

A Content Analysis of Indoor Tanning Twitter Chatter During COVID-19 Shutdowns

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Abstract

Background: Indoor tanning is a preventable risk factor for skin cancer. Statewide shutdowns during the COVID-19 pandemic resulted in temporary closures of tanning businesses. Little is known about how tanners reacted to losing access to tanning businesses.

Objective: The present study analyzed Twitter chatter about indoor tanning during the statewide pandemic shutdowns.

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Results: About half (50.6%) of tweets were by people unlikely to indoor tan, and most of these mocked tanners or the act of tanning (94.9%). Thirty-four percent of tweets were posted by users likely to indoor tan, and most of these (64.7%) mentioned missing tanning beds, often citing appearance- or mood-related reasons. Some tweets expressed a desire to purchase or use home tanning beds (12.7%), while only 3.9% mentioned tanning alternatives (e.g., self-tanner). Very few tweets (2.5%) were public health messages about the dangers of indoor tanning.

Conclusions: Findings revealed that during statewide shutdowns, half of the tweets about indoor tanning were mocking tanning bed users and/or the tanned look, while about one-third were indoor tanners reacting to their inability to access tanning beds. Future work is needed to understand emerging trends in tanning post-pandemic.

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Original Manuscript

A Content Analysis of Indoor Tanning Twitter Chatter During COVID-19 Shutdowns

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Abstract

Background Indoor tanning is a preventable risk factor for skin cancer. Statewide shutdowns during the COVID-19 pandemic resulted in temporary closures of tanning businesses. Little is known about how tanners reacted to losing access to tanning businesses.

Objective The present study analyzed Twitter chatter about indoor tanning during the statewide pandemic shutdowns.

Methods We collected tweets from March 15 to April 30, 2020, and performed a directed content analysis of a random sample of 20% of tweets from each week (n=1,165). Two coders independently rated themes ($\kappa = .67-1.0$, 94-100% agreement).

Results About half (50.6%) of tweets were by people unlikely to indoor tan, and most of these mocked tanners or the act of tanning (94.9%). Thirty-four percent of tweets were posted by users likely to indoor tan, and most of these (64.7%) mentioned missing tanning beds, often citing appearance- or mood-related reasons or withdrawal. Some tweets expressed a desire to purchase or use home tanning beds (12.7%), while only 3.9% mentioned tanning alternatives (e.g., self-tanner). Very few tweets (2.5%) were public health messages about the dangers of indoor tanning.

Conclusion Findings revealed that during statewide shutdowns, half of the tweets about indoor tanning were mocking tanning bed users and/or the tanned look, while about one-third were indoor tanners reacting to their inability to access tanning beds. Future work is needed to understand emerging trends in tanning post-pandemic.

Keywords: Twitter, tanning, social media, COVID19

Introduction

In the United States, one in five people will develop skin cancer in their lifetime.¹ Melanoma, the deadliest type of skin cancer, is the most common cancer among young adults aged 25-29.² Excessive exposure to ultraviolet (UV) radiation from either the sun or artificial sources (e.g., tanning beds) is a major risk factor for skin cancer.³ On March 11th, 2020, the World Health Organization (WHO) declared COVID-19 a pandemic, and states across the US enforced stay-at-home orders, forcing businesses to close their doors. The shutdowns in the US served as a natural experiment of the impact of tanning businesses closing on indoor tanners, as demand for tanning services tends to peak between January and June, coinciding with the COVID 2020 shutdowns.⁴ Twitter data may be useful for understanding indoor tanning attitudes, given that young adults who indoor tan are almost twice as likely to use Twitter regularly than those who do not.⁵ Another study assessed the frequency of mentions of indoor tanning on Twitter and found that in a two week period, 120,354 unique users made 154,486 tweets that mentioned the words indoor tanning, tanning bed, tanning

booth, tanning salon, sun bed, or sun lamp, and these tweets reached 113,888,616 users.⁶ Other studies have delved into the content of tweets about indoor tanning. For example, one study examined tweets that contained the phrases “tanning bed” or “tanning salon” and found that most tweets (71.2%) were posted by tanners and either expressed positive sentiment about indoor tanning, negative tanning bed experiences, or tanning-related injuries.⁷ Another study of tweets containing keywords for tanning bed use and burning revealed that in 2013 over 15,000 had these keywords and 64% described a tanning-bed induced burn.⁸ Together these studies reveal that Twitter may provide insights into tanners’ attitudes and behaviors.

The current study aimed to examine Twitter chatter about indoor tanning during the COVID shutdowns (March 15th- April 30th 2020). Stay-at-home orders became colloquially known by several terms, such as “shutdowns” and “lockdowns”, but all terms refer to the orders issued by local and state officials that limited business activities to those deemed essential (e.g., grocery, pharmacies, and hospitals) and limited residents’ “non-essential” travel outside of the home.⁹ The majority of stay-at-home orders (e.g., shutdowns) began in March 2020, and by March 31st, 2020, 42 states and the US territories had issued a stay-at-home orders affecting 73% of all U.S. counties.^{10,11} Location data from mobile devices suggests that compliance with restrictions was high, with 97.6% of counties with mandatory stay-at-home orders reporting a decrease in median population movement immediately after the start dates of the stay-at-home orders.¹⁰ We were interested in whether tanners found alternative means of accessing tanning beds, if they discussed interest in UV tanning alternatives (e.g., sunless tanners), and their reactions to having no access to commercial tanning beds. Given the proliferation of misinformation about the impact of UV radiation on COVID-19 that appeared to have begun after President Trump proposed the idea that UV light could be used inside the body to remedy COVID-19¹², we also examined the presence of misinformation in tweets about tanning beds.^{13,14}

Methods

This was a cross-sectional qualitative study of public tweets about indoor tanning during the COVID-19-related shutdowns. We searched Twitter for two common lay terms, “tanning bed” and “tanning salon” that refer to “indoor tanning,” a public health term that refers to tanning using artificial ultraviolet light-producing devices.^{7,15} Using the R package “rtweet,” we captured tweets that occurred between March 15, 2020, one of the first days of the COVID-19 statewide business shutdowns, and April 30, 2020.^{16,17} We excluded retweets because our interest was in the original thoughts of users, but we included “quote tweets,” which contain the tweeter’s own sentiments. We removed tweets that were advertisements, pornography, or from accounts that became private or were suspended between the data capture and the qualitative coding process in April 2021 (Figure 1). Of the 5,811 tweets captured, we randomly sampled 20% of eligible tweets captured per week during the sampling window to capture conversation from the entire sampling window (N=1,165), consistent with other studies of tweets.¹⁸ This study does not meet the definition of human subjects research and thus did not require IRB approval. However, to protect the privacy of users who may not expect public tweets to be used in research, we paraphrased tweets in Table 1 to render the tweet’s content unsearchable while preserving the meaning. We confirmed that the paraphrased content did not produce the original tweet via searches.

Statistical Analysis

We conducted a directed content analysis of tweets utilizing a codebook from our 2016 Twitter study about indoor tanning.^{7,19} We modified the codebook after examining a subsample of 100 tweets. The original codebook had 9 codes: desire to use a tanning bed, sleeping in a tanning bed, tanning-related injury, complaint about or negative experiences tanning, tanning salon employee chatter, mocking tanners or tanning, health warnings

about indoor tanning, pushback against “tanning is unhealthy” messaging or anti-tanning legislature, and references to indoor tanning in the context of an unrelated topic (e.g., movie quote). We expanded the codebook to include 3 additional codes for tweets in which the user expressed that they missed being able to go indoor tanning, expressed a desire to buy a home tanning bed and/or crowd sourced followers to use a home tanning bed, and mentioned the use of UV tanning alternatives (e.g., self-tanners). We eliminated 3 codes (i.e., sleeping in a tanning bed, tanning-related injury, a complaint about, or negative experiences) because they were not represented within the current dataset. We also coded tweets as posted by people who were likely to indoor tan (based on their admission of tanning or having tanned in their tweets), tanning salon employees (based on the content of their tweets), people who are not likely to indoor tan (based on their mocking indoor tanning or discussing the risks of indoor tanning), and people whose tweets do not indicate if they indoor tan or not. If a tweet seemed to be posted by a tanning salon employee but referred to their individual tanning behavior, we coded the tweet as being posted by someone likely to indoor tan. After finalizing the codebook, two coders independently coded all 1,165 tweets (100% doubled-coded). Discrepantly coded tweets were discussed to reach consensus.

We calculated interrater reliability and Cohen's kappa for each coding category. Interrater agreement of tweet categories ranged from 94%-100%, and Cohen's kappa statistics ranged from 0.6654 to 1.0. Interrater agreement among coders was 94% ($\kappa = 0.9106$). We summarized the proportion of tweets posted by those likely to indoor tan, tanning salon employees, those unlikely to indoor tan, and those whose tweets do not indicate whether they indoor tan. We then reported the frequency of tweet categories by user types. Analyses were conducted using SAS 9.4 (SAS Institute, Inc., Cary, NC).

Results

In our final sample of 1,165 tweets, 1,144 (98%) were posted by unique Twitter accounts. Ninety-three percent ($n=1,084$) of tweets in our analytic sample were from the search term “tanning bed,” while only 7% ($n=81$) were from the search term “tanning salon.” Half of the tweets (50.6%; $n=589/1,165$) came from users unlikely to indoor tan, while 34.5% ($n=402/1,165$) were posted by users who seemed likely to indoor tan (Table 1). Very few tweets (0.4%; $n=4/1,165$) appeared to be posted by tanning salon employees, and in the remaining 14.5% of tweets ($n=170/1,165$) the content did not clearly indicate whether the user was an indoor tanner.

Tweets from people unlikely to indoor tan. The majority (95%, $n=562/589$) were classified as mocking tanners, tan people, or the act of tanning. Among these, the majority (75.7%; $n=446/589$) mocked former US President Donald Trump's skin tone and 20.6% ($n=116/589$) mocked the appearance of tanners and the use of tanning beds in general. The remaining 5% ($n=30/589$) of tweets from users unlikely to be indoor tanners contained health warnings about indoor tanning.

Tweets from people likely to indoor tan. Nearly two-thirds (64.7%; $260/402$) were coded as “missing tanning,” meaning the user expressed they missed tanning, their frustration that they could not go tanning, and/or their eagerness to get back to tanning (Table 1). Within this category, 60% ($n=156/260$) of tweets did not mention a specific reason they missed tanning, but 30% ($n=77/260$) indicated they missed indoor tanning for appearance-related reasons, 5% ($n=13/260$) indicated they missed indoor tanning for mood-related reasons, and 5% ($n=12/260$) indicated withdrawal symptoms from being restricted from indoor tanning. The second most common theme among tweets from likely tanners was general positive attitudes about indoor tanning (17.2%; $n=69/402$), followed by the desire to buy a home tanning bed or use someone else's (22.3%; $n=90/402$), misinformation about tanning

(6%; n=24), and finally, use of alternative tanning methods such as self-tanner and bronzer makeup (3.9%; n=16/402; Table 1).

Other Tweets. The content of the remaining tweets (98.8%; n=170) made it unclear whether the user was an indoor tanner. The vast majority (95.9%; n=165/170) mentioned tanning beds in the context of an unrelated topic (e.g., movie scene). Tweets posted by tanning salon employees (n=4) were rare and included observations of occurrences in the workplace.

Discussion

About half of the tweets (50.6%; n=589/1,165) using the keywords “tanning bed” or “tanning salon” during the COVID-19 pandemic shutdowns in March and April 2020 were not by people who likely use tanning beds. Most of these tweets were mocking people who tan, tanning beds, or the tanned look. The next largest set of tweets (; 34.5%; n=402/1,165) seemed to be by people who use tanning beds, as evidenced by their content which focused on lamenting the inability to tan during the shutdown, expressing the desire for a home tanning bed, expressing positive sentiment about tanning beds, discussing alternative ways to get a tan in the absence of tanning beds, or promoting misinformation.

The finding that only about one-third of tweets (34.5%; n=402/1,165) appeared to be from indoor tanners is in contrast to a similar investigation by Waring et al. (2019), where twice the proportion of tweets (71.2%; n=699/978) using the same search terms in March 2016 appeared to be from indoor tanners.⁷ This finding could be due to declining rates of tanning bed use in recent years²⁰ and/or that COVID-19 shutdowns curtailed indoor tanning which may have decreased chatter about it.²⁰ Another possibility could be that the proportion of tanning-related tweets that were negative chatter about former President Donald Trump’s skin color increased from 2016 to 2020.^{21–25} Waring et al. (2019) found only 10.7% of tweets in 2016 were mocking tanners and/or the tanned look compared to (48%; n=562/1,165) of tweets from 2020 in the present study. Among tweets that mocked tanners, the vast majority (79.7%; n=448/562) mocked former President Donald Trump, accounting for 38% (n=446/1,165) of all tweets. Criticism of a tan-appearing public figure may shift social norms about indoor tanning for the better or worse, depending on how people feel about that public figure. Perceived social norms strongly predict indoor tanning²⁶ and increased negative sentiment toward indoor tanning and a tan appearance may shift appearance-related social norms. Future research should explore how negative sentiment on social media about tanned celebrities influences indoor tanning behavior and attitudes.

While most posted tweets lamented the inability to tan, interestingly, very few (3.9%; n=16/402) mentioned using tanning alternatives (e.g., sunless tanners). Some tanners may have been more interested in gaining access to UV tanning than non-UV tanning, even though the latter was far more accessible. However, those who switched to non-UV tanning may have been less inclined to discuss this on Twitter, perhaps simply because non-UV tanning was more accessible or perhaps to the extent they felt stigma around admitting to getting a “fake tan”.^{27,28} The COVID-19 related shutdowns may have been a missed opportunity to promote sunless tanning products. Because orange-appearing skin was also the focus of tweets mocking Donald Trump (e.g., “Trump been in the tanning bed too long? He looks like a Cheeto”), these tweets may have also negatively impacted social norms around sunless tanning products. Many tanners fear sunless tanning products will create an orange appearance because early products had this effect.^{27,28} Future research should examine how social norms around tanning beds and sunless tanning are influenced by social media conversations.

The most common type of tweet among tanners expressed that they missed tanning, and 39% (n=260/402) of these mentioned reasons they missed tanning. Appearance-related reasons were by far the most common (30%; n=77/260). The increase in the use of

videoconferencing software during the COVID-19 pandemic has been shown to have exacerbated appearance-related concerns leading to an increase in cosmetic surgery consults.^{29,30} Because physical appearance is well established to be among the most common reasons people use tanning beds,^{31,32} future studies should examine how the widespread use of videoconferencing has impacted tanning behavior.

Additional reasons people cited for missing indoor tanning included the positive impact they perceive tanning has on their mood and/or their discomfort with the negative affect they experience when they are unable to use tanning beds. Research has shown that 8%-20% of tanners meet criteria for "tanning addiction," indicators of which may include the experience of mood enhancement from tanning and withdrawal symptoms (e.g., irritability) when they cannot tan.³³⁻³⁶ Future research should explore how the shutdowns may have impacted tanning behavior among people qualifying as "tanning addicted." The forced period of "cold turkey" could possibly have led some tanners to reduce or quit their tanning habit altogether. Alternatively, when tanning salons reopened a disinhibition effect may have occurred such that tanners increased their tanning beyond pre-pandemic levels after being involuntarily restricted.

Some tweets from tanners (22%; n=90/402) expressed their interest in gaining access to a home tanning bed. Future studies should examine whether the small segment of indoor tanners (<10%) who use home beds grew following the pandemic shutdowns.^{37,38} The impact of restricted or discouraged access to tanning beds has implications for legislative and public health efforts. For example, Australia banned commercial tanning services in 2016. Governments initiated buyback programs to discourage home tanning bed use in the states of Victoria and New South Wales.^{39,40} Afterward, Australian consumer interest in tanning beds declined to less than one-fourth of pre-ban seasonal peaks, but interest in sunless tanning was high.⁴¹ While home tanning beds are still legally marketed in Australia, spray tanning remains more popular.^{41,42} Therefore, buyback programs and/or legislation restricting the sale of home tanning beds may be necessary accompaniments to legislation restricting tanning businesses in the US.

Unfortunately, we observed very few public health messages regarding the dangers of indoor tanning. Only 2.5% (n=29/1,165) of tweets were of this type which is even less than the 4.3% that were observed in the previous investigation of tanning bed chatter on Twitter.⁷ To be sure, public health efforts were heavily focused on COVID-19 at this time. However, given the misinformation about UV and COVID-19 prevention,¹⁴ this would have been an important opportunity to underscore the dangers of indoor tanning. Interestingly, only 5 (0.4%) tweets out of 1,165 contained misinformation. Misinformation themes included that UV radiation from tanning beds could kill COVID-19, that UV radiation from the sunbathing could kill COVID-19, and that indoor tanning is healthy to use as therapy. However, because tweets in our study must have contained the words tanning bed or tanning salon, they may not have captured the full range of misinformation circulating about UV and COVID-19.

This study has limitations. Our data capture was limited to two common lay terms typically used in the US to refer to indoor tanning. We may not have captured tweets containing other terms that refer to indoor tanning nor tweets about using non-UV tanning alternatives. Also, states started reopening at different times during the end of the sampling window which may have impacted the types of tweets in our sample.⁴³ Further, we may have captured tweets that were posted by users outside of the US. Few Twitter users activate their location data,⁴⁴ so it is difficult to determine where all the tweets originated. As we only coded 1,165 tweets from the nearly 5,000 unique tweets captured during the sampling window, we may have missed interesting yet rare topics of conversation. Additionally, tanners who were most upset by the shutdowns may have been more likely to

tweet about it. Among the 23% of adults in the US that use Twitter, only 18% reside in rural areas^{45,46} so our data may not have captured the full range of sentiment about indoor tanning in rural areas of the US.

Conclusion

Many indoor tanners appeared to miss indoor tanning during the pandemic shutdown, particularly due to appearance concerns, and some were seeking alternative ways to access tanning beds. We also discovered that, compared to a similar investigation 5 years ago, a much larger percentage of tweets about indoor tanning were very critical of indoor tanning.⁷ The use of tanning beds and/or the appearance of having used them appears to be the target of insults that are often politically motivated on social media. Future research is needed to examine how the pandemic and the surrounding political climate affected tanning behavior and attitudes.

Tables and Figures

Figure 1: Tweet sampling and construction of analytic sample

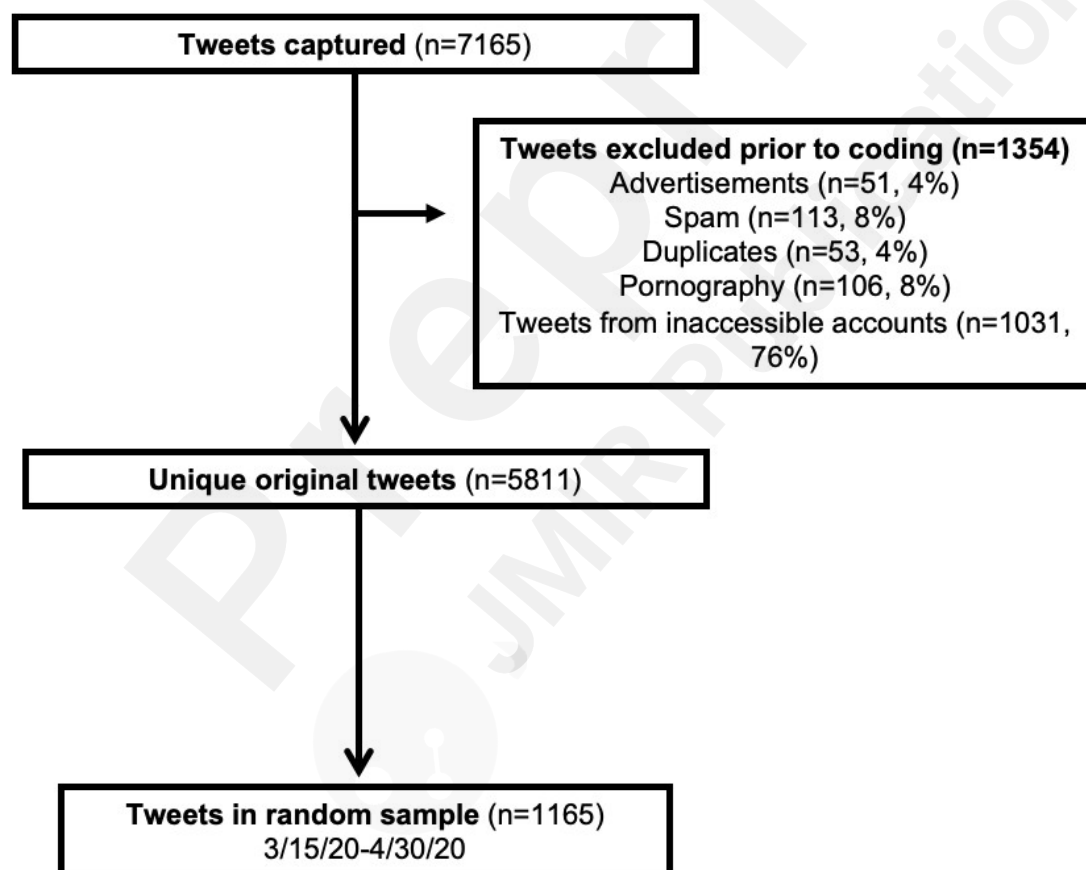


Table 1: Topics of tweets (N=1,165) about indoor tanning on Twitter during statewide shutdowns (3/15/2020-4/30/2020), by user type^a

| Tweet Category by User Type | N (% of tweets) | Illustrative Examples ^b |
|---|-----------------|------------------------------------|
| People who likely do not tan indoors (n=589 tweets) | | |

| | | |
|--|----------------|---|
| Mocking tanners, tan people, or the act of tanning | 562 (95.4%) | Some people are about to meet their real girlfriends for the first time with the tanning bed closed hahaha |
| Mocking tweets mentioning Donald Trump | 448 (76.1%) | Trump went in the tanning bed too long. Looks like a burnt cheeto |
| Health warnings | 30 (5.1%) | Sorry if you're a person that uses the tanning bed, you are ruining your skin's health and look! Proud to be pale and skin cancer free. I used to tan in a tanning bed, but you get older and your wrinkles hide small objects |
| People likely to tan indoors (n= 402 tweets) | | |
| Missing tanning | 260 (64.7%) | I need the tanning bed to reopen, being pale makes me depressed Having serious tanning bed withdrawals, this is killing me! |
| <i>Appearance-related missing tanning</i> | 77 (30%) | I need the tanning bed to open back up. I look so pale I can't stand it. |
| <i>Mood-related missing tanning</i> | 13 (5.0%) | I need the tanning bed to reopen, that's my stress-reliever! |
| <i>Withdrawal from indoor tanning</i> | 12 (4.6%) | Anyone else going through tanning bed separation anxiety? This hurts |
| Expressing a desire to buy a home tanning bed, bought a tanning bed, or looking to use someone else's home tanning bed | 90 (22.4%) | I will buy a tanning bed if this quarantine continues PSA who's got a tanning bed for me to use?! I'm desperate |
| Positive sentiment about tanning | 69 (17.2%) | So happy I have a tanning bed during this, I need to be tan |
| Use of alternative behaviors | 15 (3.9%) | Give me some recs for self-tanners since my tanning salon is closed! Ordered some self-tanner because this no tanning bed thing is killing me |
| Arguments against messages that tanning is unhealthy or presents indoor tanning misinformation | 24 (6.0%) | Let's reopen the tanning salon, I think we can all agree that UV light will help kill the virus. |
| Other | 27 (6.9%) | Burnt my face in the tanning bed and now I don't look good |

| Tanning salon employees ($n=4$ tweets) | | |
|---|-------------|--|
| Tanning salon employee chatter | 4 (100%) | Will these mandatory closing impact the tanning salon I work at? |
| People whose tweets do not indicate whether they indoor tan ($n=170$ tweets) | | |
| Unrelated to indoor tanning, tweets by people who do not indoor tan, or unclear whether speaker is a tanner | 168 (98.8%) | That tanning bed scene in the final destination movie is creepy |
| Argues against messages that tanning is unhealthy or presents indoor tanning misinformation | 2 (1.2%) | I'm gonna open a coronavirus clinic, ordered a tanning bed and some Lysol. I'll save everyone! |

^a Tweets could be coded in more than one tweet category

^b While all tweets included in the analysis were posted publicly, to protect the privacy of individuals who posted these tweets, we paraphrased the words of tweets in a way that prevents the content of the tweet to be searchable without changing meaning

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Supplementary Files