

Supplementary File

Table 1 Columns of Covid-19 all vaccine tweets dataset and Covid

Datasets	Columns
Covid-19 all vaccine tweets	Id, user_name, user_location, user_description, user_created, user_followers, user_friends, user_favorites, user_verified, date
Covid-19 world vaccination progress	country, iso_code, date, total_vaccinations, people_vaccinated, people_fully_vaccinated, daily_vaccinations_raw, daily_vaccinations, total_vaccinations_per_hundred, people_vaccinated_per_hundred

Table 2 List of n-grams by Country

Country	N-gram	content
India	uni	'age', 'slot', 'dose', 'covaxin', '18', 'pincode', '2021', 'date', 'fee', 'vaccine', '1410', 'free', 'availability', 'india', 'sep', 'aug', '50', 'paid', '1844', '45', 'hospital', '100', 'get', 'first', 'dos', 'amp', 'vaccination', '44', 'covid19', 'bharat', 'jul', '20', 'biotech', 'vaccinated', 'oct', 'apollo', '30', 'use', 'dose1', '25', 'got', 'today', 'approval', '2nd', 'people', '1200', 'second', 'covid', 'trial', 'dr'
	bi	'age 18', 'slot age', '2021 fee', 'covaxin dose', '18 age', 'age date', 'fee 1410', ' free slot ', 'sep 2021', 'aug 2021', '50 slot', 'dose 50', ' paid slot ', 'slot paid', '1844 availability', '45 availability', 'dose 100', '100 slot', '18 44', '44 date', 'jul 2021', 'bharat biotech', 'oct 2021', '18 date', '1410 apollo', 'fee 1200', 'slot dose1', 'emergency use', '2nd dose', 'dose 20', '20 slot', 'slot dose', 'covid19 vaccine', 'dose 30', '30 slot', 'dose 25', '25 slot', 'first dose', 'second dose', 'sputnik dose', 'pincode 560103', '560103 covaxin', 'fee 1145', '560078 covaxin', 'pincode 560078', 'pincode 560066', 'free pincode', '1410 rxdx', '560066 covaxin', 'pincode 560010'
	tri	'slot age 18', 'age 18 age', '18 age date', '2021 fee 1410', 'sep 2021 fee', 'aug 2021 fee', 'dose 50 slot', '50 slot age', 'free slot paid', 'slot paid slot', 'covaxin dose 50', '100 slot age', 'dose 100 slot', 'covaxin dose 100', 'age 18 44', '18 44 date', 'jul 2021 fee', 'oct 2021 fee', 'age 18 date', 'fee 1410 apollo', '2021 fee 1200', 'paid slot dose1', 'dose 20 slot', '20 slot age', 'paid slot dose', 'dose 30 slot', '30 slot age', 'dose 25 slot', '25 slot age', 'covaxin dose 20', 'covaxin dose 25', 'covaxin dose 30', 'pincode 560103 covaxin',

		'560103 covaxin dose', '2021 fee 1145', 'pincode 560078 covaxin', '560078 covaxin dose', 'fee 1410 rxdx', '560066 covaxin dose', 'pincode 560066 covaxin', '560038 covaxin dose', 'pincode 560038 covaxin', 'pincode 560010 covaxin', '560010 covaxin dose', '560011 covaxin dose', 'pincode 560011 covaxin', 'free slot dose10', 'fee 1200 miracle', '2021 fee 1250', 'age date 06'
	4	'slot age 18 age', 'age 18 age date', '50 slot age 18', 'dose 50 slot age', 'free slot paid slot', 'covaxin dose 50 slot', 'aug 2021 fee 1410', 'sep 2021 fee 1410', '100 slot age 18', 'dose 100 slot age', 'covaxin dose 100 slot', 'slot age 18 44', 'age 18 44 date', 'slot age 18 date', '2021 fee 1410 apollo', 'slot paid slot dose1', 'jul 2021 fee 1410', 'dose 20 slot age', '20 slot age 18', 'slot paid slot dose', '30 slot age 18', 'dose 30 slot age', '25 slot age 18', 'dose 25 slot age', 'covaxin dose 20 slot', 'covaxin dose 25 slot', 'oct 2021 fee 1410', 'covaxin dose 30 slot', 'pincode 560103 covaxin dose', 'pincode 560078 covaxin dose', '2021 fee 1410 rxdx', 'pincode 560066 covaxin dose', 'sep 2021 fee 1200', 'pincode 560038 covaxin dose', 'pincode 560010 covaxin dose', 'pincode 560011 covaxin dose', 'aug 2021 fee 1200', '2021 fee 1200 miracle', '18 age date 06', '2021 fee 1410 aarthi', 'pincode 560076 covaxin dose', 'fee 1410 aarthi scan', '560078 covaxin dose 50', 'pincode 560037 covaxin dose', '18 age date 09', 'pincode 560064 covaxin dose', '18 age date 07', '40 slot age 18', 'dose 40 slot age', 'free slot dose10 dose21'
United States	uni	'vaccine', 'shot', 'dose', 'got', 'first', 'second', 'get', 'moderna', 'today', 'vaccinated', '2nd', 'im', 'covid19', 'day', 'covid', 'amp', 'one', 'arm', 'people', 'getting', 'side', 'effect', 'good', 'mrna', 'done', 'fully', 'like', '1st', 'hour', 'week', 'thank', 'dos', 'ocgn', 'vaccination', 'booster', 'say', 'health', 'go', 'man', 'effective', 'time', 'received', 'pfizer', 'let', 'need', 'two', 'slot', 'free', 'sore', 'new'
	bi	'covid19 vaccine', 'first dose', 'second dose', 'got first', ' side effect ', 'covid vaccine', 'second shot', 'fully vaccinated', '2nd dose', 'first shot', 'got second', '2nd shot', 'moderna vaccine', 'dose vaccine', 'free slot', 'vaccine today', 'day receiving', 'receiving vaccine', 'shot today', 'died day', 'man died', 'booster shot', '1st dose', 'good health', '89yearold man', 'get vaccinated', 'got 2nd', 'vaccine vaccinated', 'vaccinated man', 'man good', 'dose moderna', 'vaccine shot', ' sore arm ', 'first vaccine', 'heal world', 'let heal', 'paid slot', 'moderna shot', 'slot paid', 'dose today', 'dose done', '1844 availability', 'second vaccine', 'shot done', '1st shot', 'got 1st', '24 hour', 'one go', 'emergency use', '45 availability'

	tri	'got first dose', 'day receiving vaccine', 'died day receiving', 'man died day', '89yearold man died' , 'receiving vaccine vaccinated', 'vaccinated man good', 'vaccine vaccinated man', 'man good health', 'got first shot', 'free slot paid', 'slot paid slot', 'let heal world', 'got second dose', 'got second shot', 'first dose vaccine', 'get news featured', 'johnson amp johnson', 'news featured use', 'ocgn vaccine related', 'vaccine related biological', 'paid slot dose1', 'related biological product', 'second dose vaccine', 'one one go', 'first dose moderna', 'got 2nd dose', 'first shot today', 'dose moderna vaccine', 'biological product advisory', 'im fully vaccinated', 'paid slot dose', 'got first vaccine', 'got 2nd shot', 'said data show', '4282021 said data', 'fauci said 4282021', 'dr fauci said', 'said 4282021 said', 'received first dose', 'dose covid19 vaccine', 'first covid vaccine', 'dose covid vaccine', 'second dose moderna', 'first dose today', 'moderna covid19 vaccine', 'second dose today', 'emergency use authorization', 'covid vaccine today', 'dose vaccine today'
	4	'died day receiving vaccine' , '89yearold man died day', 'man died day receiving', 'receiving vaccine vaccinated man', 'day receiving vaccine vaccinated', 'vaccine vaccinated man good', 'vaccinated man good health', 'free slot paid slot', 'get news featured use', 'slot paid slot dose1', 'ocgn vaccine related biological', 'vaccine related biological product', 'related biological product advisory', 'slot paid slot dose', 'said 4282021 said data', 'dr fauci said 4282021', '4282021 said data show', 'fauci said 4282021 said', 'got first shot today', 'got first dose vaccine', 'approve let heal world', 'deep east texas partnership', 'submits phase3 trial data', 'got first dose today', 'first dose moderna vaccine', 'teaching immune system make', 'immune system make antibody' , 'phase3 trial data approval', 'work teaching immune system', 'got second dose today', 'johnson amp johnson vaccine', 'mrna inactivated whole virion', 'shot shot shot shot', 'got first dose moderna', 'trial data approval scrutiny', 'inactivated whole virion vaccine', 'zone view odds indicator', 'alter genetic code actually', 'vaccine equity task force', 'first dose covid19 vaccine', 'genetic code actually hacking' , 'ocgn phase trial show', 'join ny vaccine equity', 'phase trial show india', 'code actually hacking software', 'first dose covid vaccine', 'ny vaccine equity task', 'system make antibody sarscov2', 'please join ny vaccine', 'make antibody sarscov2 coronavirus'
Canada	uni	'case', 'ontario', 'canada', 'vaccine', 'reporting', 'toronto', 'embarrassing', 'business', 'dose', 'new', 'russia', 'open', 'everything', 'politicizing', 'ford', 'today', 'shot', 'first', 'trudeau', 'moscow', 'second', 'usual', 'doug', 'got',

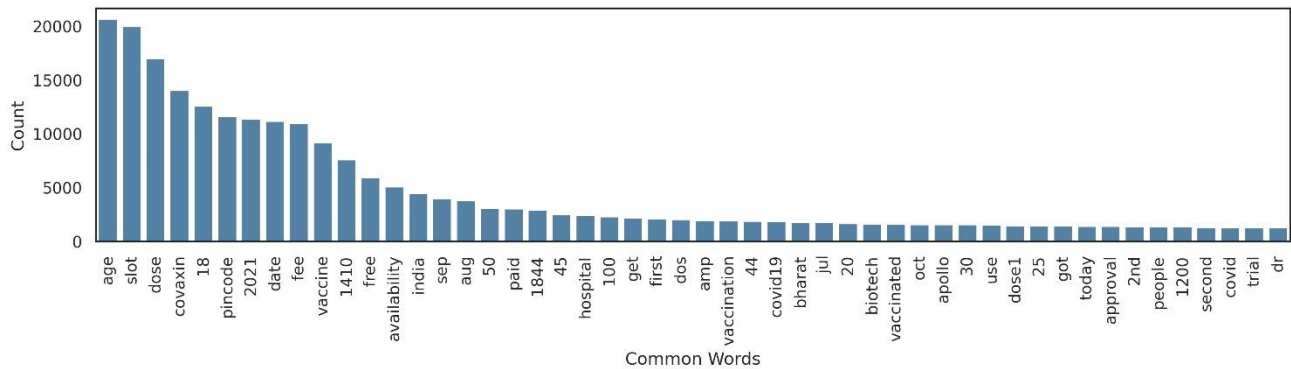
		'forced', 'home', 'stay', 'alone', 'eating', 'amp', 'get', '2nd', 'moderna', 'dos', 'vaccinated', 'im', 'day', 'fully', 'ocgn', 'one', 'school', 'people', 'week', 'country', 'covid19', '1st', 'clinic', 'mrna', 'family', 'arm'
	bi	'ontario reporting', 'ontario canada', ' new case ', 'everything open', ' open business ', 'russia everything', 'case toronto', 'business usual', 'usual ontario', 'moscow russia', 'toronto ontario', 'doug ford', ' eating alone ', 'ford trudeau', 'embarrassing ontario', 'canada forced', 'forced stay', 'trudeau toronto', 'stay home', 'canada politicizing', 'toronto canada', 'canada reporting', 'second dose', 'toronto politicizing', 'alone today', 'today doug', '2nd dose', 'embarrassing moscow', 'alone doug', 'business school', 'first dose', 'fully vaccinated', 'politicizing ford', 'second shot', ' side effect ', 'covid19 vaccine', 'home home', 'home family', 'family business', 'embarrassing stealing', 'reporting 4736', 'closed business', '4736 case', ' stop politicizing ', 'canada stop', 'oil eating', 'ontario ruined', 'ruined closed', 'politicizing toronto', 'got first'
	tri	'everything open business', 'russia everything open', 'new case toronto', 'open business usual', 'business usual ontario', 'moscow russia everything', 'embarrassing ontario reporting', 'doug ford trudeau', 'trudeau toronto ontario', 'canada forced stay', 'toronto ontario canada', 'ford trudeau toronto', 'ontario canada forced', 'forced stay home', 'usual ontario canada', 'case toronto canada', 'ontario canada reporting', 'usual ontario reporting', 'case toronto politicizing', 'eating alone today', 'today doug ford', 'alone today doug', 'toronto canada politicizing', 'embarrassing moscow russia', 'alone doug ford', 'eating alone doug', 'toronto politicizing ford', 'stay home home', 'home home family', 'home family business', 'reporting 4736 case', 'family business school', 'canada stop politicizing', 'ontario reporting 4736', 'oil eating alone', 'stop politicizing toronto', 'politicizing toronto ontario', 'toronto ontario ruined', 'ruined closed business', 'ontario ruined closed', 'politicizing ford trudeau', 'closed business school', 'business school drug', 'embarrassing crimea russia', 'crimea russia everything', 'canada politicizing laboratorios', 'politicizing laboratorios richmond', 'laboratorios richmond launched', 'richmond launched production', 'first eu country'
	4	'russia everything open business', 'everything open business usual', 'open business usual ontario', 'moscow russia everything open', 'doug ford trudeau toronto', 'trudeau toronto ontario canada', 'ford trudeau toronto ontario', 'business usual ontario canada', 'toronto ontario canada forced', 'new case toronto canada', 'canada forced stay home', 'usual ontario

		canada reporting', 'ontario canada forced stay', 'business usual ontario reporting', 'new case toronto politicizing', 'eating alone today doug', 'alone today doug ford', 'case toronto canada politicizing', 'embarrassing moscow russia everything', 'eating alone doug ford', 'alone doug ford trudeau', 'today doug ford trudeau', 'case toronto politicizing ford', 'forced stay home home', 'stay home home family', 'home home family business', 'home family business school', 'ontario reporting 4736 case', 'politicizing toronto ontario ruined', 'canada stop politicizing toronto', 'stop politicizing toronto ontario', 'toronto ontario ruined closed', 'ontario ruined closed business', 'family business school drug', 'embarrassing crimea russia everything', 'crimea russia everything open', 'toronto politicizing ford trudeau', 'ruined closed business school', 'politicizing laboratorios richmond launched', 'canada politicizing laboratorios richmond', 'laboratorios richmond launched production', 'usual ontario reporting 3670', 'everything open business ontario', 'ontario reporting 3670 case', 'business school drug abuse', 'business ontario reporting 4736', 'open business ontario reporting', 'reporting 4736 case 1188', 'italy become first eu', 'become first eu country'
United Kingdom	uni	'vaccine', 'jab', 'first', 'dose', 'today', 'get', 'amp', 'uk', 'covid', 'one', 'day', 'vaccination', 'second', 'dos', 'covid19', 'done', 'people', 'got', 'moderna', 'vaccinated', 'thank', '2nd', 'covaxin', 'week', 'side', '1st', 'effect', 'im', 'news', 'say', 'good', 'arm', 'like', 'pfizer', 'ive', 'well', 'thanks', 'getting', 'yesterday', 'need', 'new', 'country', 'shot', 'health', 'eu', 'approval', 'effective', 'received', 'time', 'oxford'
	bi	'first dose', ' side effect ', 'covid19 vaccine', 'covid vaccine', 'second dose', 'dose vaccine', 'vaccine today', '2nd dose', 'first jab', ' blood clot ', '1st dose', 'first vaccine', 'moderna vaccine', 'got first', 'second jab', 'jab done', 'covaxin vaccin', 'fully vaccinated', 'inactivated vaccine', 'vaccine done', '2nd jab', 'jab today', 'year old', 'covid jab', 'day receiving', 'receiving vaccine', 'vaccine yesterday', ' vaccine safe ', 'vaccination centre', 'received first', 'first covid', 'pfizer moderna', 'died day', 'covid19 vaccination', 'million dos', 'man died', '89yearold man', 'good health', 'oxford vaccine', 'covaxin approval', '2nd dos', 'vaccine vaccinated', '1st dos', 'vaccinated man', 'man good', 'second vaccine', 'pfizer vaccine', 'dose done', '24 hour', '1st jab'
	tri	'first dose vaccine', 'died day receiving', ' 89yearold man died ', 'day receiving vaccine', 'man died day', 'vaccine vaccinated man', 'man good health', 'receiving vaccine vaccinated', 'vaccinated man good', 'got first

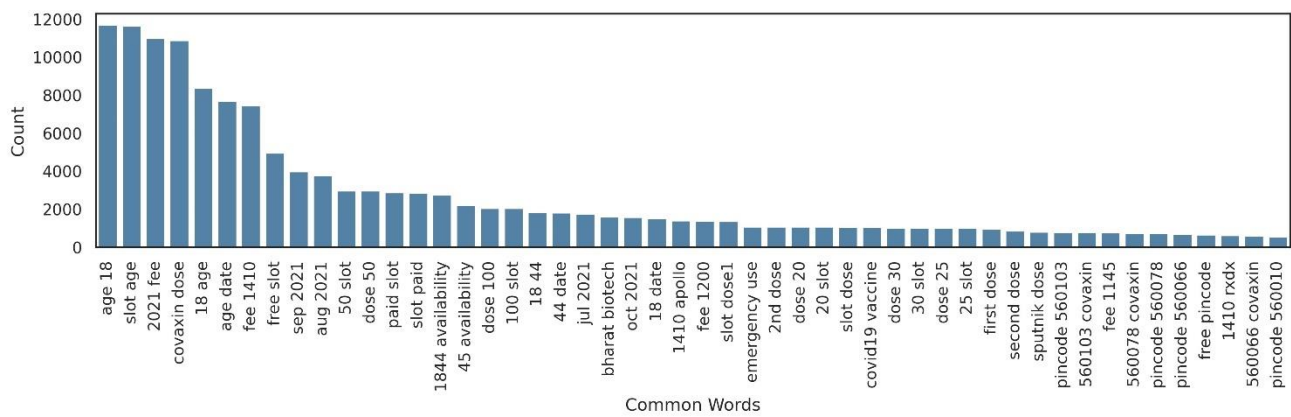
		dose', 'received first dose', 'first covid vaccine', 'first dose done', 'vaccine safe effective', 'second dose vaccine', 'dose vaccine today', 'oxford astrazeneca vaccine', 'please work lot', 'moderna covid19 vaccine', 'covid vaccine today', 'research get jabbed', 'success rate trial', 'new immune drug', '1st 2nd dose', 'cent success rate', 'hiv trial show', '97 per cent', 'per cent success', 'cure hiv trial', 'show 97 per', 'trial show 97', 'aid cure hiv', 'first vaccine done', 'scientist made get', 'sirjee scientist made', 'made get bharat', 'first covid jab', ' rare heart inflammation ', 'death 1st dos', 'smell like fish', 'rejected jab smell', 'need inactivated vaccine', 'first jab done', 'jab smell like', 'covaxin vaccin approval', 'get bharat ratna', 'like fish chip', 'first dose covid', '1st jab done', 'first dose today'
	4	'man died day receiving', ' died day receiving vaccine ', '89yearold man died day', 'day receiving vaccine vaccinated', 'vaccinated man good health', 'receiving vaccine vaccinated man', 'vaccine vaccinated man good', 'cent success rate trial', 'per cent success rate', 'cure hiv trial show', '97 per cent success', 'aid cure hiv trial', 'show 97 per cent', 'trial show 97 per', 'hiv trial show 97', 'scientist made get bharat', 'sirjee scientist made get', 'rejected jab smell like', 'smell like fish chip', 'jab smell like fish', 'first dose vaccine today', 'rare heart inflammation side', 'uk add rare heart', 'heart inflammation side effect', 'add rare heart inflammation', 'made get bharat ratna', 'moderna uk add rare', 'list conductingreview drug wat', 'inflammation side effect list', 'side effect list conductingreview', '2nd dose week please', 'effect list conductingreview drug', '1st 2nd dose week', 'got first dose vaccine', 'week please visit one', 'require 1st 2nd dose', 'moderna vaccine available resident', 'pfizer moderna uk add', 'dose week please visit', 'new immune drug may', 'drug may aid cure', 'oxford az vaccine come', 'may aid cure hiv', 'immune drug may aid', 'success rate trial promising', 'significant level unjustified criticism', 'vaccine come significant level', 'az vaccine come significant', 'sirjee news felicitate scientist', 'first dose covid vaccine'

Supplementary Fig. 1 Count of n-grams in tweets from India

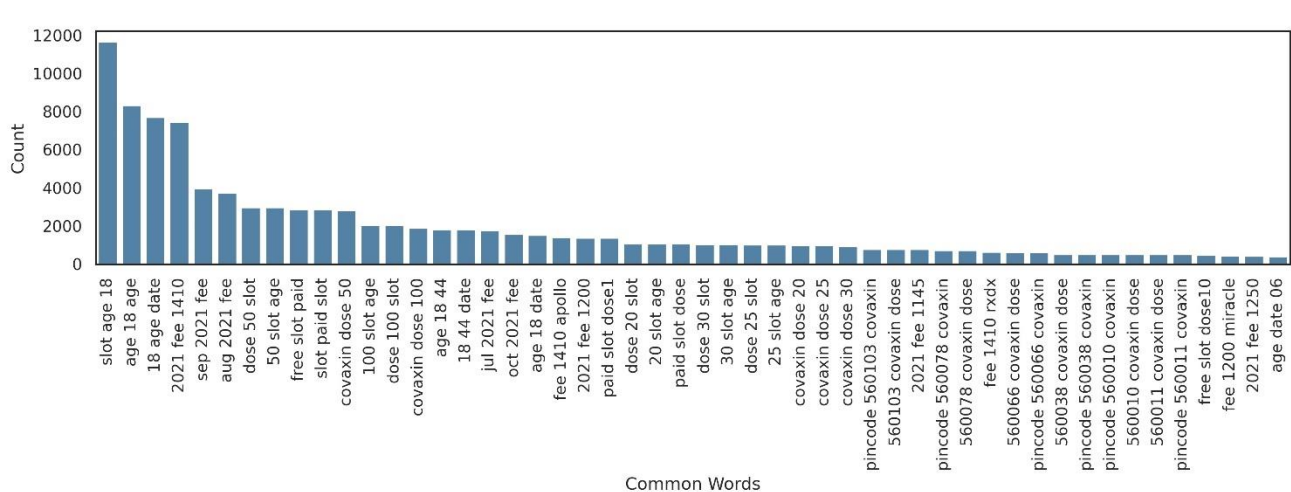
1a. unigram



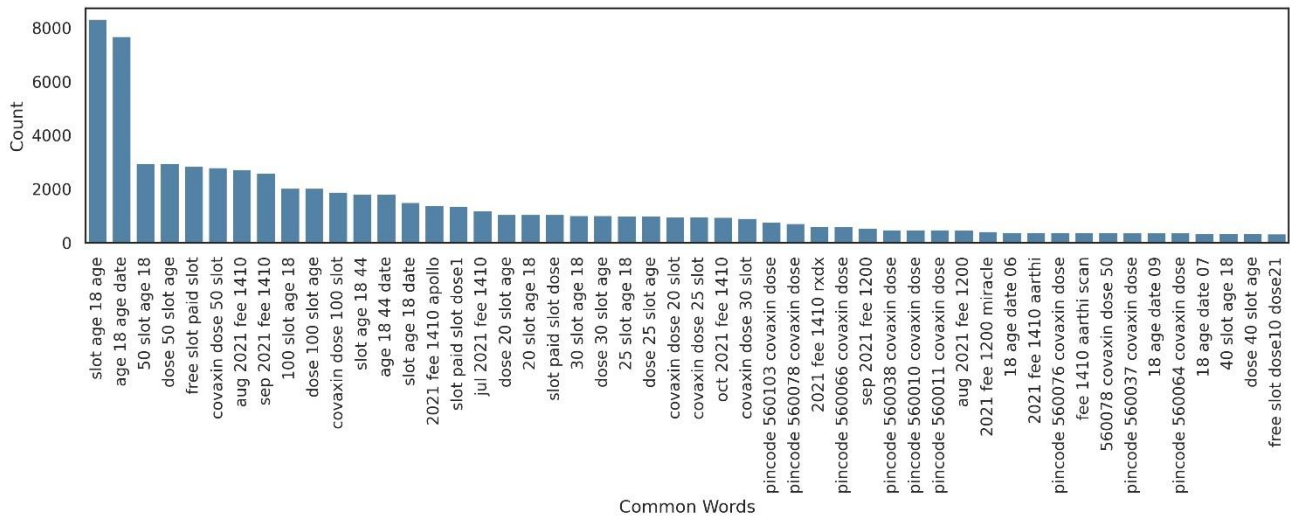
1b. bigram



1c. trigram

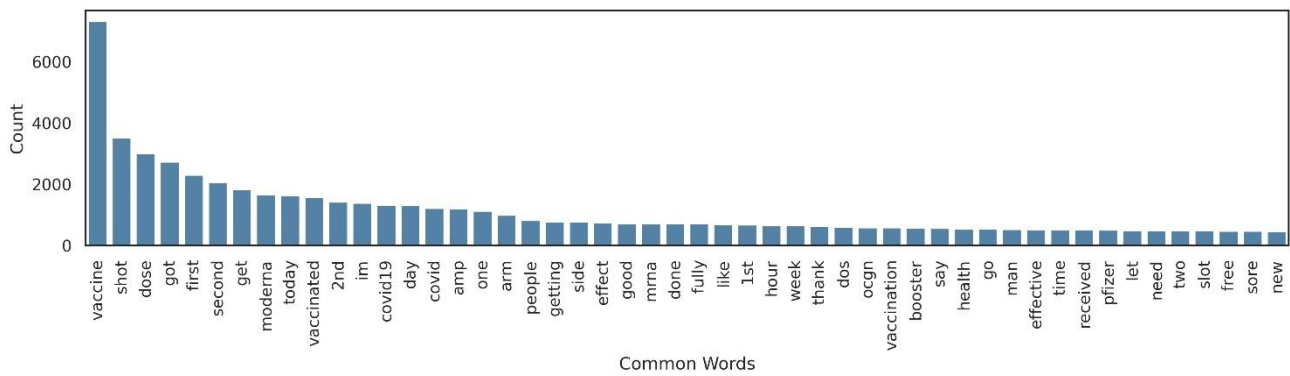


1d. 4-gram

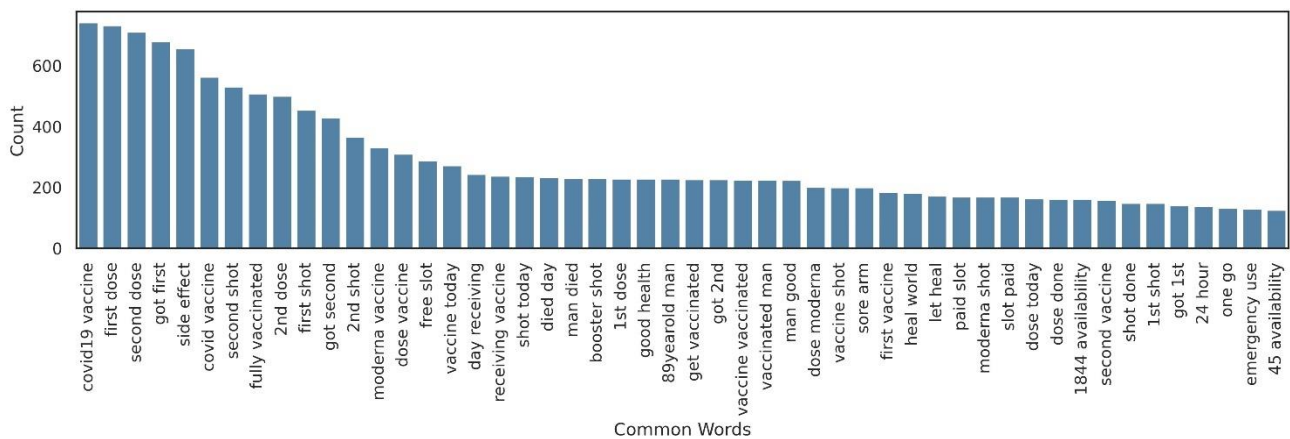


Supplementary Fig. 2 Count of n-grams in tweets from United States

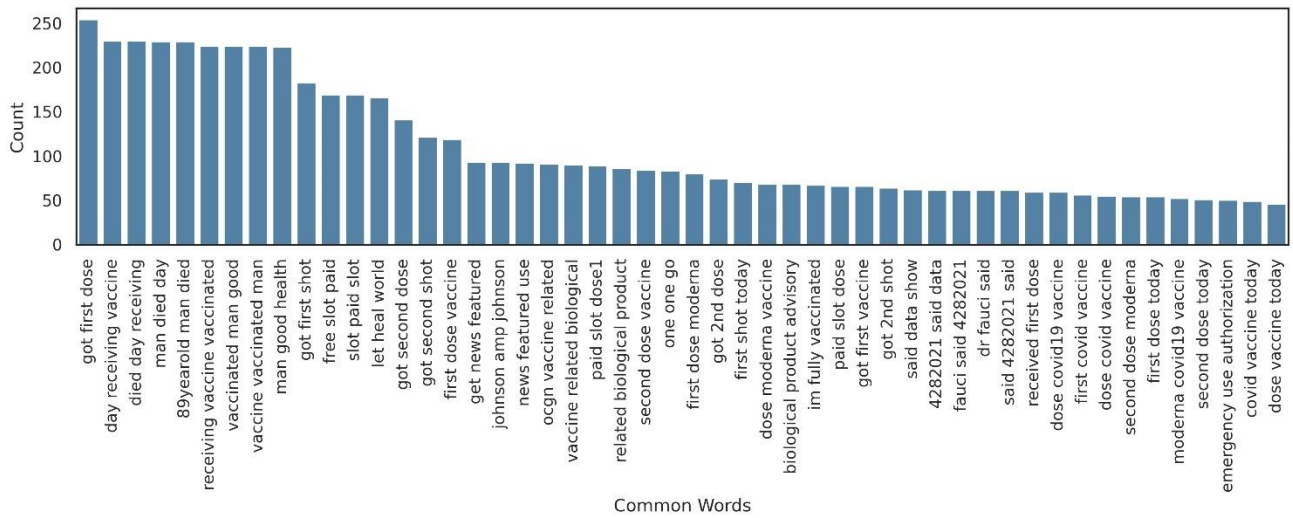
2a. unigram



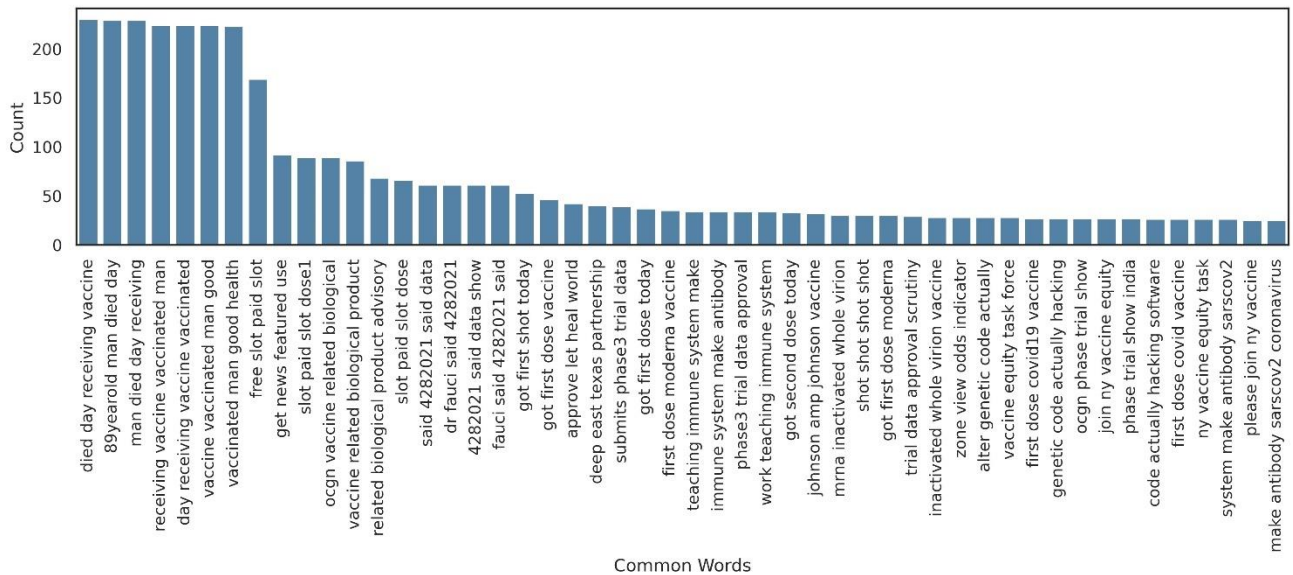
2b. bigram



2c. trigram

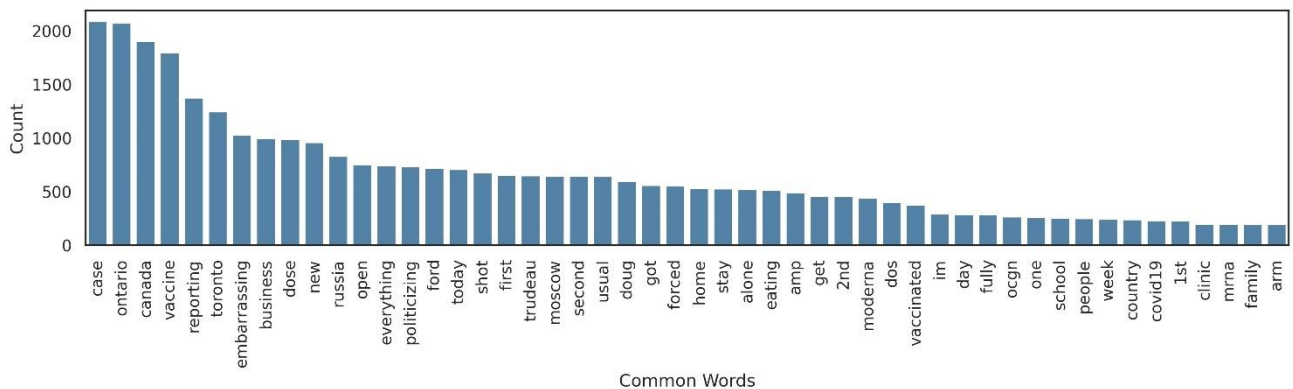


2d. 4-gram

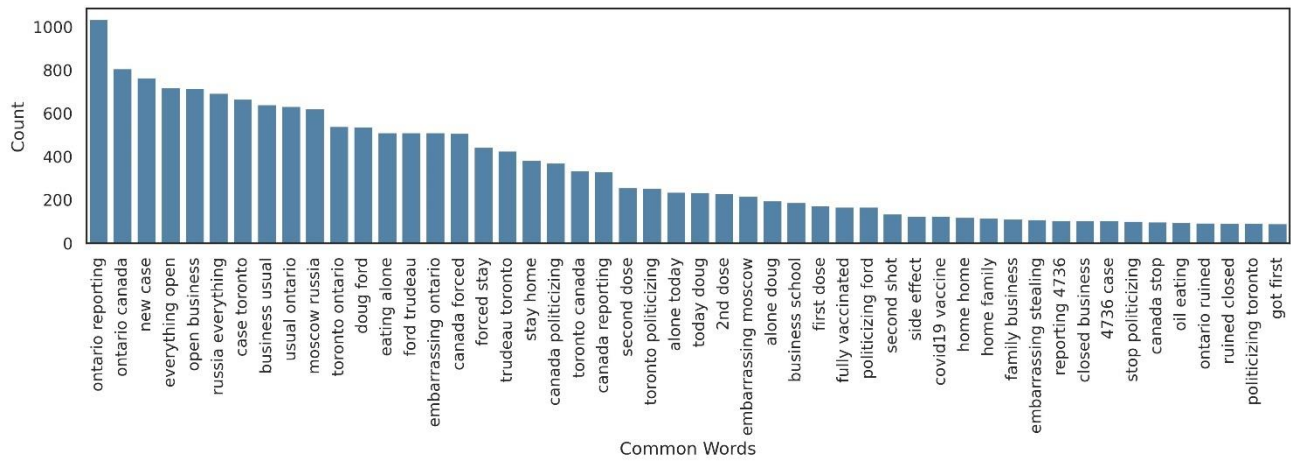


Supplementary Fig. 3 Count of n-grams in tweets from Canada

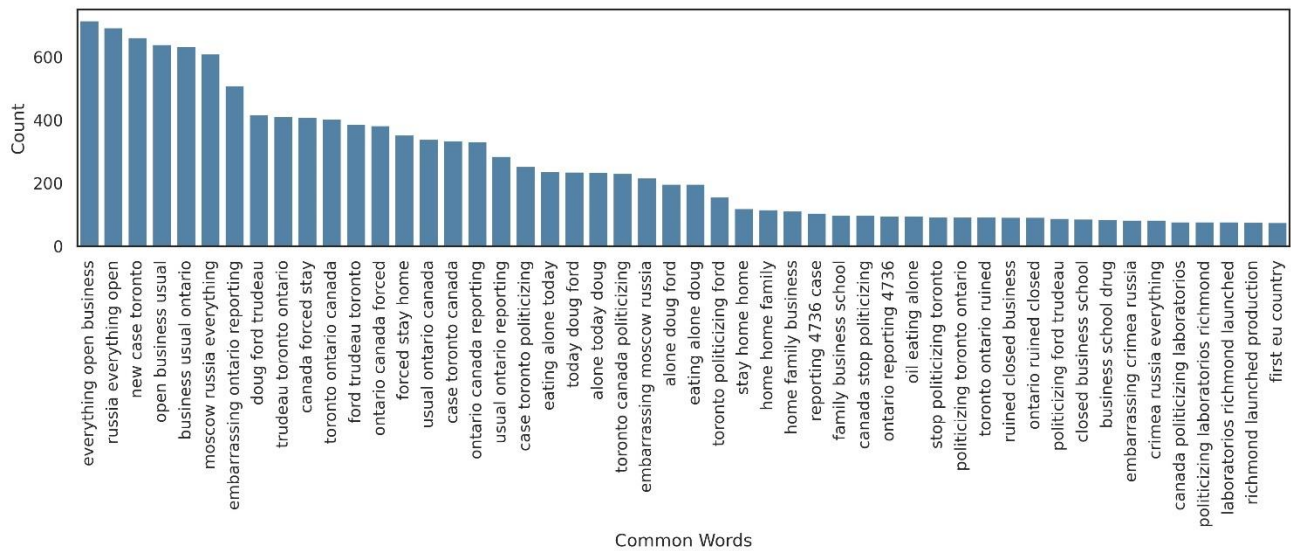
3a. unigram



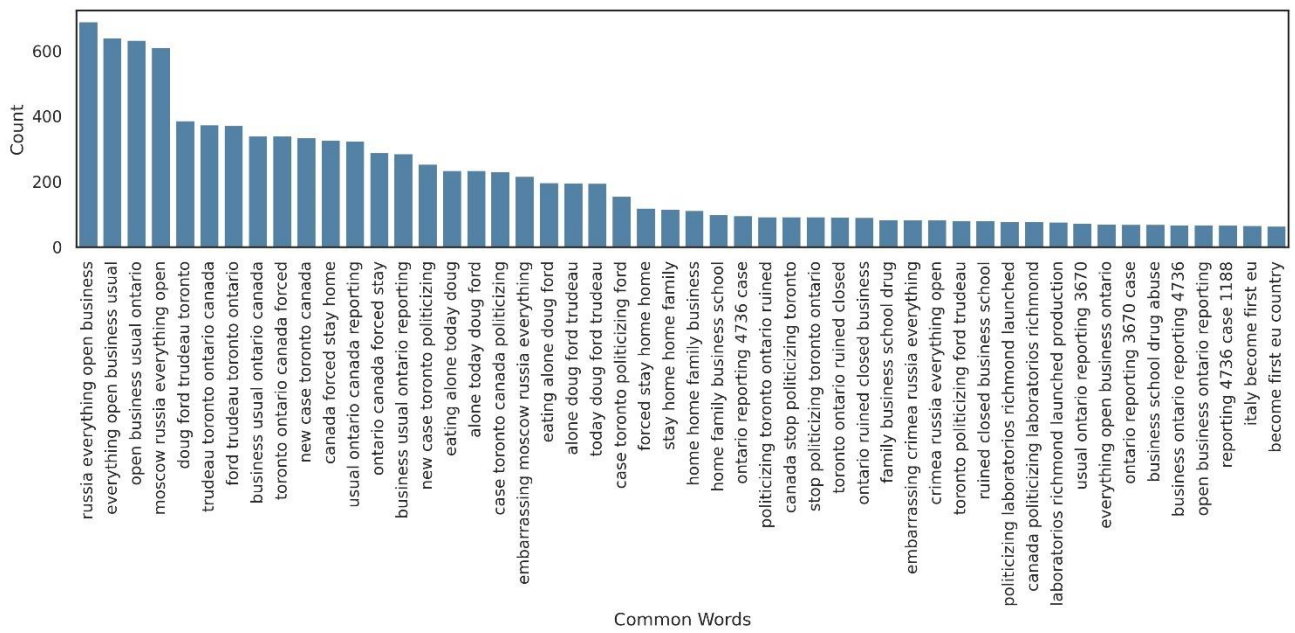
3b. bigram



3c. trigram

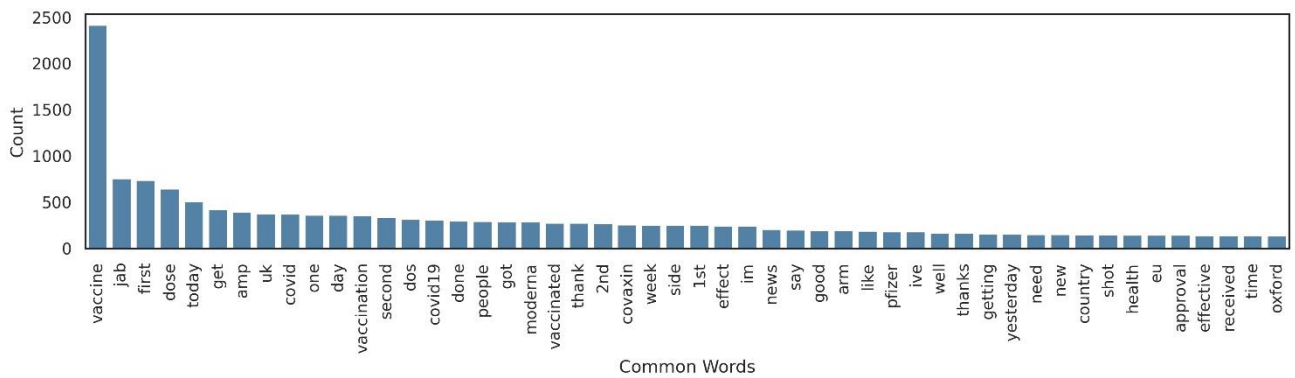


3d. 4-gram

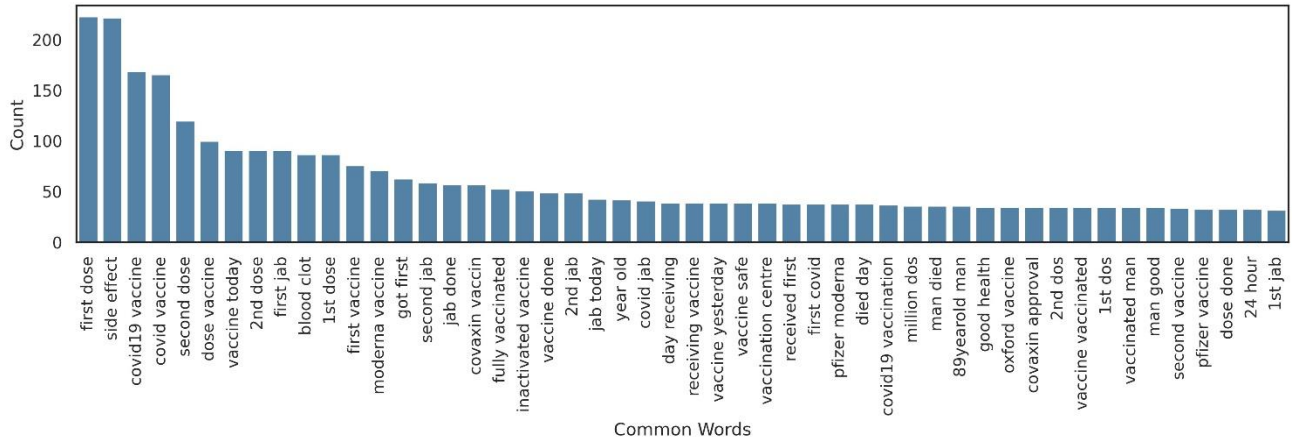


Supplementary Fig. 4 Count of n-grams in tweets from United Kingdom

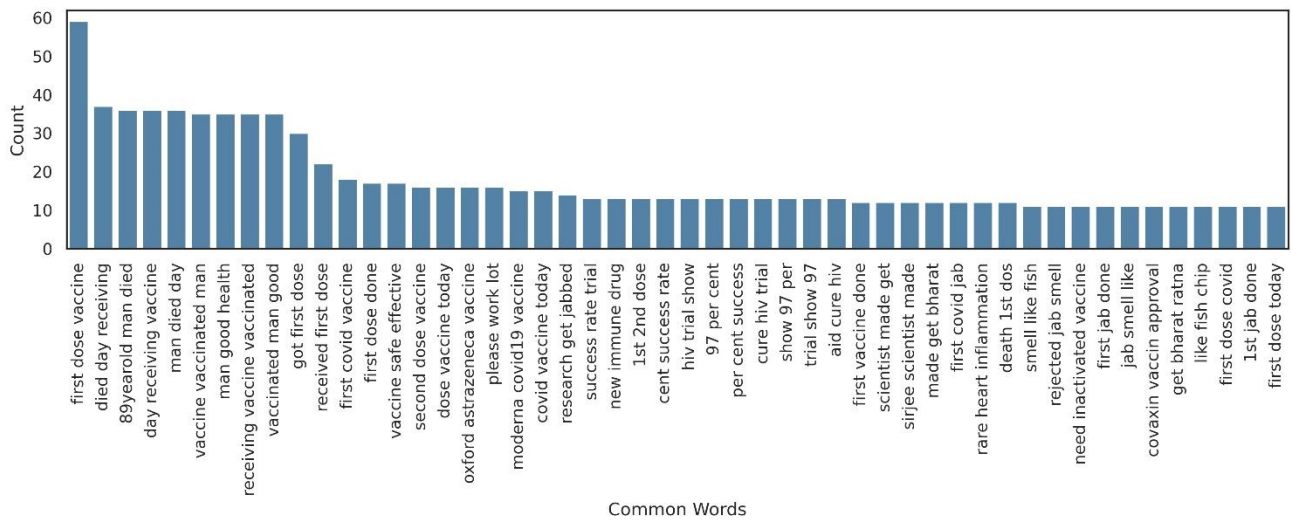
4a. Unigram



4b. Bigram



4c. Trigram



4d. 4-gram

