

## HCV Testing and Care Cascade among Transgender and Gender Diverse Individuals

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**Appendix Table 1.** International Classification of Diseases, Ninth and Tenth Revision (ICD-9 and 10), Clinical Modification (ICD-9-CM; ICD-10-CM) for HCV

Code Type	Code
ICD-9	070.41
ICD-9	070.44
ICD-9	070.51
ICD-9	070.54
ICD-9	070.70
ICD-9	070.71
ICD-9	V02.62
ICD-10	B1711
ICD-10	B182
ICD-10	B1710
ICD-10	B1920
ICD-10	B1921
ICD-10	Z22.52

**Appendix Table 2.** Current Procedural Terminology (CPT) and Healthcare Common Procedure Coding System (HCPCS) Codes for HCV Tests

Code Type	Code
CPT	86803
CPT	80074
CPT	86804
HCPCS	G0472
CPT	87902
CPT	3266F
CPT	87520
CPT	87521
CPT	87522

**Appendix Table 3.** National Drug Codes (NDC) for HCV Treatment

<b>NDC Code</b>	<b>Description</b>
00004008694	Copegus
54868488800	Copegus
00003001101	Daklinza
00003021501	Daklinza
00003021301	Daklinza
61958220101	Epclusa
61958180101	Harvoni
61958180301	Harvoni
51167010003	Incivek
51167010001	Incivek
72626260101	Ledipasvir-Sofosbuvir
00527194748	Lopinavir-Ritonavir
00074262528	Mavyret
00074262580	Mavyret
00074262501	Mavyret
00074322414	Moderiba
00074328256	Moderiba
00074322456	Moderiba
00074327156	Moderiba
00074327114	Moderiba
00074323914	Moderiba
00074328214	Moderiba
00074319716	Moderiba
00074323956	Moderiba
00074663322	Norvir
00074339930	Norvir
54569617000	Norvir
00074949202	Norvir
54569565600	Norvir
54569461300	Norvir
54868378202	Norvir
54569617001	Norvir
00074333330	Norvir
00074949254	Norvir
54868378203	Norvir
35356013830	Norvir
00074663330	Norvir
54868378201	Norvir
54569433500	Norvir
54569479200	Norvir

00074194063	Norvir
54868378200	Norvir
59676022528	Olysio
00004035039	Pegasys
54868488700	Pegasys
54868488701	Pegasys
00004035009	Pegasys
00004035730	Pegasys
00004035239	Pegasys
00004036030	Pegasys Proclick
00004036530	Pegasys Proclick
00085129101	Pegintron
00085127901	Pegintron
00085435601	Pegintron
00085435501	Pegintron
00085435401	Pegintron
00085130401	Pegintron
00085435301	Pegintron
00085136801	Pegintron
00085132301	Pegintron Redipen
54868503601	Pegintron Redipen
00085137001	Pegintron Redipen
00085132302	Pegintron Redipen
00085129702	Pegintron Redipen
54868503600	Pegintron Redipen
00085131601	Pegintron Redipen
00085129701	Pegintron Redipen
00085137002	Pegintron Redipen
00085131602	Pegintron Redipen
64406001502	Plegridy
64406001601	Plegridy
64406001501	Plegridy
64406001101	Plegridy Pen
64406001201	Plegridy Pen
64406001102	Plegridy Pen
00085119403	Rebetol
54868503500	Rebetol
00085138507	Rebetol
00085132704	Rebetol
00085131801	Rebetol
00085135105	Rebetol
00085125802	Rebetron 1000
00085123602	Rebetron 1000

00085124102	Rebetron 1000
00085125801	Rebetron 1200
00085124101	Rebetron 1200
54569542700	Rebetron 1200
00085123601	Rebetron 1200
00085125803	Rebetron 600
00085123603	Rebetron 600
00085124103	Rebetron 600
49884007176	Ribapak
49884033876	Ribapak
49884034076	Ribapak
66435010356	Ribasphere
66435010156	Ribasphere
49884085656	Ribasphere
54868452100	Ribasphere
66435010456	Ribasphere
66435010142	Ribasphere
66435010184	Ribasphere
66435010170	Ribasphere
49884085694	Ribasphere
66435010118	Ribasphere
66435010216	Ribasphere
49884085693	Ribasphere
49884085692	Ribasphere
66435010756	Ribasphere Ribapak
66435010899	Ribasphere Ribapak
66435010656	Ribasphere Ribapak
66435010556	Ribasphere Ribapak
66435010799	Ribasphere Ribapak
66435010856	Ribasphere Ribapak
66435010699	Ribasphere Ribapak
66435010599	Ribasphere Ribapak
16241007076	Ribatab
16241006976	Ribatab
16241006956	Ribatab
16241007056	Ribatab
16241033776	Ribatab
54738095342	Ribavirin
68084017965	Ribavirin
00406204616	Ribavirin
00781204316	Ribavirin
00093722763	Ribavirin
00093722777	Ribavirin

49452622102	Ribavirin
65862020768	Ribavirin
68382004610	Ribavirin
68382026028	Ribavirin
49884004532	Ribavirin
00406226084	Ribavirin
59930152304	Ribavirin
59930152303	Ribavirin
54868452102	Ribavirin
54738095384	Ribavirin
65862029084	Ribavirin
68084015065	Ribavirin
59930152302	Ribavirin
00781204367	Ribavirin
68382026004	Ribavirin
63370021955	Ribavirin
65862029070	Ribavirin
68382004603	Ribavirin
62991207701	Ribavirin
63370021950	Ribavirin
00406226042	Ribavirin
54738095016	Ribavirin
00781517728	Ribavirin
49452622103	Ribavirin
68382026009	Ribavirin
38779025609	Ribavirin
62991207702	Ribavirin
00093723281	Ribavirin
49452622101	Ribavirin
68382012907	Ribavirin
54738095256	Ribavirin
00781204304	Ribavirin
68382026010	Ribavirin
68382026012	Ribavirin
51927167100	Ribavirin
59930152301	Ribavirin
54868452103	Ribavirin
68084017911	Ribavirin
54738095356	Ribavirin
54738095370	Ribavirin
68084015011	Ribavirin
68382039504	Ribavirin
65862029018	Ribavirin

68382039501	Ribavirin
54738095156	Ribavirin
54738095318	Ribavirin
00093722772	Ribavirin
68682001906	Ribavirin
68382012807	Ribavirin
65862029056	Ribavirin
00093722758	Ribavirin
54868452101	Ribavirin
00406226056	Ribavirin
62991207703	Ribavirin
00406226070	Ribavirin
68382026007	Ribavirin
68382004628	Ribavirin
00781204342	Ribavirin
65862029042	Ribavirin
68382012707	Ribavirin
49452622104	Ribavirin
60687042025	Ritonavir
60687042095	Ritonavir
60687036495	Ritonavir
31722059730	Ritonavir
65162006106	Ritonavir
00054040713	Ritonavir
65862068730	Ritonavir
68382069606	Ritonavir
60687036425	Ritonavir
72626270101	Sofosbuvir-Velpatasvir
61958150301	Sovaldi
61958150101	Sovaldi
00085434801	Sylatron
00085138801	Sylatron
00085128702	Sylatron
00085131201	Sylatron
00085434901	Sylatron
00085434701	Sylatron
00085138802	Sylatron 4-Pack
00085128703	Sylatron 4-Pack
00085131202	Sylatron 4-Pack
00074308228	Technivie
00085031402	Victrelis
00085031403	Victrelis
00074309328	Viekira Pak

00074309301	Viekira Pak
00074006328	Viekira XR
00187000714	Virazole
53095000714	Virazole
00187000701	Virazole
53095000701	Virazole
61958240101	Vosevi
00006307402	Zepatier
00006307401	Zepatier

**Appendix Table 4.** Demographic Characteristics of Entire Sample, 2001-2019

Characteristic	TOTAL (N=10,507,834)		TFN (n=9,940)		TMN (n=18,882)		TGD Unclassified (n=9,619)		Cis Women (n=5,215,258)		Cis Men (n=5,251,750)		Cis Unclassified (n=2,385)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Race</b>														
Asian	404,491	3.85	271	2.73	494	2.62	250	2.60	193,236	3.71	210,189	4.00	51	2.14
Black	842,448	8.02	779	7.84	1,527	8.09	711	7.39	455,025	8.72	384,266	7.32	140	5.87
Hispanic	1,044,613	9.94	773	7.78	1,645	8.71	827	8.60	499,807	9.58	541,439	10.31	122	5.12
Unknown	2,683,184	25.54	1,898	19.09	3,038	16.09	2,185	22.72	1,342,411	25.74	1,332,250	25.37	1,402	58.78
White	5,533,098	52.66	6,219	62.57	12,178	64.50	5,646	58.70	2,724,779	52.25	2,783,606	53.00	670	28.09
<b>Region</b>														
Midwest	2,592,455	24.67	2,393	24.07	4,260	2.56	2,569	26.71	1,283,161	24.60	1,299,653	24.75	419	17.57
South	4,630,240	44.06	3,676	36.98	8,206	43.46	3,311	34.42	2,305,473	44.21	2,308,518	43.96	1,056	44.28
West	2,147,321	20.44	2,788	28.05	4,613	24.43	2,594	26.97	1,066,734	20.45	1,069,969	20.37	623	26.12
Northeast	1,028,881	9.79	1,072	10.78	1,783	9.44	1,125	11.70	516,655	9.91	507,978	9.67	268	11.24
Unknown	108,937	1.04	11	0.11	20	0.11	20	0.21	43,235	0.83	65,632	1.25	19	0.80
<b>Enrollment Age (years)</b>	35.59	21.35	39.90	18.37	33.27	15.40	28.45	19.11	36.33	21.82	34.88	20.87	29.60	18.87

*Cis*, Cisgender; *TGD*, Transgender and gender diverse; *TFN*, Trans feminine and non-binary; *TMN*, Trans masculine and non-binary. *Note*: Demographic characteristics among entire sample stratified by gender in Optum’s de-identified Clinformatics® Data Mart Database from 2001-2019. Race: Asian, Black, and White are non-Hispanic. Enrollment Age: represented in years; Mean represented in n column, standard deviation in percent column.



**Appendix Table 5.** Demographic Characteristics of People who Inject Drugs, 2001-2019

Characteristic	TOTAL (N=5,195)		TFN (n=26)		TMN (n=72)		TGD Unclassified (n=12)		Cis Women (n=2,636)		Cis Men (n=2,448)		Cis Unclassified (n=1)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Race</b>														
Asian	123	2.37	0	0.00	1	1.39	0	0.00	63	2.39	59	2.41	--	--
Black	525	10.11	3	11.54	8	11.11	2	16.67	307	11.65	204	8.33	--	--
Hispanic	428	8.24	2	7.69	7	9.72	3	25.00	205	7.78	211	8.62	--	--
Unknown	636	12.24	2	7.69	4	5.56	1	8.33	310	11.76	319	13.03	--	--
White	3483	67.05	19	73.08	52	72.22	6	50.00	1,751	66.43	1,655	67.61	--	--
<b>Region</b>														
Midwest	1536	29.57	10	38.46	21	29.17	3	25.00	750	28.45	752	30.72	--	--
South	2151	41.41	9	34.62	36	50.00	3	25.00	1,138	43.17	964	39.38	--	--
West	861	16.57	7	26.92	12	16.67	3	25.00	458	17.37	381	15.56	--	--
Northeast	639	12.30	0	0.00	3	4.17	3	25.00	284	10.77	349	14.26	--	--
Unknown	8	0.15	0	0.00	0	0.00	0	0.00	6	0.23	2	0.08	--	--
<b>Enrollment Age (years)</b>	48.62	20.14	48.19	20.63	42.86	16.84	29.08	17.04	50.91	19.49	46.43	20.62	--	--

*Cis*, Cisgender; *TGD*, Transgender and gender diverse; *TFN*, Trans feminine and non-binary; *TMN*, Trans masculine and non-binary. *Note*: Demographic characteristics among people who inject drugs stratified by gender in Optum’s de-identified Clinformatics® Data Mart Database from 2001-2019. Cis Unclassified were not reported for confidentiality since only one individual met this criterion. Race: Asian, Black, and White categories are non-Hispanic. Enrollment Age: age at first documentation of IDU represented in years; Mean represented in n column, standard deviation in percent column.

**Appendix Table 6.** Unadjusted Prevalence of Hepatitis C virus (HCV) Testing, 2001-2019

	Entire Sample (N=10,507,834)				People who inject drugs (N=5,195)		
Gender Minority Status	n	%	<i>P</i>	Gender Minority Status	n	%	<i>P</i>
<b>TGD</b>				<b>TGD</b>			
No HCV Testing	32,741	85.17	<b>***</b>	No HCV Testing	96	87	*
HCV Testing	5,700	14.83		HCV Testing	14	13	
<b>Cis</b>				<b>Cis</b>			
No HCV Testing	10,078,798	96.27		No HCV Testing	4,704	93	
HCV Testing	390,595	3.73		HCV Testing	381	7	
<b>Gender Subgroups</b>	<b>n</b>	<b>%</b>	<b><i>P</i></b>	<b>Gender Subgroups</b>	<b>n</b>	<b>%</b>	<b><i>P</i></b>
<b>TFN</b>				<b>TFN</b>			
No HCV Testing	8,233	82.83	<b>***</b>	No HCV Testing	24	92	*
HCV Testing	1,707	17.17		HCV Testing	2	8	
<b>TMN</b>				<b>TMN</b>			
No HCV Testing	15,447	81.81		No HCV Testing	60	83	
HCV Testing	3,435	18.19		HCV Testing	12	17	
<b>TGD Unclassified</b>				<b>TGD Unclassified</b>			
No HCV Testing	9,061	94.20		No HCV Testing	12	100	
HCV Testing	558	5.80		HCV Testing	0	0	
<b>Cis Women</b>				<b>Cis Women</b>			
No HCV Testing	4,993,885	95.76		No HCV Testing	2,441	93	
HCV Testing	221,373	4.24		HCV Testing	195	7	
<b>Cis Men</b>				<b>Cis Men</b>			
No HCV Testing	5,082,578	96.78		No HCV Testing	2,262	92	
HCV Testing	169,172	3.22		HCV Testing	186	8	
<b>Cis Unclassified</b>				<b>Cis Unclassified</b>			
No HCV Testing	2,335	97.90		No HCV Testing	1	100	
HCV Testing	50	2.10		HCV Testing	0	0	

*Cis*, Cisgender; *P*, P-value; *TGD*, Transgender and gender diverse; *TFN*, Trans feminine and non-binary; *TMN*, Trans masculine and non-binary. Bolded values represent significance at  $p < 0.05$ . Note: Unadjusted prevalence of hepatitis C virus (HCV) testing among entire sample and people who inject drugs stratified by gender in Optum's de-identified Clinformatics® Data Mart Database from 2001-2019. P-values were derived from Fisher's exact test for gender subgroups among people who inject drugs;  $\chi^2$  tests were used for all other analyses. Boldface indicates statistical significance (\* $p \leq 0.05$ , \*\* $p \leq 0.01$ , \*\*\* $p \leq 0.001$ ).

**Appendix Table 7.** Adjusted Multivariable Models of Gender and Hepatitis C virus (HCV) Testing, 2001-2019

Entire Sample (N=10,507,834)				People who inject drugs (N=5,195)			
	HCV Testing				HCV Testing		
Characteristic	aOR	95% CI	P	Characteristic	aOR	95% CI	P
<b>PRIMARY PREDICTOR</b>				<b>PRIMARY PREDICTOR</b>			
<b>Gender</b>				<b>Gender</b>			
Cis Women	Ref.	--	--	Cis Women	Ref.	--	--
Cis Men	0.78	0.78-0.79	***	Cis Men	0.92	0.74-1.14	0.45
Cis Unclassified	0.81	0.61-1.09	0.16	Cis Unclassified	--	--	--
TFN	2.63	2.49-2.79	***	TFN	1.05	0.24-4.53	0.95
TMN	2.67	2.56-2.78	***	TMN	2.21	1.16-4.23	*
TGD Unclassified	1.16	1.07-1.27	***	TGD Unclassified	--	--	--
<b>CONTROL VARIABLES</b>				<b>CONTROL VARIABLES</b>			
<b>Race</b>				<b>Race</b>			
White	Ref.	--	--	White	Ref.	--	--
Asian	1.46	1.45-1.49	***	Asian	1.22	0.64-2.32	0.54
Black	1.27	1.26-1.29	***	Black	1.52	1.10-2.10	**
Hispanic	1.26	1.25-1.27	***	Hispanic	1.07	0.74-1.56	0.72
Unknown	0.66	0.66-0.67	***	Unknown	0.87	0.62-1.23	0.43
<b>Region</b>				<b>Region</b>			
Midwest	Ref.	--	--	Midwest	Ref.	--	--
South	1.31	1.30-1.32	***	South	1.15	0.89-1.50	0.29
West	1.00	0.98-1.01	0.38	West	1.05	0.75-1.48	0.78
Northeast	1.78	1.76-1.80	***	Northeast	2.12	1.54-2.93	***
Unknown	0.14	0.13-0.15	***	Unknown	--	--	--
<b>Enrollment Age (years)</b>	1.01	1.01-1.02	***	<b>Age of First IDU (years)</b>	0.98	0.97-0.99	***
<b>Enrollment Months</b>	1.02	1.02-1.02	***	<b>Months Past IDU</b>	0.99	0.99-1.00	0.12
<b>Enrollment Year</b>	1.06	1.06-1.06	***	<b>First Year of IDU</b>	1.03	1.01-1.05	**

aOR, Adjusted odds ratio; CI, Confidence interval; Cis, Cisgender; IDU, Injection drug use; P, P-value; TFN, Trans feminine and non-binary; TMN, Trans masculine and non-binary. Note: Adjusted multivariable models examining the association between gender and hepatitis C virus (HCV) testing among entire sample and people who inject drugs in Optum's de-identified Clinformatics® Data Mart Database from 2001-2019. Variables with missing data indicate dropped observations from perfect predictions. Outcome: Hepatitis C virus (HCV) diagnosis (ref=no HCV diagnosis). Model adjusted for all listed demographic and enrollment characteristics. Boldface indicates statistical significance (\*p<0.05, \*\*p<0.01, \*\*\*p<0.001).

**Appendix Table 8.** Adjusted Multivariable Analyses of Gender and Hepatitis C virus (HCV) Care Cascade, 2001-2019 (N=13,134)

	Specialist Follow-Up			HCV-Specific Procedure			HCV Antiviral Prescription		
	aOR	95% CI	P	aOR	95% CI	P	aOR	95% CI	P
<b>PRIMARY PREDICTOR</b>									
<b>Gender</b>									
Cis Women	Ref.	--	--	Ref.	--	--	Ref.	--	--
Cis Men	0.93	0.85-1.01	0.08	1.04	0.94-1.14	0.48	1.17	1.09-1.26	***
Cis Unclassified	0.21	0.03-1.62	0.13	--	--	--	--	--	--
TFN	1.72	0.94-3.14	0.08	2.69	1.08-6.74	*	1.56	0.98-2.47	0.06
TMN	1.13	0.52-2.43	0.76	--	--	--	0.83	0.46-1.51	0.54
TGD Unclassified	0.65	0.29-1.48	0.31	1.70	0.50-5.71	0.39	1.78	0.81-3.88	0.15
<b>CONTROL VARIABLES</b>									
<b>Race</b>									
White	Ref.	--	--	Ref.	--	--	Ref.	--	--
Asian	0.65	0.52-0.81	***	0.81	0.61-1.06	0.12	0.81	0.66-1.01	0.06
Black	1.01	0.89-1.14	0.93	1.26	1.08-1.47	**	1.07	0.96-1.18	0.24
Hispanic	0.82	0.72-0.94	**	1.03	0.88-1.21	0.73	1.05	0.93-1.18	0.40
Unknown	0.91	0.81-1.02	0.10	0.88	0.77-1.01	0.06	1.10	0.99-1.23	0.07
<b>Region</b>									
Midwest	Ref.	--	--	Ref.	--	--	Ref.	--	--
South	1.18	1.04-1.32	**	0.79	0.68-0.91	***	0.97	0.88-1.08	0.61
West	0.44	0.38-0.50	***	0.65	0.55-0.76	***	0.79	0.71-0.89	***
Northeast	1.25	1.05-1.48	**	1.02	0.83-1.26	0.82	0.85	0.74-0.98	*
Unknown	0.57	0.20-1.60	0.28	1.01	0.23-4.52	0.99	0.42	0.13-1.34	0.14
<b>Index Age (years)</b>	1.01	1.00-1.01	***	1.00	1.00-1.01	0.16	1.00	0.99-1.00	**
<b>Months Past Index</b>	1.01	1.01-1.01	***	1.01	1.01-1.01	***	1.01	1.01-1.01	***
<b>Index Year</b>	0.95	0.94-0.96	***	0.96	0.95-0.97	***	1.04	1.03-1.05	***

aOR, Adjusted odds ratio; CI, Confidence interval; Cis, Cisgender; IDU, Injection drug use; P, P-value; TFN, Trans feminine and non-binary; TMN, Trans masculine and non-binary. Note: Adjusted multivariable analyses examining the association between gender and each step of the hepatitis C virus (HCV) care cascade among individuals with chronic HCV in Optum's de-identified Clinformatics® Data Mart Database from 2001-2019 (N=13,134). Outcomes based on yes=1 or no=0 for each care cascade step. Model adjusted for all listed demographic and enrollment characteristics. Index signifies the date of initial HCV test. In our second model, results are null because 100% of TMN had an HCV-specific procedure. Boldface indicates statistical significance (\*p≤0.05, \*\*p≤0.01, \*\*\*p≤0.001).