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Fertility-related conversations in the context of COVID-19 and vaccinations

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Engagement





Motivation

Examining social media conversations about fertility

- In relation to both COVID-19 and COVID-19 vaccinations
- Conversations that might relate to fertility
- Focusing on personal reports
- Visualizing trends

Exploratory

Not safety signal detection

Data collection


Tweets collected from January 2020 to October 2022

Four searches that combine COVID-19 and vaccine-related terms with

- a. Menstrual-related terms
- b. Miscarriage-related terms
- c. Pregnancy and birth-related terms
- d. Child sickness-related terms

Menstrual-related query

((covid OR covid-19 OR corona OR coronavirus) OR

(pfizer OR mRNA OR biontech OR moderna OR spikevax OR astrazeneca OR vaxzevria OR "the AZ" OR novavax OR nuvaxovid OR covid19vaccine OR covidvaccine OR covidvax OR vaccine OR vaccines OR vaccinated OR unvaccinated OR inoculated OR vax OR vaxxed OR  OR jab OR jabs OR jabbed OR booster OR boosted OR "my shot" OR "my jab" OR "the jab" OR "first shot" OR "second shot" OR "clot shot" OR "1st shot" OR "2nd shot" OR "first dose" OR "second dose" OR "3 shots" OR "3rd shot" OR "4 shots" OR "4th shot")) AND

(menstrual OR premenstrual OR "pre-menstrual" OR menstruation OR period OR periods OR "my cycle" OR "her cycle" OR cycles OR "days early" OR "days late" OR "came early" OR "came late" OR flow OR gushing OR cramps OR spotting OR irregular OR heavy OR heavier OR heaviest OR bleeding OR ovaries OR ovarian OR uterine OR uterus OR womb OR "ob-gyn" OR gynecologist OR obstetrician OR menopause OR menopausal OR "hot flashes" OR "decidual cast")

-is:retweet lang:en

The other queries

(miscarried OR "my miscarriage" OR "a miscarriage" OR "suffered an" OR "suffered a" OR "failed pregnancy" OR "pregnancy failed" OR "pregnancy failure" OR "pregnancy loss" OR "lost my baby" OR "baby died" OR "babies death" OR "babys death" OR neonatalloss OR neonataldeath OR babyloss OR infantloss OR childloss OR stillbirth OR waveoflight OR "still birth" OR "still-birth" OR "still born" OR "still-born" OR "born dead" OR "born asleep" OR lifeafterloss)

("weeks early" OR "came early" OR "arrived early" OR "pre-mature" OR "pre mature" OR "pre-term" OR "pre term" OR preemie OR scbu OR "baby unit" OR "she was delivered" OR "he was delivered" OR "baby was delivered" OR "babies were delivered" OR "was born" OR "were born" OR birth OR childbirth OR "blessed event" OR "into labor" OR "into labour")

(baby OR infant OR child OR daughter OR son OR children) AND

(sick OR ill OR milk OR breastmilk OR breastfeeding OR "breast fed" OR "breast feeding" OR cancer OR genetic OR chromosome OR chromosomal OR syndrome OR abnormal OR disorder OR disease OR hospital OR emergency OR ed OR icu OR unit OR ambulance)

Counts of keyword matches

Dataset	Count	Vax mention	Personal	Personal Vax
Total tweets	2,180,460	2,014,462 (92%)	133,365 (6%)	123,207 (5.6%)
Menstrual	1,148,364	1,067,080	95,469	87,378
Pregnancy & birth	369,385	351,578	5,580	5,234
Pregnancy loss	80,478	78,178	3,174	2,954
Child sickness	452,546	438,289	21,700	21,016

*1,304,958 duplicated or irrelevant tweets were removed
e.g., "covid-19 period", "miscarriage of justice"...*

Analytical Approaches

Large Language Models

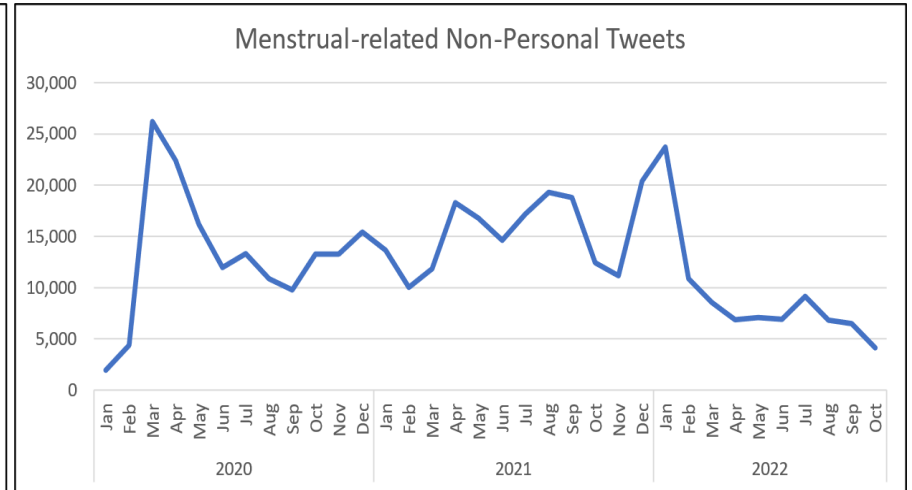
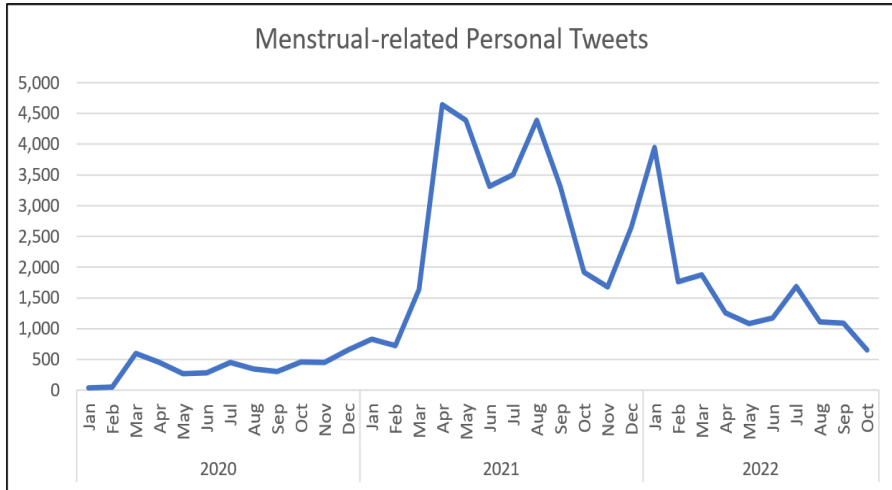
Topic Modelling

Personal Health Mention detection

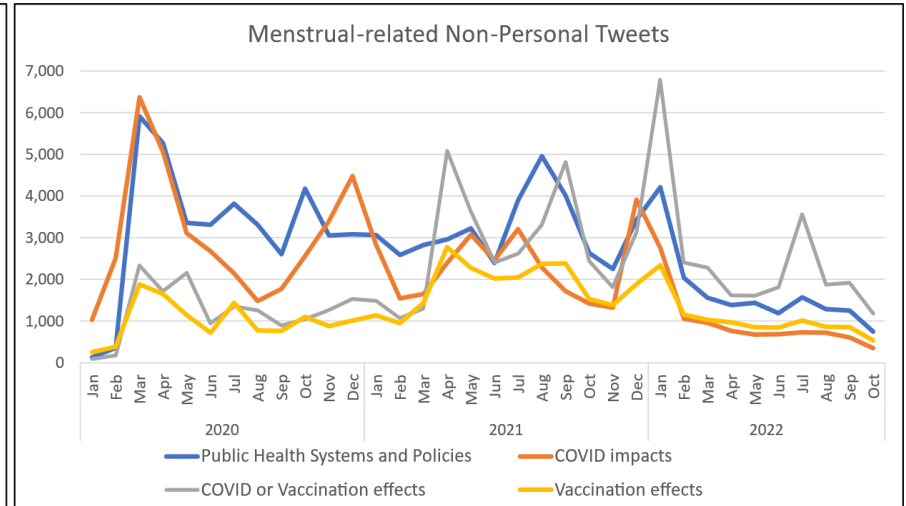
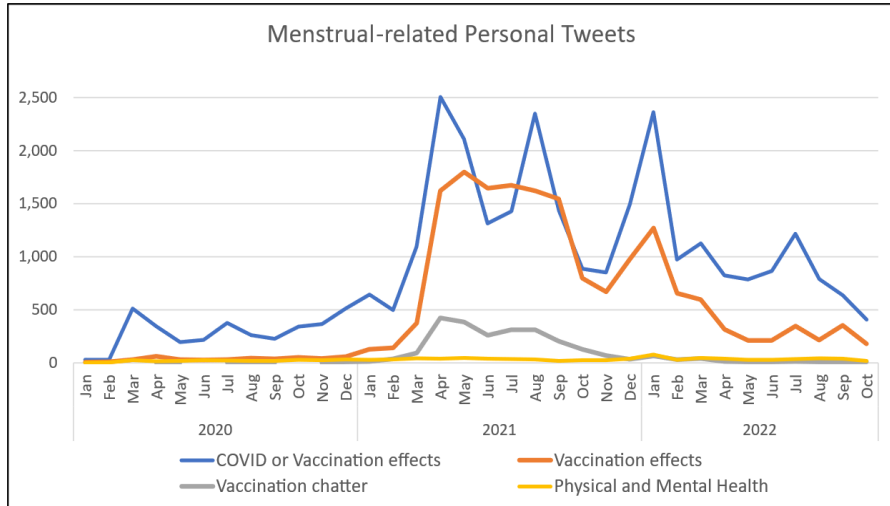
Trends over duration of the pandemic

Examination of the texts

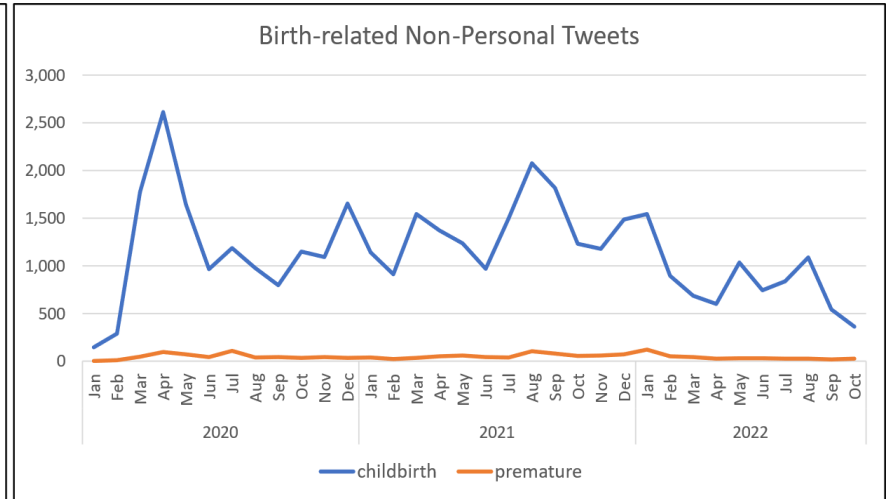
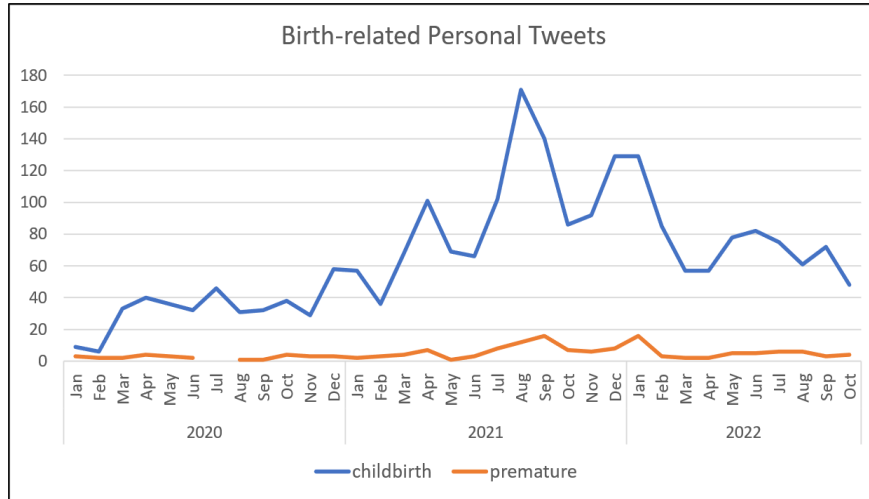
Menstrual related trends



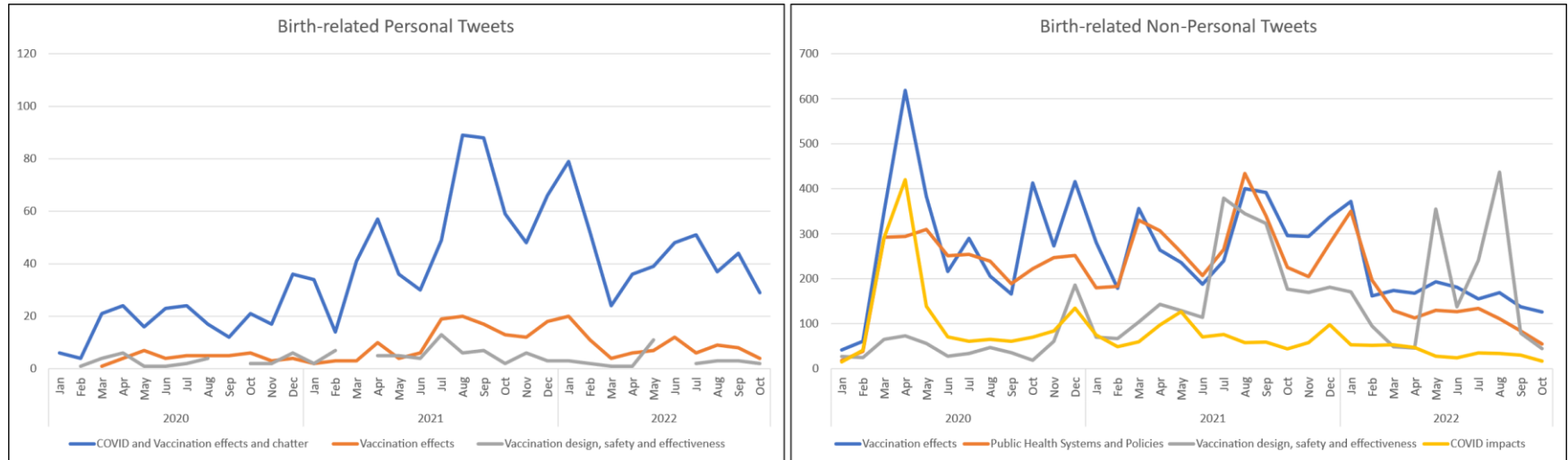
Menstrual related topic categories



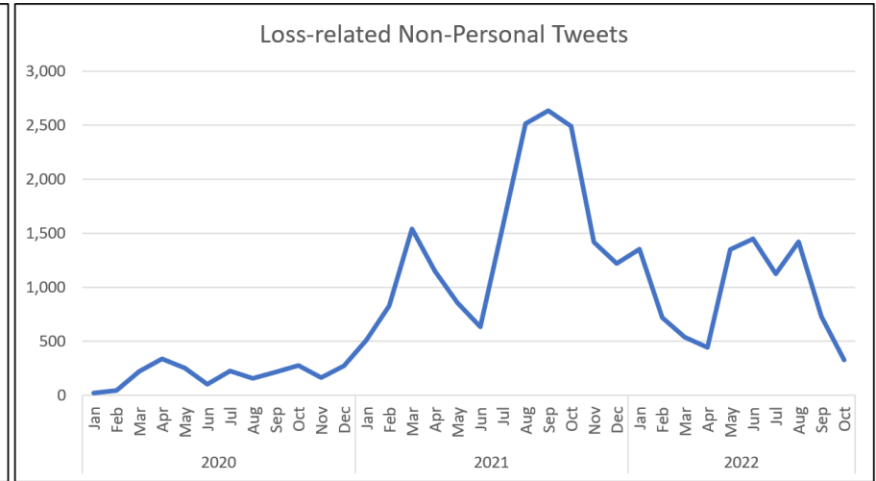
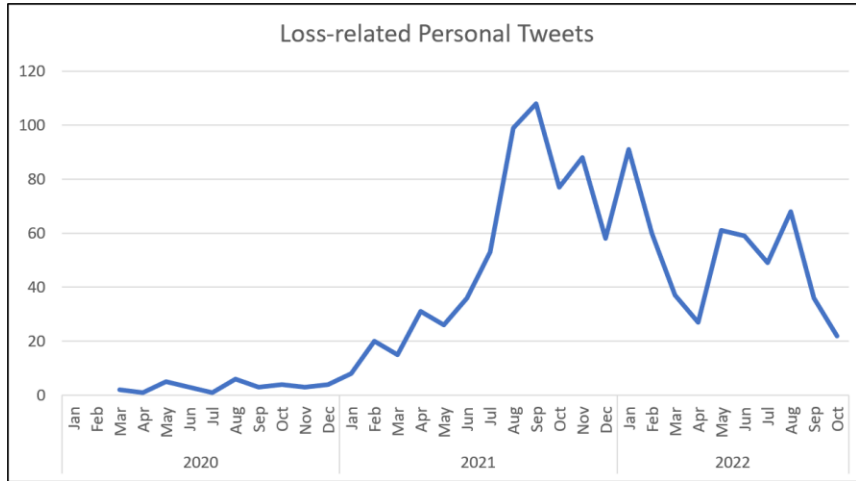
Pregnancy and Birth related trends



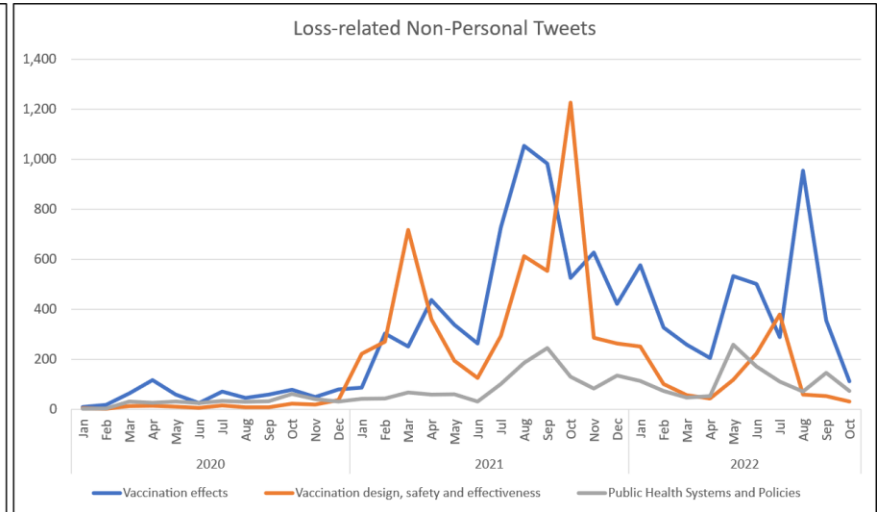
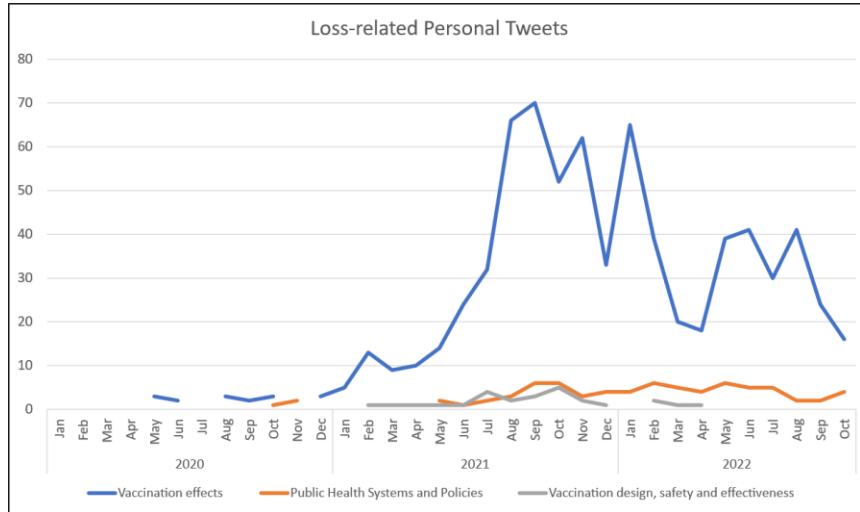
Pregnancy and Birth related topic categories



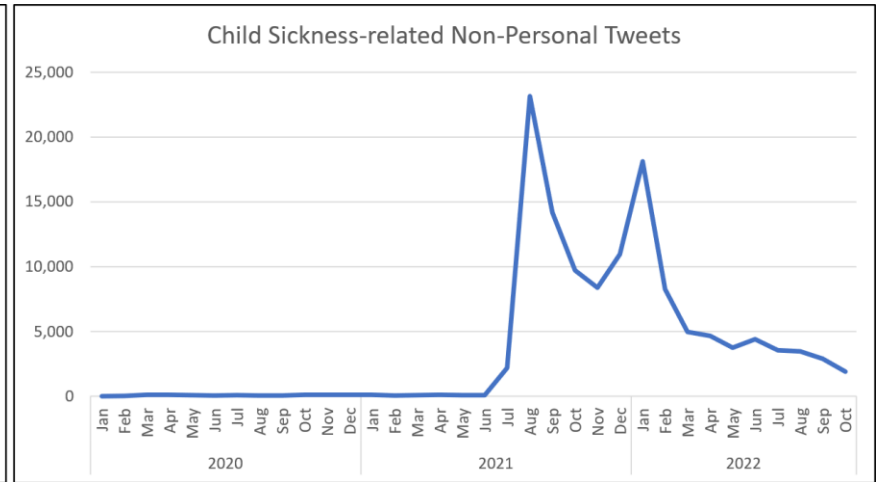
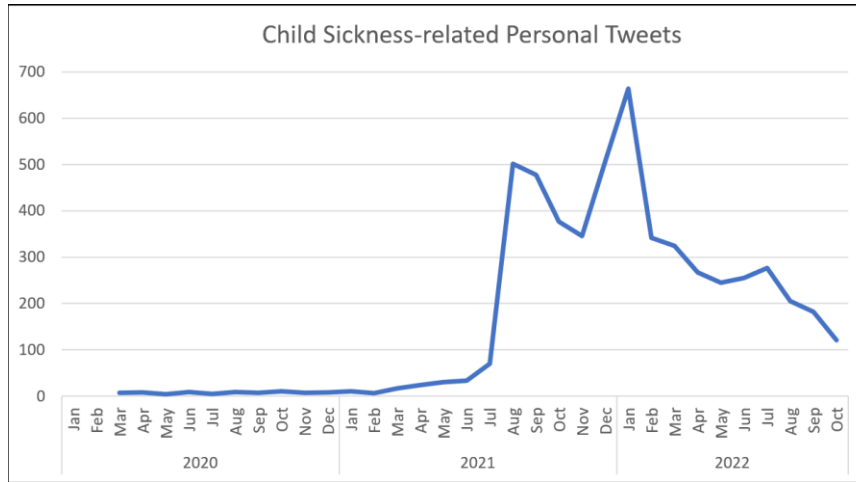
Pregnancy loss related trends



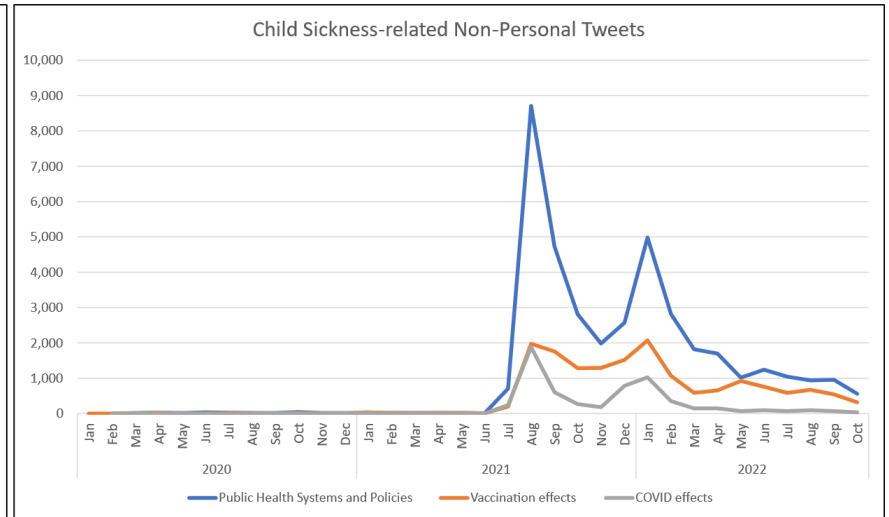
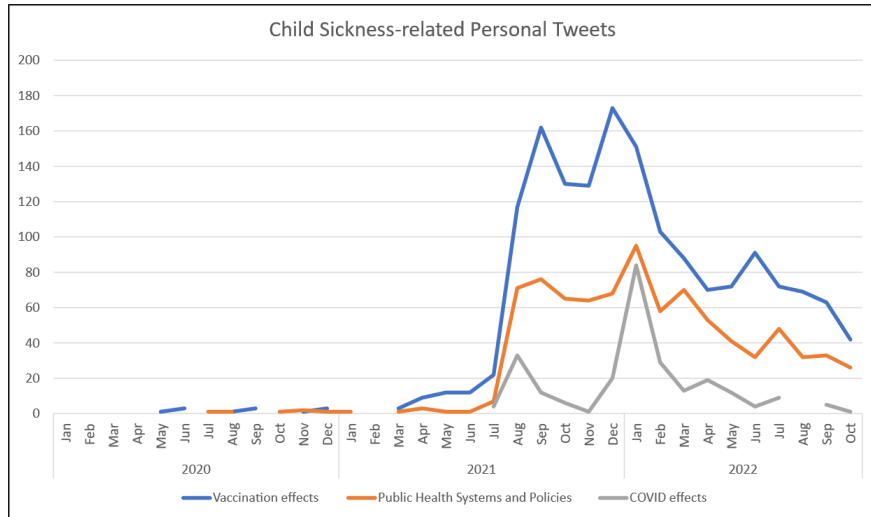
Pregnancy loss related topic categories



Child-sickness related trends



Child-sickness related topic categories



Tweet examples

“5 days after getting the Vax, my period stopped coming. 7 months later still no period”

“My daughter's period has stopped after the 2nd Pfizer jab, 3 months now. She always had regular periods... she was planning on starting a family...”

“my period stopped for 5 months after my second dose, and I think that does need to be researched further”

“Two weeks after her vax, my niece gave birth to her son at 27 weeks. Her placenta all of a sudden stopped working. She said the nicu is full of newborns who are having unexplained seizures”

“My daughter miscarried 24 hours after her first jab. She is now experiencing heavier flow and unable to conceive again. I would have a 6 month old grandchild by now”

Observations

The trends analysis show a pattern of increased reporting as vaccinations are rolled out.

Trends of personal reporting in particular - indicate increased reporting upon rollout.

The personal miscarriage conversations increase 4 to 7 months after rollout.

Some of the increased reporting is due to increased vaccine keywords matching to tweets.

Despite the distinct search categories there is spillover, e.g., child-sickness contains adults.

Vaccine mentions can also indicate them as effective against COVID-19.

Observations, 2

The dominant topic categories of personal tweets are concerned with vaccine side-effects.

Public health policy and vaccine safety & effectiveness feature more in non-personal tweets.

Menstrual issues are the largest group, pregnancy, birth and miscarriage are much smaller.

Sickness issues are between – and show a sudden increase with vaccine rollouts.

According to the Twitter conversations, delayed pregnancy because of menstrual issues, combined with failed pregnancy, arise from COVID-19 illness as well as the vaccines.

Limitations

Limitations of social media data.

Exploratory and indicative only.

Genuine reports and effects are not quantified or proven per search group.

Although user stats suggest genuine users in personal tweets, no bot detection carried out.



Conclusion

This study uses a social media data source to explore online public discussions about COVID-19 and vaccinations that relate to fertility; and highlights the need to listen to, validate, and engage in the public conversation regarding these concerns.



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