characteristics, we saw the following satisfaction rates (note these categories are not mutually exclusive):
  - 18-24-years-old (N=177) **68.4%** (61.4% - 75.3%)
  - American Indian / Alaska Native (N=137) **73.7%** (66.3% - 81.2%)
  - Insured by Medicaid (N=398) **70.1%** (65.6% - 74.6%)
  - LGBTQ (N=118) **65.3%** (56.5% - 74.0%)
  - Uses smokeless tobacco (N=328) **69.8%** (62.4% - 74.8%)

### 3. What is the cost-benefit of the NDQuits program?

*Key findings and an overall summary of this analysis are included in the main body of the report, while the full calculations can be found in the Methods Appendix.*

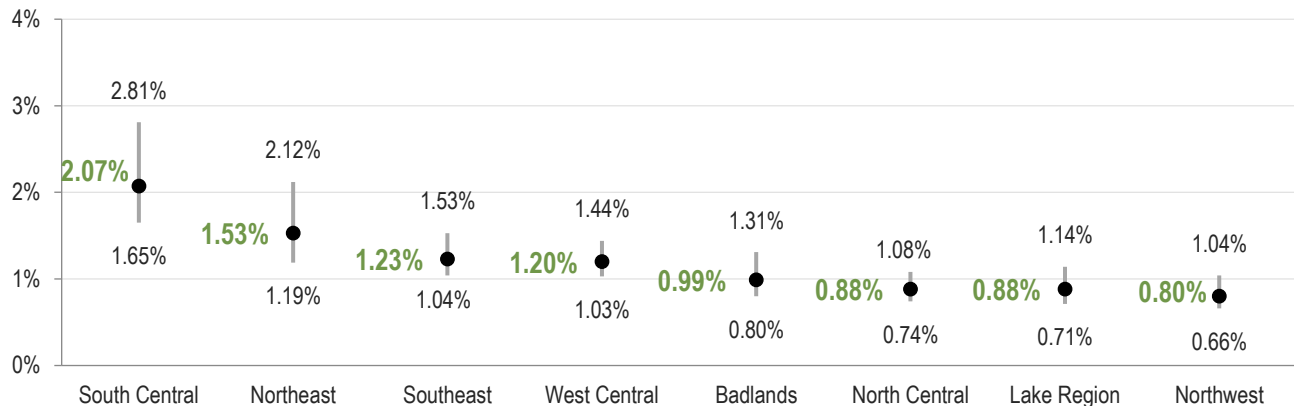
### 4. How many people does NDQuits serve?

- An initial look at surveys conducted in **September 2020 through January 2021** with individuals who enrolled February – May 2020 showed that:
  - **45% of individuals reported the COVID-19 pandemic made quitting or staying quit from tobacco harder**, while **45% reported it was about the same** difficulty, and the remaining 10% reported it was easier (among N=251).
  - Among N=41 ENDS users, **59% reported quitting was about the same difficulty**, 27% reported it was harder, and 15% reported it was easier.
- For quit rates before and after the beginning of the COVID-19 pandemic, see p. 25.

- In the weeks around **Quit Week (June 15 – 21, 2020)**, weekly enrollments were as follows:

Week	NDQuits enrollments (not unique participants)
4/19/2020	40
4/26/2020	47
5/3/2020	37
5/10/2020	27
5/17/2020	34
5/24/2020	24
5/31/2020	33
6/7/2020	45
6/14/2020 (Quit Week)	58
6/21/2020	45
6/28/2020	26
7/5/2020	52
7/12/2020	45
7/19/2020	47
7/26/2020	38
8/2/2020	44
8/9/2020	55

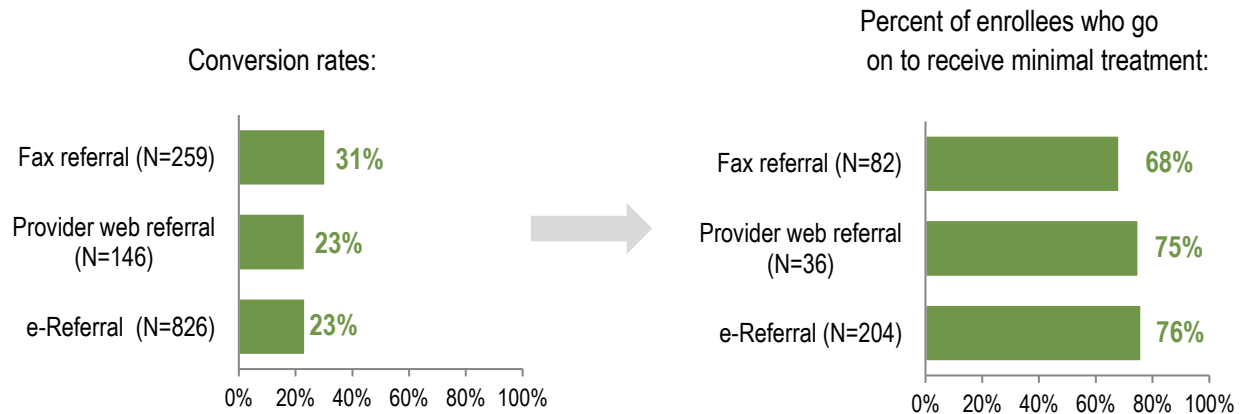
- Of N=1,016 Phone enrollees, **51% were aware of the CDC Tips** media campaign (as noted by answering “yes” to the question “In the past three months, did you hear about 1-800-QUIT-NOW from any advertisements with smokers telling personal stories and tips about living with health problems?”)
- Treatment reach varied by Human Service Region, with similar trends to past years: reach being generally **highest in eastern and southern regions**.



- Treatment reach among **smokeless tobacco users** (with or without the use of other tobacco types) was **0.33%** (0.29%-0.39%).
- Reach among individuals identifying as **American Indian / Alaska Native** was **0.97%** (0.78%-1.30%).

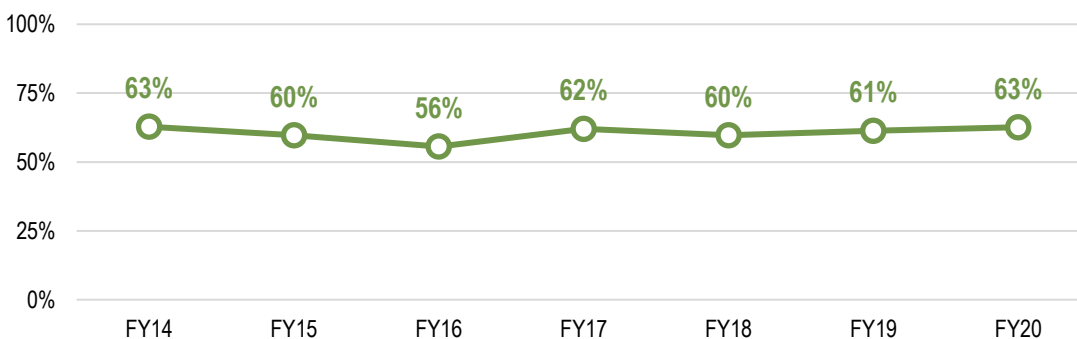
## 5. How many referrals does NDQuits receive?

- The **1,542 referrals received were for 1,318 unique tobacco users**. Conversion rates are calculated among 1,231 unique tobacco users (excluding June 2020 referrals to allow individuals time to enroll; see details in the Methods Appendix).
  - Among the 1,183 referrals by NDDoH-funded grantees, 25% went on to enroll, while among 38 referrals from other entities, 34% went on to enroll.
- Conversion rates and rates at which enrollees go on to receive minimal treatment are shown below by referral type:



## 6. What services did participants use?

- The percentage of participants receiving minimal treatment was **similar to past years**.



- **40%** of overall NDQuits participants (N=2,533) received at least one coaching call (note this includes Web participants who are not offered phone counseling; see Phone and Web-Phone program statistics in the report).
- Most participants who received at least one day of counseling received at least one shipment of NRT from NDQuits: **76%** (among N=1,024).

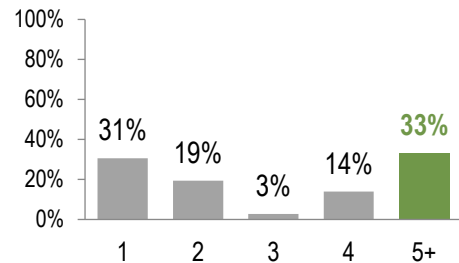


- Text message and web program use varied by program:

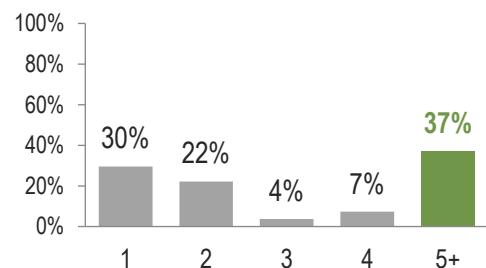
	Phone (N=1,046)	Web-Phone (N=402)	Web (N=1,085)
Received at least 1 <b>text message</b>	63%	61%	Not available
Logged in to the <b>web</b> portal	Not available	21%	40%
<b>Old calculation method</b> ; Logged in to the web portal *	Not available	46%	96%

\* For this year's analysis, PDA incorporated new information from NJH about which parts of web portal use happen during enrollment instead of after. The new calculation method more accurately reflects activity occurring after signing up rather than simply completing registration. The old calculation method is included here for comparison to past reports only.

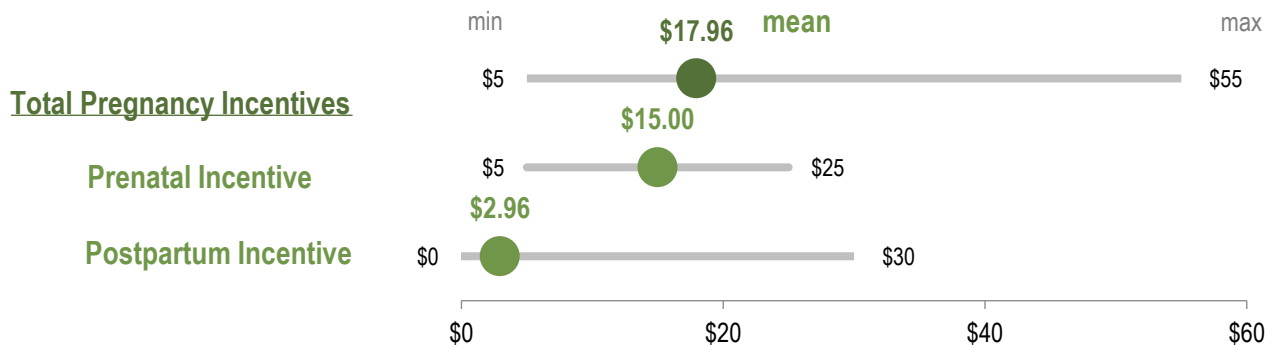
- On average, registrants using the American Indian Commercial Tobacco Program (AICTP) who engaged in counseling (N=36) received **3.5** coaching calls, with a **median of 2.5** coaching calls (see distribution of number of calls to right).



- Individuals in the Pregnancy Postpartum Protocol (PPP) who received a counseling call (N=27) received an average of **3.3 calls**, with a median of **2.0**. See full distribution of number of calls to the right.



- PPP registrants receive incentives: \$5 for each of the first five prenatal coaching calls and \$10 for each of the first four postpartum calls, for a total of up to \$65 per participant. While there could be some occasions these are not distributed, the estimated figures below assume they are distributed according to that structure.

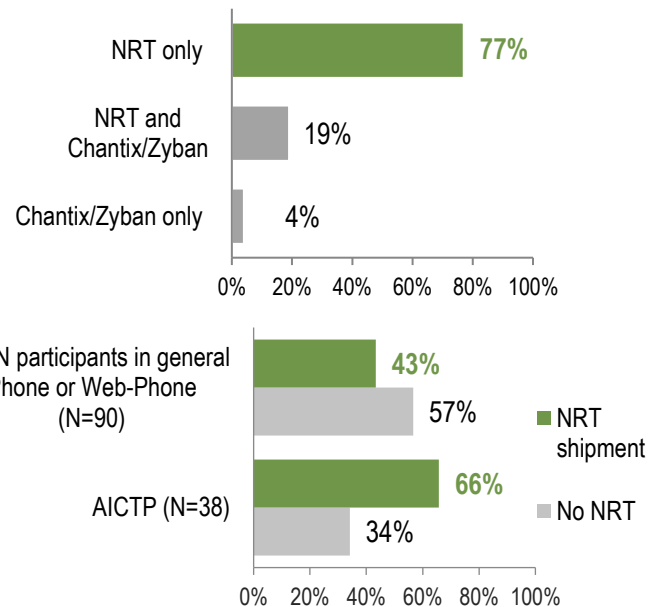


Among the N=27 PPP participants receiving calls, the **mean total payout was \$17.96**, of which only a very small part came postpartum.



## 7. To what extent was NRT provided and used?

- Most participants shipped NRT **received one shipment** (63% of N=1,343).
- Among follow-up survey participants who reported use of any quitting medication (N=464), most reported **use of NRT only**, not Chantix/Zyban (see figure to the right).
- **AICTP participants received NRT at higher rates** than American Indian/Alaska Native individuals who did not elect to enroll (Phone or Web-Phone participants only, see chart to the right).
- Two-thirds of those **expecting to receive free NRT** (total of N=392, as reported at the follow-up survey) from NDQuits did (based on utilization data). Among those not expecting to receive free NRT, 60% did (out of N=162).
- At the follow-up survey, among N=394 individuals who received NRT, **76% reported the process was very easy**, 17% reported it was somewhat easy, 6% reported it was somewhat difficult, and 1% reported it was very difficult.
  - **5% said they had received confusing information** about how to get NRT (among N=388)
- Among those **who reported not having received NRT** from NDQuits (N=173):
  - 23% reported the program never sent NRT
  - 10% reported it was because they couldn't figure out how to order NRT
  - 7% reported it was because they did not want to use NRT
  - 7% reported they had health insurance and were told to access NRT through it
  - 5% reported it was too confusing to order NRT
  - 4% reported they already had cessation medication to use
  - 3% reported they had to get permission from their doctor
  - 2% reported they received too much conflicting information



- 2% reported they decided not to quit
- 1% reported they wanted to use a medication not available through NDQuits

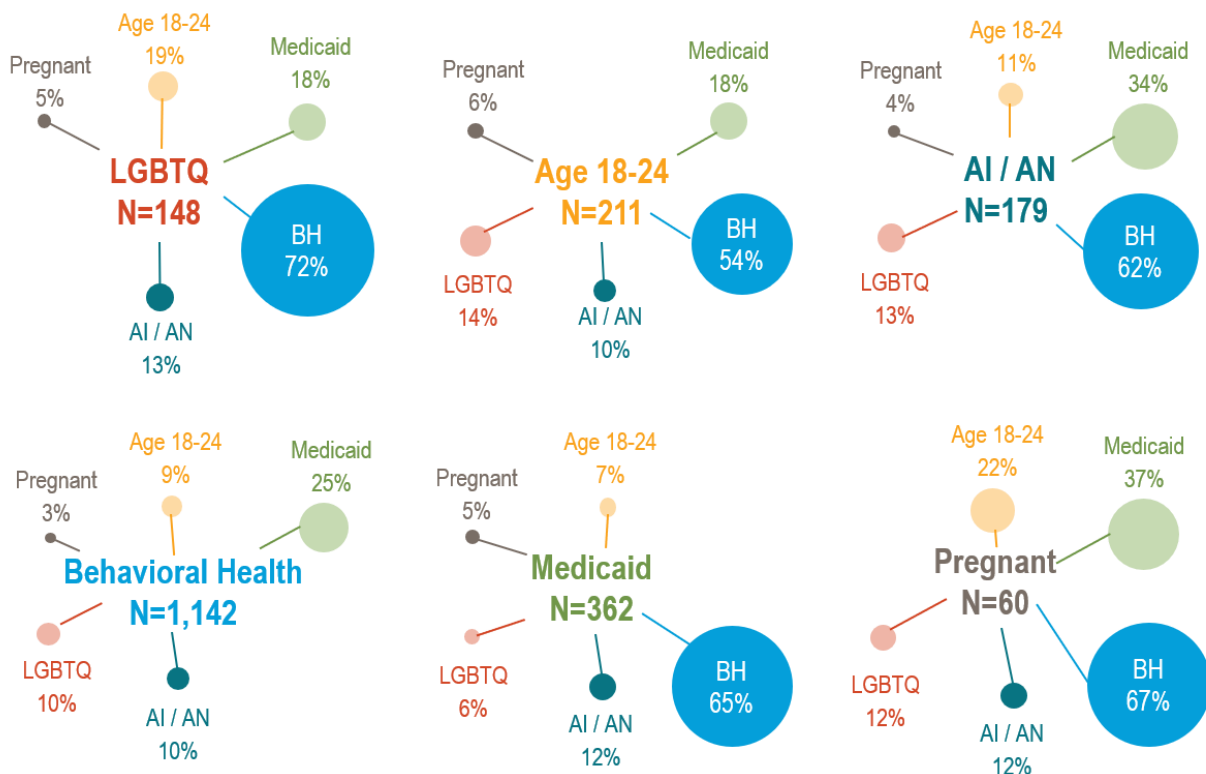
## 8. Who is using NDQuits?

Key findings of this analysis are included in the main body of the report, while the full table of participant characteristics (including by program) can be found in the Table Appendix.

The figure below provides a further look at the overlap between priority populations (as described on page 17 of the report) by demonstrating what percent of participants in each priority population listed also identify as belonging to each of the other populations. This figure does not provide information on overlap of more than two identities. It is intended to serve as a starting point to consider NDQuits recruitment, intervention, and evaluation strategies.

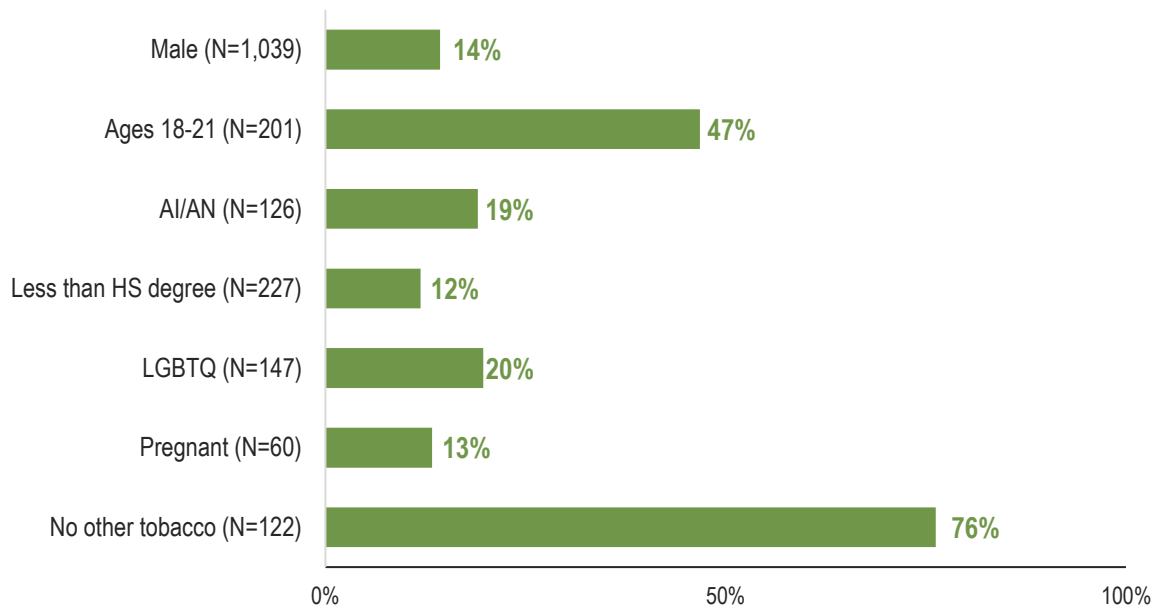
Some key findings of this information (which also provide an understanding of how to read the figure) include:

- Among **18-24-year-olds**, **14% identify as LGBTQ**.
- Among participants who identify as **LGBTQ**, **72% have a behavioral health condition**.
- Among **pregnant** participants, **22% are 18-24-year-old**.
- There is a higher proportion of participants with **Medicaid** among **pregnant** participants and among participants who identify as **American Indian or Alaska Native**.

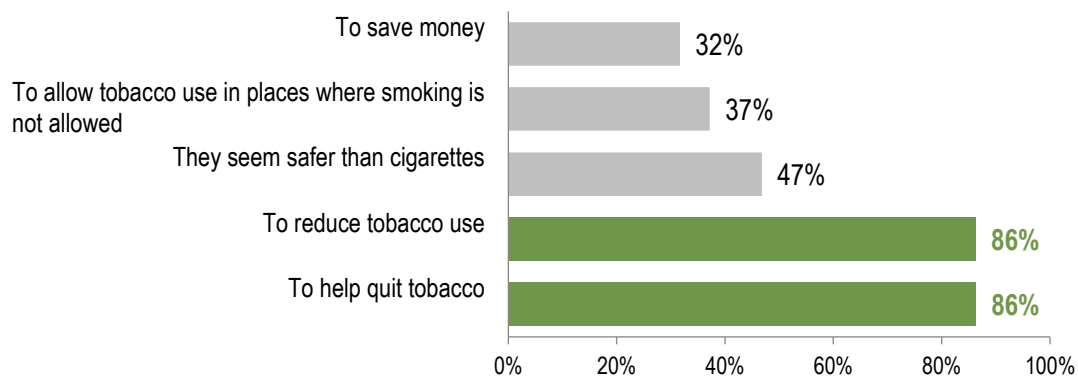


## 9. What are patterns in tobacco and ENDS use among participants?

- At intake, some priority populations reported **higher levels of recent ENDS use** (in the last 30 days) than the overall 14% rate, and **others lower**. The chart below shows the percent of each of the following groups who reported using ENDS at intake (for example, among male registrants, 14% reported using ENDS in the last 30 days when they enrolled in the program). Note that the categories are not mutually exclusive.



- Among follow-up survey respondents using ENDS (N=86), **86% reported they were using ENDS to help them quit tobacco**, and the same proportion reported using it to reduce their tobacco use. See the full list of reasons below.



## Table Appendix

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This appendix contains two sections:

1. Comparing NDQuits participants in **FY20 to FY19 participants** (FY20 representing fiscal year 2020, July 1, 2019-June 30, 2020, and FY19 representing the year before that).
2. Comparing NDQuits participants **across program** (Web-Phone, Phone, and Web) as well as to **statewide statistics** from the ATS or BRFSS.

In each section, individual characteristics and tobacco use characteristics are included. Specific differences are flagged in each section and summarized here:

- Comparing FY20 to FY19, any categories for which the proportion of NDQuits participants changed by 2% or more are flagged. These include that in FY20, compared to the previous year, **NDQuits served a higher percentage of:**
  - Participants **with insurance**
  - **Medicare** beneficiaries
  - Participants using **ENDS**
  - Those who had **attempted to quit 3 to 4 times** prior to enrolling in the program

It is notable that **given the overall decrease in enrollments, almost every category showed lower absolute numbers** in FY20 than in FY19.

- Comparing NDQuits participants to all tobacco users in North Dakota, any categories for which the proportions differ by 5% or more are flagged, meaning that group is either over- or underrepresented within NDQuits participants. **Compared to all tobacco users in North Dakota, NDQuits participants:**
  - Are more likely to be **female**
  - Report **higher levels of education**
  - Are more likely to be **uninsured**
  - Report **higher use of cigarettes only**, and **lower use of: more than one** tobacco type, **smokeless tobacco** only, and **ENDS with 1+ type** of tobacco
  - Report **higher levels of addiction to cigarettes**, including smoking more per day and smoking earlier after waking
  - Report **lower levels of ENDS use**

## Comparison of NDQuits in FY19 & FY20

▲ ▼ Arrows flag categories where the proportion changed by 2% or more. (Note generally we would flag 5% or higher, but proportions were quite consistent between the years; these changes of 2% may or may not be practically meaningful.)

### Participant characteristics in FY19 & FY20

Item	Response	FY19 (N=3,029)		FY20 (N=2,533)		Change in %
		N	%	N	%	
Gender	Female	1,686	56.4%	1,405	56.4%	0.0
	Male	1,301	43.6%	1,084	43.6%	0.0
Age	18-24	222	7.3%	211	8.3%	1.0
	25-34	822	27.1%	658	26.0%	-1.1
	35-44	694	22.9%	575	22.7%	-0.2
	45-54	492	16.2%	443	17.5%	1.3
	55-64	534	17.6%	406	16.0%	-1.6
	65+	265	8.7%	240	9.5%	0.8
Education level attained	Less than high school	269	9.2%	234	9.5%	0.3
	High school grad or GED	1,042	35.6%	857	34.9%	-0.7
	Some college / technical school	990	33.8%	850	34.6%	0.8
	College graduate	625	21.4%	516	21.0%	-0.4
Race	White	2,566	88.8%	2,115	87.3%	-1.5
	American Indian / Alaskan Native	155	5.4%	128	5.3%	-0.1
	Black or African American	63	2.2%	65	2.7%	0.5
	Other (Multiple, Asian, NHPI, Other)	105	3.6%	116	4.8%	1.2
Hispanic/Latino*	No	1,577	95.6%	1,356	95.8%	0.2
	Yes	73	4.4%	59	4.2%	-0.2
LGBTQ	Yes	134	4.7%	148	6.2%	1.5
	No	2,716	95.3%	2,242	93.8%	-1.5
Pregnant**	No	2,955	97.6%	2,473	97.6%	0.0
	Yes	74	2.4%	60	2.4%	0.0
Health insurance	No	660	28.4%	527	25.8%	▼ -2.6
	Yes	1,668	71.6%	1,512	74.2%	▲ 2.6
Health insurance type***	Uninsured	660	28.6%	527	26.3%	▼ -2.3
	Private	716	31.1%	601	30.0%	-1.1
	Medicaid	430	18.7%	362	18.1%	-0.6
	Medicare	332	14.4%	344	17.2%	▲ 2.8
	Other (IHS, Military, Other)	167	7.2%	167	8.3%	1.1

\* Hispanic/Latino ethnicity is only asked of participants who complete Phone registration, missing 44% of data in FY20.

\*\* Pregnancy here is reported out of all enrollees (regardless of gender/age). If they did not answer the pregnancy question, we are assuming they are not pregnant.

\*\*\* Health insurance type is not asked consistently on Web registration, missing 21% of data in FY20.

▲ ▼ Arrows flag categories where the proportion changed by 2% or more. (Note generally we would flag 5% or higher, but proportions were quite consistent between the years; these changes of 2% may or may not be practically meaningful.)

### Participant tobacco use characteristics in FY19 & FY20

Item	Response	FY19 (N=2,816)		FY20 (N=2,403)		Change in %
		N	%	N	%	
Tobacco type and ENDS use	Cigarettes only	2,194	77.9%	1,832	76.2%	-1.7%
	Smokeless tobacco only	166	5.9%	112	4.7%	-1.2%
	Other only (cigars, pipe, other)	23	0.8%	25	1.0%	0.2%
	More than one tobacco type	114	4.0%	104	4.3%	0.3%
	ENDS only	29	1.0%	93	3.9%	▲ 2.9%
	ENDS and 1+ type of tobacco	290	10.3%	237	9.9%	-0.4%
Cigarette use frequency (among cigarette smokers)	Every day	2,415	94.4%	1,983	94.1%	-0.3%
	Some days	84	3.3%	81	3.8%	0.5%
	Not at all	60	2.3%	43	2.0%	-0.3%
Cigarettes per day (among cigarette smokers)	1-9	378	14.5%	329	15.6%	1.1%
	10-19	943	36.2%	749	35.4%	-0.8%
	20 or more	1,285	49.3%	1,036	49.0%	-0.3%
Time to first cigarette after waking (among cigarette smokers)	Within five minutes	1,073	43.0%	851	41.4%	-1.6%
	6 to 30 minutes	899	36.0%	778	37.8%	1.8%
	31 to 60 minutes	311	12.5%	256	12.5%	0.0%
	More than 60 minutes	212	8.5%	171	8.3%	-0.2%
Smokeless use frequency (among smokeless users)	Every day	215	76.5%	162	73.6%	▼ -2.9%
	Some days	60	21.4%	53	24.1%	▲ 2.7%
	Not at all	6	2.1%	5	2.3%	0.2%
Times you have tried to quit	None	307	10.9%	223	9.4%	-1.5%
	1 to 2	976	34.5%	852	35.8%	1.3%
	3 to 4	728	25.8%	662	27.8%	▲ 2.0%
	5 to 6	367	13.0%	301	12.7%	-0.3%
	7 to 8	96	3.4%	65	2.7%	-0.7%
	9 to 10	89	3.1%	70	2.9%	-0.2%
	11 or more	264	9.3%	205	8.6%	-0.7%
ENDS use	No	2,531	88.8%	2,102	86.4%	▼ -2.4%
	Yes	319	11.2%	330	13.6%	▲ 2.4%

## Comparison of NDQuits participants to North Dakota tobacco users

▲ ▼ Arrows flag categories where the proportions differ by 5% or more.

### Individual characteristics

Item	Response	NDQuits Jul 2019 - Jun 2020				All ND BRFSS 2019 (N=1,181) or ND ATS 2019 (N=391) %	NDQuits vs. ND Difference
		Web-Phone (N=402) %	Phone (N=1,046) %	Web (N=1,085) %	Overall (N=2,533) %		
Gender	Female	66.4%	51.8%	57.2%	56.4%	37.1%	▲ 19.3
	Male	33.6%	48.2%	42.8%	43.6%	62.9%	▼ -19.3
Age	18-24	8.5%	4.2%	12.3%	8.3%	15.3%	▼ -7.0
	25-34	24.9%	17.9%	34.2%	26.0%	25.5%	0.5
	35-44	24.1%	16.8%	27.8%	22.7%	17.7%	▲ 5.0
	45-54	18.4%	18.9%	15.8%	17.5%	13.7%	3.8
	55-64	16.9%	24.7%	7.4%	16.0%	15.7%	0.3
	65+	7.2%	17.5%	2.6%	9.5%	12.1%	-2.6
Education level attained	Less than high school	9.6%	13.9%	5.1%	9.5%	11.6%	-2.1
	High school grad or GED	32.2%	40.2%	30.5%	34.9%	34.4%	0.5
	Some college / technical school	36.5%	28.8%	39.8%	34.6%	41.6%	▼ -7.0
	College graduate	21.8%	17.1%	24.6%	21.0%	12.4%	▲ 8.6
Race	White	86.9%	83.7%	91.0%	87.3%	87.6%	-0.3
	American Indian / Alaskan Native	5.9%	6.5%	3.8%	5.3%	7.8%	-2.5
	Black or African American	1.8%	4.1%	1.6%	2.7%	1.4%	1.3
	Other (Multiple, Asian, NHPI, Other)	5.4%	5.8%	3.6%	4.8%	3.2%	1.6
Hispanic/Latino*	No	96.1%	96.9%	83.3%	95.8%	95.9%	-0.1
	Yes	3.9%	3.1%	16.7%	4.2%	4.1%	0.1
LGBTQ	Yes	6.8%	4.9%	7.3%	6.2%	6.9%	-0.7
	No	93.2%	95.1%	92.7%	93.8%	93.1%	0.7
Pregnant**	No	95.3%	97.6%	98.5%	97.6%	98.9% **	-1.3
	Yes	4.7%	2.4%	1.5%	2.4%	1.1% **	1.3
Health Insurance	No	20.1%	16.3%	42.2%	25.8%	12.2%	▲ 13.6
	Yes	79.9%	83.7%	57.8%	74.2%	87.8%	▼ -13.6
Health Insurance Type***	Uninsured	20.2%	16.4%	44.1%	26.3%	-	N/A
	Private	29.3%	25.8%	36.7%	30.0%	-	N/A
	Medicaid	24.0%	21.8%	9.8%	18.1%	-	N/A
	Medicare	15.5%	27.5%	2.5%	17.2%	-	N/A
	Other (IHS, Military, Other)	11.0%	8.5%	6.8%	8.3%	-	N/A

\*Hispanic/Latino ethnicity is only asked of participants who complete Phone registration, missing 44% of data.

\*\*Pregnancy here is reported out of all NDQuits enrollees (regardless of gender/age). If they did not answer the pregnancy question, we are assuming they are not pregnant. See bottom of following page for information on the statewide pregnancy estimate, which uses additional data.

\*\*\*Health insurance type is not asked consistently on Web registration, missing 21% of data.



▲ ▼ Arrows flag categories where the proportions differ by 5% or more.

### Tobacco use characteristics

Item	Response	NDQuits Jul 2019 - Jun 2020				All ND ATS 2019 (N=391) %	NDQuits vs. ND Difference
		Web-Phone (N=386) %	Phone (N=1,022) %	Web (N=995) %	Overall (N=2,403) %		
Tobacco type and ENDS use*	Cigarettes only	79.0%	81.2%	70.1%	76.2%	41.4%	▲ 34.8
	Smokeless tobacco only	2.8%	3.2%	6.8%	4.7%	11.6%	▼ -6.9
	Other only (cigars, pipe, other)	0.3%	1.8%	0.6%	1.0%	5.1%	-4.1
	More than one tobacco type	4.1%	5.3%	3.4%	4.3%	20.1%	▼ -15.8
	ENDS only	2.8%	2.1%	6.1%	3.9%	7.0%	-3.1
	ENDS and 1+ type of tobacco	10.9%	6.5%	13.0%	9.9%	14.9%	▼ -5.0
Cigarette use frequency (among cigarette smokers)	Every day	93.9%	92.9%	95.7%	94.1%	-	N/A
	Some days	3.9%	3.5%	4.3%	3.8%	-	N/A
	Not at all	2.2%	3.7%	0.0%	2.0%	-	N/A
Cigarettes per day (among cigarette smokers)	1-9	13.5%	16.1%	15.8%	15.6%	17.2%	-1.6
	10-19	38.3%	29.9%	40.2%	35.4%	50.4%	▼ -15.0
	20 or more	48.2%	54.0%	44.0%	49.0%	32.4%	▲ 16.6
Time to first cigarette after waking (among cigarette smokers)	Within five minutes	42.7%	41.2%	41.0%	41.4%	17.4%	▲ 24.0
	6 to 30 minutes	38.7%	37.7%	37.6%	37.8%	27.7%	▲ 10.1
	31 to 60 minutes	10.8%	11.0%	14.9%	12.5%	18.4%	▼ -5.9
	More than 60 minutes	7.7%	10.1%	6.6%	8.3%	36.5%	▼ -28.2
Smokeless use frequency (among smokeless users)	Every day	60.0%	67.5%	81.8%	73.6%	-	N/A
	Some days	36.7%	27.5%	18.2%	24.1%	-	N/A
	Not at all	3.3%	5.0%	0.0%	2.3%	-	N/A
Times you have tried to quit	None	9.0%	9.1%	9.8%	9.4%	-	N/A
	1 to 2	29.6%	35.1%	39.2%	35.8%	-	N/A
	3 to 4	26.8%	25.6%	30.8%	27.8%	-	N/A
	5 to 6	11.3%	13.8%	11.9%	12.7%	-	N/A
	7 to 8	4.4%	2.4%	2.4%	2.7%	-	N/A
	9 to 10	5.4%	3.4%	1.4%	2.9%	-	N/A
	11 or more	13.4%	10.6%	4.4%	8.6%	-	N/A
ENDS use**	No	86.3%	91.6%	81.1%	86.4%	78.2%	▲ 8.2
	Yes	13.7%	8.4%	18.9%	13.6%	21.8%	▼ -8.2

\*ATS data included if respondent reported ENDS use or tobacco use.

\*\*The e-cigarette question for the NDQuits intake form (Have you used an e-cigarette or other electronic vaping product in the past 30 days?) is different than the ATS, which asks about e-cigarette use frequency (what is reported is currently "every day" or "some days").

Estimate of pregnant tobacco users in ND: There were 1,099 ND resident births to individuals who smoked at any time during pregnancy (Vital Statistics data) / 98,921 cigarette smokers in ND (see Reach calculations) = 1.1%. Limitations are that this does not include individuals who miscarry, only counts cigarette smokers, and uses a different question (any smoking in pregnancy versus past 30 day use).

## Methods Appendix

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Since 2012, Professional Data Analysts (PDA) has been contracted by the North Dakota Department of Health (NDDoH) to evaluate NDQuits. PDA has a long history of evaluating state quitline programs in the United States and has written a white paper for the North American Quitline Consortium (NAQC) on how to calculate quit rates. This evaluation aims are to provide ongoing monitoring and data about the service quality of NDQuits and assess the effectiveness of this program in supporting North Dakota residents to quit tobacco.

This report presents several measures of program use and quality provided to the NDDoH on an annual basis to evaluate the NDQuits program. These analyses answer the following evaluation questions:

1. What were the program **quit** outcomes?
2. To what extent were participants **satisfied** with NDQuits?
3. What is the **cost-benefit** of the NDQuits program?
4. **What services** did participants use?
5. To what extent was **NRT** provided and used?
6. How many people does **NDQuits serve**?
7. How many **referrals** does NDQuits receive?
8. **Who** is using NDQuits?
9. What are **patterns in tobacco and ENDS use** among participants?

This appendix provides further detail on the following topics:

- **Data sources**
  1. Referral
  2. Registration/intake
  3. Utilization
  4. Follow-up survey
  5. Surveillance: ATS
  6. Surveillance: BRFSS
- **Evaluation and analysis methods**
  - Treatment reach calculations
  - Follow-up survey analysis
  - Cost-benefit analysis

## Data sources

The data in this report come primarily from six datasets. Each of these are described in further detail in this section.

### 1. Referral

**Background:** NJH tracks all incoming referrals of tobacco users by providers (through fax, e-referral, or provider web referral) to NDQuits in the Referral Detail Extracts.

**Timeline:** Data in this report is for referrals in the first 11 months of FY20: July 1, 2019 - May 31, 2020. Note this is to allow the calculation of conversion rates (analyzing what percentage of referrals go on to enroll in NDQuits) using enrollments for the full FY20, with each individual having at least a month to enroll potentially.

**Uses in this report include:** Referral and conversion rate section.

### 2. Registration/intake

**Background:** Registration data (sometimes called intake data) is collected when someone registers for NDQuits, either via web or phone. It is collected by NJH.

**Timeline:** Data in this report is for all NDQuits intakes in FY20: July 1, 2019 – June 30, 2020.

**Contents include:** Participant characteristics, tobacco use, consent to follow-up.

**Uses in this report include:** Referrals, enrollees, demographics, and tobacco use.

It is important to note that data from intake can be used at either the enrollment or unique participant level. A participant could have more than one enrollment within FY20, and a relatively small number of participants did so. Data used in this report is generally at the unique participant level rather than the enrollment level.

The table below describes attrition between overall enrollments, unique participants, and unique participants who received NAQC-defined minimal treatment. Note that this report sometimes uses the term “tobacco user” to indicate someone enrolling in NDQuits seeking treatment, though they may also be an ENDS user. Also, 23 youth enrolled in NDQuits this year; they are mentioned in the report but not included in any analyses due to not being covered under PDA’s current IRB.

### FY20 intake dataset attrition table

	Phone	Web-Phone	Web	Total
Enrollments (tobacco users requesting services)	1,099	423	1,116	2,638
Unique participants (unique, adult tobacco users requesting services)	1,046	402	1,085	2,533
Unique participants receiving NAQC minimal treatment (unique, adult tobacco users receiving a counseling call or NRT)	795	243	547	1,585

### 3. Utilization

**Background:** Utilization data is recorded by NJH and by UND on an ongoing basis when someone uses a particular aspect of the program.

**Timeline:** Data in this report is for FY20, with one extra month appended to allow time for all registrants to accrue at least one month of utilization; thus, this period is July 1, 2019 – July 31, 2020.

**Contents include:** Documentation of the number of calls, web use, text messages, and NRT shipments.

**Uses in this report include:** Minimal treatment, reach, utilization, and NRT receipt.

### 4. Follow-up survey

**Background:** The Wyoming Survey & Analysis Center (WYSAC) conducts a follow-up survey to gather feedback and information about current tobacco and ENDS use from NDQuits enrollees seven months after they enroll.

**Timeline:** Data in this report are from surveys conducted in FY20: July 1, 2019 – June 30, 2020, meaning respondents had enrolled in NDQuits in the period December 1, 2018 – November 30, 2019 (though note there are references in the report to survey responses from two other time periods: FY16 – FY20 for the five-year priority population quit rates, and, regarding opinions around COVID-19 and quitting, surveys conducted September 2020 – January 2021. Both of those still represent seven-month follow-up surveys.).

**Contents include:** Program satisfaction, use of NRT, quit attempts, quit behavior, and additional quitting support.

**Uses in this report include:** Outcomes (quit rates, satisfaction).

### **5. Surveillance: ATS**

The North Dakota Adult Tobacco Survey (NDATS or ATS) is a survey conducted across the state to learn about tobacco use. PDA does not conduct the ATS, but we use ATS data in this report to understand characteristics of all tobacco users in North Dakota and as a point of comparison to understand how NDQuits participants do and do not resemble that group.

### **6. Surveillance: BRFSS**

Similar to the ATS, the Behavioral Risk Factor Surveillance System (BRFSS) is a survey that PDA does not conduct but rather uses to understand tobacco use across North Dakota.

## Evaluation and analysis methods

Since 2012, PDA has been contracted by the NDDoH to evaluate NDQuits. The evaluation of NDQuits is one component of a comprehensive evaluation of North Dakota's Tobacco Prevention and Control Program (TPCP), and NDQuits is one of four available cessation programs. The other cessation support includes health systems grants (NDQuits Cessation program), a BABY & ME – Tobacco Free Program, and in-person cessation support provided by some of the local public health units. These other cessation programs support referrals to NDQuits.

PDA takes a utilization-focused approach to our evaluation work, meaning that we identify and work closely with the primary intended users of the evaluation deliverables to ensure the processes and products are created to address programmatic needs and the information needs of key stakeholders. Some of the key methodology is described in this section.

### Treatment reach calculations

Quitline "reach" refers to the percentage of a state's tobacco-using population that is served by a state's quitline. One type of reach is "treatment reach," a measure of the impact of the quitline. The North American Quitline Consortium (NAQC) defines treatment reach as "the proportion of the target population who receives an evidence-based treatment from a quitline."<sup>1</sup> NAQC defines the target population as all adult tobacco users in the state and evidence-based treatment, also called "minimal treatment," as phone counseling and nicotine replacement therapy (NRT). CDC's *Best Practices for Comprehensive Tobacco Control Programs*<sup>2</sup> set as a goal that quitlines should annually reach 8% of smokers. However, NAQC calculated that in FY19, among the 50 quitlines providing data to NAQC, the average treatment reach was only 1.19%.<sup>3</sup>

PDA calculated NAQC treatment reach for tobacco users overall (which includes just cigarette and smokeless tobacco users due to limitations on data availability) and for American Indian tobacco users in particular. Overall reach is further broken down by tobacco types and region.

Following NAQC recommendations, the numerator of each calculation includes individuals who at intake were over age 18 and had used tobacco in the past 30 days and who went on to receive minimal treatment (a counseling call or NRT) from NDQuits. The denominator in each calculation used BRFSS and Census data to estimate the size of that group within North Dakota overall. See more reach calculations on the following pages:

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<sup>1</sup> North American Quitline Consortium (NAQC). (2009). *Measuring Reach of Quitline Programs. Quality Improvement Initiative* (S. Cummins, PhD). Phoenix, AZ.

<sup>2</sup> Centers for Disease Control and Prevention. (2014). *Best Practices for Comprehensive Tobacco Control Programs—2014*. Atlanta: U.S. Department of Health and Human Services, CDC, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

<sup>3</sup> North American Quitline Consortium. 2019. Results from the 2019 NAQC Annual Survey of Quitlines. C. Clements Stein, editor. Available at <https://www.naquitline.org/page/2019survey>

FY20 treatment reach to North Dakota tobacco users (cigarettes or smokeless tobacco)

Region	Population (2019 Census)	Prevalence (2019 BRFSS)	North Dakota Tobacco Users	Participants (Any Program)	Reach (Any Program)	Reach (Any Program) 95% Confidence Interval	
Statewide	581,891	21.8%	126,852	1,476	1.16%	1.08%	1.26%
Statewide AI/AN (only)	31,643	36.4%	11,518	112	0.97%	0.78%	1.30%
Western Service Regions	271,202	24.4%	66,173	659	1.00%	0.90%	1.10%
Eastern Service Regions	310,689	19.1%	59,342	816	1.38%	1.22%	1.57%
1. Northwest	38,520	31.3%	12,057	97	0.80%	0.66%	1.04%
2. North Central	74,990	26.1%	19,572	172	0.88%	0.74%	1.08%
3. Lake Region	29,046	24.3%	7,058	62	0.88%	0.71%	1.14%
4. Northeast	70,679	18.3%	12,934	198	1.53%	1.19%	2.12%
5. Southeast	168,380	18.2%	30,645	378	1.23%	1.04%	1.53%
6. South Central	42,584	20.2%	8,602	178	2.07%	1.65%	2.81%
7. West Central	122,779	20.1%	24,679	295	1.20%	1.03%	1.44%
8. Badlands	34,913	27.4%	9,566	95	0.99%	0.80%	1.31%



FY20 treatment reach to North Dakota cigarette users (with or without other tobacco)

Region	Population (2019 Census)	Prevalence (2019 BRFSS)	North Dakota Tobacco Users	Participants (Any Program)	Reach (Any Program)	Reach (Any Program) 95% Confidence Interval	
Statewide	581,891	17.0%	98,921	1,416	1.43%	1.31%	1.57%
Western Service Regions	271,202	18.8%	50,986	627	1.23%	1.10%	1.39%
Eastern Service Regions	310,689	15.7%	48,778	789	1.62%	1.42%	1.90%

FY20 treatment reach to North Dakota smokeless tobacco users (with or without other tobacco)

Region	Population (2019 Census)	Prevalence (2019 BRFSS)	North Dakota Tobacco Users	Participants (Any Program)	Reach (Any Program)	Reach (Any Program) 95% Confidence Interval	
Statewide	581,891	6.7%	38,987	129	0.33%	0.29%	0.39%
Western Service Regions	271,202	7.8%	21,154	64	0.30%	0.25%	0.38%
Eastern Service Regions	310,689	4.9%	15,224	64	0.42%	0.33%	0.56%

FY20 treatment reach to North Dakota dual cigarette and smokeless users

Region	Population (2019 Census)	Prevalence (2019 BRFSS)	North Dakota Tobacco Users	Participants (Any Program)	Reach (Any Program)	Reach (Any Program) 95% Confidence Interval	
Statewide	581,891	2.0%	11,638	69	0.59%	0.47%	0.85%
Western Service Regions	271,202	2.2%	5,966	32	0.54%	0.38%	0.91%
Eastern Service Regions	310,689	1.5%	4,660	37	0.79%	0.52%	1.70%

## Follow-up survey analysis

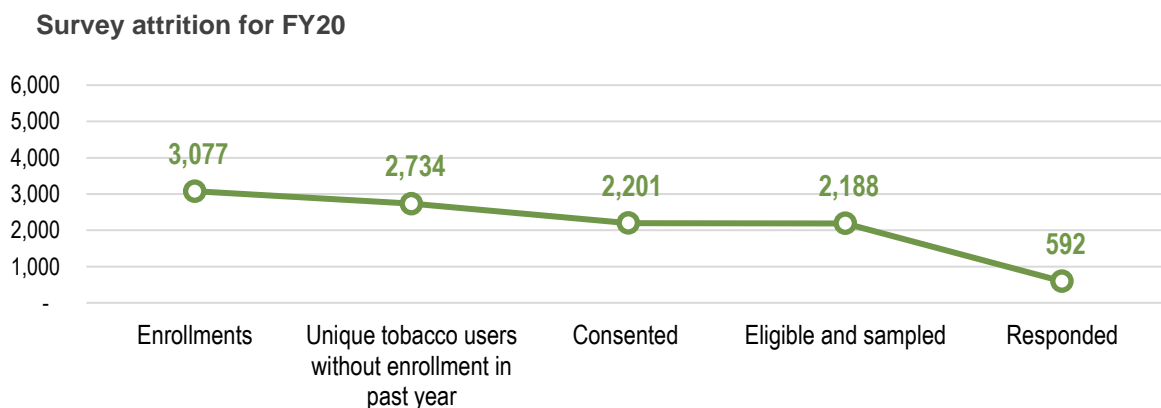
### Background

The ongoing follow-up survey of NDQuits participants is conducted with an exhaustive sample of eligible participants seven months after they enrolled. The follow-up survey includes standard questions developed by NAQC, with additional questions developed by PDA and the NDDoH. WYSAC administers the survey to all eligible participants as a mixed-mode survey (via web and phone, though separately and not concurrently). See further description of eligibility in the following section.

Once the sample is determined, WYSAC sends an email to potential respondents with a valid email address. By clicking on this email, individuals are directed to the online follow-up survey. According to WYSAC, it is also a pre-notification for the phone survey, as the pool of respondents are informed that if they do not complete a web survey, they will receive a call from WYSAC to complete the survey over the phone. The first two weeks of follow-up use the web survey only. During the second two weeks, individuals who have not completed a web survey are called and asked to take the survey via phone.

### Survey eligibility and attrition

There were 3,077 enrollments in NDQuits from December 1, 2018 – November 30, 2019. Enrollees were eligible to be sampled if it was their first enrollment in the past 12 months, if they provided consent for follow-up, if they were aged 18 years or older, lived in North Dakota, and provided a valid phone number or email address. Of the 2,734 unique tobacco users without an enrollment in the past year, 2,201 consented to follow-up (80.5%), counting missing as not consented. There were 2,188 unique people who met all of the sampling of the eligibility criteria, or 71.1% of all enrollments. NDQuits conducted an exhaustive sample of these participants. Of those sampled, 27.1% (N=592) responded to the survey. (Note this response rate **falls well below NAQC's recommended 50%**; see the following sections for more information on this.)



	Phone	Web-Phone	Web
Enrollments	1,274	494	1,309
Unique tobacco users without enrollment in the past 12 months	1,115	413	1,206
Consented (Consent rates)	1,056 (94.7%)	377 (91.3%)	768 (63.7%)
<i>Missing rates (counted as not consenting)</i>	<i>missing 0%</i>	<i>missing 4%</i>	<i>missing 12%</i>
Eligible (18+ years old, valid phone or email, lives in ND) and sampled for follow-up survey	1,053	372	763
Follow-up survey respondents (Response rates)	299 (28.4%)	111 (29.8%)	182 (23.9%)

### Weighting

By design, the sample mirrors the general population of all participants in terms of the proportion enrolled in each of the three primary programs. However, due to differing consent and response rates between the programs, survey data for the three programs combined were weighted by a program weight to more accurately reflect actual levels of the study population in each of the programs. The program weights for this report were as follows:

Program	N of Surveys	Weight
Phone	299	0.8075
Web-Phone	111	0.8057
Web	182	1.4348

To address the low response rate (27%), we used post-stratification weighting methods to weight the follow-up survey responders back to the study population based on age, education, race, and gender. This was completed using a raking macro in SAS (David Izrael, David C. Hoaglin, and Michael P. Battaglia; Abt Associates Inc., Cambridge, Massachusetts; Paper 258-25; A SAS Macro for Balancing a Weighted Sample; 2000). The final post-stratification weights are available by request. The follow-up analyses with all programs combined have a 2-level weight (program sample weight \* post-stratification weight), while the follow-up analyses by program are only weighted by the post-stratification weight. All weights were scaled back to the responder sample size for consistency (N=592).

### Response bias analysis

In order to assess the extent to which survey respondents were representative of all NDQuits participants, PDA conducted a response bias analysis, comparing survey respondent characteristics with those of non-survey respondents in the study population (unique, adult tobacco users). Differences were assessed for 14 demographic and clinical variables: program, gender, age, race, education, health insurance, LGBTQ, pregnancy, types of tobacco used, time

to first cigarette upon waking, number of cigarettes per day smoked for cigarette users, receipt of NRT, completion of a coaching call, and receipt of program text messages.

For the FY20 follow-up data cohort, the survey respondents differed in a few ways from the non-respondents (significant at the  $p < .05$  level with differences in proportion of 5% or more). Specifically, responders were more likely to be in the Phone program (and less likely to be in the Web program), be older at enrollment, have insurance (including specifically Medicare and private insurance), be less nicotine dependent (longer to first cigarette use after waking), receive NRT, complete a counseling call, and participate in the text program.

**Variables that differed significantly by response status for FY20**

▲ = This group was **more likely** to respond ▼ = This group was **less likely** to respond

			Survey respondents	Non- respondents
<b>Program</b>				
(Pearson $\chi^2(2) = 54.7724, p < .0001$ )				
	Phone	▲	50.5%	38.1%
	Web-Phone		18.8%	14.1%
	Web	▼	30.7%	47.8%
<b>Age at enrollment</b>				
(Pearson $\chi^2(5) = 52.9494, p < .0001$ )				
	18-24		6.4%	8.0%
	25-34	▼	20.8%	27.0%
	35-44	▼	17.6%	25.1%
	45-54		19.8%	16.9%
	55-64	▲	21.8%	15.7%
	65+	▲	13.7%	7.4%
<b>Health insurance</b>				
(Pearson $\chi^2(4) = 58.1930, p < .0001$ )				
	Uninsured	▼	17.1%	31.7%
	Private Insurance	▲	33.6%	27.9%
	Medicaid		18.0%	19.2%
	Medicare	▲	24.0%	13.4%
	Other		7.3%	7.9%

			Survey respondents	Non- respondents
<b>Time to first cigarette after waking (among cig. users)</b>				
(Pearson $\chi^2(1) = 20.5387, p = .0001$ )				
	Within 5 minutes	▼	33.9%	45.1%
	6 to 30 minutes	▲	41.9%	34.6%
	31 to 60 minutes		13.8%	12.4%
	More than 60 minutes		10.4%	7.9%
<b>NRT shipment</b>				
(Pearson $\chi^2(1) = 43.8887, p < .0001$ )				
	NRT shipped	▲	66.0%	50.6%
	NRT not shipped	▼	34.0%	49.4%
<b>Phone counseling</b>				
(Pearson $\chi^2(1) = 144.9461, p < .0001$ )				
	Phone counseling	▲	58.6%	31.5%
	No phone counseling	▼	41.4%	68.5%
<b>Text program</b>				
(Pearson $\chi^2(1) = 30.6170, p < .0001$ )				
	Received texts	▲	60.0%	47.0%
	No texts	▼	40.0%	53.0%

### Implications of response bias on program outcomes

Because there are several statistically significant differences in the responders versus non-responders analysis, the follow-up survey responses should be interpreted with caution. We tested those variables to see if any are associated with 30-day quit rate at follow-up.

We **did not find any statistically significant differences** (at the  $p < .05$  level), though there were three variables by which quit rates differed by over 10%, which we highlight below. Given the low response rate, we still recommend the outcomes in this report be viewed with some caution, and that results may not be entirely generalizable to the entire NDQuits population.

- By **age at enrollment**, the quit rate among 45-54-year-olds (24.79%), was over 10% below that among 65+-year-olds (39.51%).
- By **insurance type**, the Medicaid quit rate (20.93%) was over 10% below the Medicare (33.04%), Uninsured (34.15%), and Private (35.40%) rates.
- By **time to first cigarette after waking (among cigarette users)**, the quit rate among individuals who smoked in the first 6 to 30 minutes after waking (25.71%) was over 10% below those smoking more than 60 minutes after waking (36.54%).

### 30-day quit rate calculations

NAQC has developed standards for calculating quitline metrics. NAQC published a white paper in 2009, updated in 2015, regarding calculation of quit rates. Key recommendations include:

1. Following up with participants seven months after they enroll
2. Reporting responder rates
3. Excluding those who received less than minimal treatment
4. Excluding those who quit 31 days or more before intake
5. Reporting 30-day abstinence
6. Including confidence intervals

Each is discussed in greater detail below. Following that is a discussion of other quit rates referenced in this report.

*Following up with participants seven months after they enroll.* This time period was chosen because many quitlines use a four or five call intervention that takes about one month to complete. In this common case, the survey is conducted six months after the end of the program.

*Reporting responder rates.* A “responder rate” only includes those who respond to the survey, versus an “intention to treat” (ITT) rate, where all non-responders are assumed not to have quit. The latter rate is considered to be overly conservative. At the same time, the former may potentially overestimate quit rates, as those who do not respond to follow-up have been found in the literature to be still using tobacco at higher rates than respondents.

The NAQC white paper demonstrated that responder rates are likely to be at least as accurate or perhaps more accurate than ITT rates.<sup>4</sup> Therefore, NAQC recommends responder rates be used, so this report only includes responder rates.

This rate is calculated as:

$$\textbf{Responder rate} = \frac{\text{\# who reports quitting}}{\text{\# who responded to the survey}}$$

*Excluding those who received less than minimal treatment.* The rationale for excluding those with less than minimal treatment (defined as receiving a counseling call or NRT) ensures outcomes reported are those that would be expected for participants who receive treatment.

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<sup>4</sup> NAQC. (2009). *Measuring Quit Rates. Quality Improvement Initiative* (L. An, A. Betzner, M. Luxenberg, J. Rainey, T. Capesus, & E. Subialka). Phoenix, AZ, p.18.

*Excluding those who quit for 31 days or more before intake.* NAQC recommends that callers be removed if they were quit for more than 30 days at the time of enrollment since it may not be feasible to attribute someone's outcomes to the service they received if they had already been quit for an extended period of time when they first called for services.

*Reporting 30-Day abstinence.* This rate means callers have **not used** tobacco for the 30 days immediately prior to the survey. They were asked, "Have you smoked any cigarettes or used any other tobacco, even one puff or pinch, in the last 30 days?" Participants who respond "no" are considered 30-day abstinent. This is the primary outcome measure for quitlines.

*Including confidence intervals.* Tobacco cessation experts also encourage quitlines to consider using confidence intervals. A confidence interval reminds us that our results represent a *sample* of individuals. Since we sampled carefully and used rigorous procedures, we can make some inferences about all enrollees, but our inferences are not perfect. They contain some error. The confidence interval is a mechanism to calculate and demonstrate the amount of potential error in our estimates. This report uses 95% confidence intervals for quit rates as well as for reach.

#### Other quit rates

While the 30-day quit rate from tobacco described above is the primary standard outcome for a quitline, this report also references several other quit rates. These are:

*30-day quit rate for tobacco and ENDS.* Calculation of this quit rate follows the procedures described. The difference is that an individual is only considered abstinent if they did not use tobacco *or ENDS* in the 30 days prior to the follow-up survey. Therefore, this rate will always be the same or lower (never higher) than the standard 30-day tobacco-only rate.

*24-hour quit rate.* On the follow-up survey, individuals are also asked if they had ever quit using tobacco for at least 24 hours since they enrolled in the quitline. The 24-hour quit rate follows the protocols described above for the standard 30-day quit rate besides using this question as the outcome (rather than use in the past 30 days). While quitting for 24 hours does not indicate the same level of durability as quitting for (at least) 30 days, it can serve as an initial indicator of the extent to which quitline participants are engaging in quit attempts, keeping in mind that nicotine is an addictive substance and challenging to quit.

#### Priority population five-year calculations

This report also includes satisfaction and 30-day quit rates for priority populations, calculated over 5 years of data due to their small N. Besides the larger time window, these calculations follow the protocols used for these rates within NDQuits generally. Detailed information, such as the breakdown of survey responses by year, is available by request.



### **Cost-benefit analysis**

PDA calculates a cost-benefit for the NDQuits program annually. The purpose of this analysis to examine the financial benefits of this program in relation to the costs. The results of the cost benefit have consistently been that there is financial benefit to North Dakota to provide the NDQuits program. This is true even if there is a tax increase on the cost of tobacco (see the FY18 report for details).

The following tables include details of the data sources and calculation methods for each component of the cost-benefit analysis.

#### Amount of cigarette use in North Dakota

<b>Metric</b>	<b>Amount</b>	<b>Data Source/Calculation Description</b> (asterisks denote multiplication)
Total number of adult cigarette smokers	98,921	2019 Census estimate of the number of adults in North Dakota (581,891) * 2019 BRFSS weighted percent of current cigarette smokers (17.0%)
Total number of packs of cigarettes sold	44,500,000	CY2019 number of cigarettes sold in ND on the tobacco surveillance table (from the ND Tax Commission)
Average number of packs of cigarettes sold per smoker per year	450	Total # packs of cigarettes sold/Total # adult cigarette smokers
Number of quitters due to NDQuits		Number of NDQuits registrants in FY20 that were using cigarettes at enrollment (2,179) * Percent of cigarette users that quit smoking. For the percent that quit, we use two estimates – the responder quit rate, 27.2%, and, for a more conservative estimate, the lower bound of the 95% confidence interval on the responder quit rate, 23.0%.
Estimated number	593	
Conservative number	501	

### Benefits gained from cessation

Benefit Component	Total	Per Pack	Per Smoker	Data Source/Calculation Description
Health care expenditures (Adult)				Smoking Attributable Mortality, Morbidity, and Economic Costs (SAMMEC), Centers for Disease Control and Prevention (CDC). Tobacco Use Data Portal. 2009 data adjusted for inflation to 2019 dollars. ( <a href="https://chronicdata.cdc.gov/health-area/tobacco-use">https://chronicdata.cdc.gov/health-area/tobacco-use</a> , Accessed Nov 13, 2019)
Ambulatory	\$39,585,780	\$0.89	\$400.17	
Hospital care	\$220,898,430	\$4.96	\$2,233.07	
Prescription drugs	\$76,239,280	\$1.71	\$770.71	
Nursing home	\$39,585,780	\$0.89	\$400.17	
Other (includes home health care, durable & nondurable medical equipment, other professional services)	\$21,747,740	\$0.49	\$219.85	
<b>Total</b>	<b>\$398,057,010</b>	<b>\$8.95</b>	<b>\$4,023.97</b>	
Health care expenditures (Neonatal)	\$418,182	\$0.01	\$4.23	Estimate of 2019 live births in ND from NDDoH vital statistics (10,447; <a href="https://www.health.nd.gov/vital">https://www.health.nd.gov/vital</a> ) * Percent of 2019 pregnant women who smoke from NDDoH vital statistics (10.3%; <a href="https://www.health.nd.gov/sites/www/files/documents/Files/HSC/CHS/Tobacco/Tobacco_Surveillance_Data.pdf">https://www.health.nd.gov/sites/www/files/documents/Files/HSC/CHS/Tobacco/Tobacco_Surveillance_Data.pdf</a> ) * Amount in smoking attributed neonatal expenditures per maternal smoker (\$388.63 [\$279 in 2004 dollars adjusted for inflation to 2020 dollars] from Adams, et al., 2011. Infant Delivery Costs Related to Maternal Smoking: An Update. Nicotine & Tobacco Research, 13(8), 627-637. <a href="https://pdfs.semanticscholar.org/87fd/eba22b4de1c755c843567dcaf8280b0e8133.pdf">https://pdfs.semanticscholar.org/87fd/eba22b4de1c755c843567dcaf8280b0e8133.pdf</a> )
Total health care expenditures	\$398,475,192	\$8.95	\$4,028.20	Adult + Neonatal expenditures
Productivity losses	\$163,707,911	\$3.68	\$1,654.93	Number of current smokers in the work force (98,921 * 69.6% [% of NDs in work force from Census Bureau 2018 1-yr ACS]) * Bunn estimate of smoking attributable losses (\$1807 in 2006 dollars; converted to 2020 dollars: \$2,350.75)
<b>Total Benefit</b>	<b>\$562,183,102</b>	<b>\$12.63</b>	<b>\$5,683.13</b>	Health care expenditures + Productivity losses

Cost of cessation

<b>Cost Component</b>	<b>Total</b>	<b>Per Pack</b>	<b>Per Smoker</b>	<b>Data Source/Calculation Description</b>
Cessation program costs	\$1,147,816	\$0.03	\$11.60	NDQuits Budget & Media Costs as reported from NDDoH FY20
Lost tax revenue (by quit rates below)				Tax rate (\$0.44) * Estimated number of FY20 NDQuits related cigarette quitters (2179 cigarette smoker enrollments into NDQuits in FY20 * quit rate [responder rate of 27.2% or lower bound of 23.0%]) * Average number of packs sold per smoker (450, from Table 1)
<b>27.2%</b>	\$117,314	\$0.0026	\$1.19	
<b>23.0%</b>	\$99,199	\$0.0022	\$1.00	

Cost-benefit results

<b>Component</b>	<b>Current tax rate (\$0.44/pack)</b>	
	<b>Quit Rate 27.2%</b>	<b>Quit Rate 23.0%</b>
Benefits of cessation	\$3,368,320	\$2,848,212
Costs of cessation		
Cessation program	\$1,147,816	\$1,147,816
Lost tax revenue	\$117,314	\$99,199
Total cost of cessation	\$1,265,130	\$1,247,015
<b>Benefit/Cost Ratio</b>	2.66	2.28