

Pre-Exposure Prophylaxis (PrEP) and 'Risk' in the news

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Abstract

This study investigates 'risk' as discussed in news coverage and in relation to Pre-Exposure Prophylaxis (PrEP): a treatment that has been proven to restrict the transmission of the Human Immunodeficiency Virus (HIV). In the U.S. and the U.K. & Ireland, there are issues concerning the provision and take-up of PrEP, which can lead to health inequalities. Raising awareness and tackling stigma are priorities in ensuring that those who would benefit from PrEP can access it, since these are reported to be obstacles to potential users seeking out the treatment.

The media has been shown to be an important resource for public understanding of health issues and there is evidence to suggest that the news media have contributed to the uncertainty and stigma around PrEP (Schwartz and Grimm 2016; Mowlabocus 2019), which has discouraged some from supporting and taking PrEP. In this study, I examine a corpus of 1424 news articles on PrEP (1 017 743 words) from the U.S. and the U.K. & Ireland, in the period 2016-2019. Using methods from corpus linguistics, I show that forms of 'risk' appear to a statistically significant degree in the data, providing a quantitative basis on which to explore these in more detail. Focusing on publications that use a high proportion of 'risk' words (compared with the overall average), I show that the focus on various risks associated with PrEP differs according to publication and that references to 'risk' are used both to advocate for the wider provision of PrEP and to caution against the effects of providing PrEP, i.e. concerns about 'risk compensation'.

Corpus methods are shown to augment existing studies of PrEP coverage, providing a systematic method for identifying recurrent lexical features in the data and thereby showing how we can report the linguistic aspects of risk representation.

Keywords: corpus linguistics, news coverage, pre-exposure prophylaxis, risk compensation

Introduction

Pre-Exposure Prophylaxis (PrEP) refers to any preventative treatment designed to inhibit infection, though is commonly used in the context of the Human Immunodeficiency Virus (HIV). More specifically, it has come to refer to forms of a specific pill – a combination of the reverse-transcriptase inhibitors emtricitabine and tenofovir – that can be taken daily or in anticipation of being exposed to HIV.¹ The World Health Organization (WHO) recommends offering oral PrEP "to people at substantial risk of HIV as part of comprehensive HIV prevention" (WHO 2019, 5) and since 2017, PrEP have been included in the WHO's Essential Medicines List (WHO 2017). When delivered alongside HIV testing and antiretroviral therapy (ART) services, PrEP has been reported to lead to population-level reductions in HIV incidence among men who have sex with MSM in the United States (Smith et al. 2020) and the United Kingdom (McCormack et al. 2016; Nwokolo et al. 2017), as well as in Australia (Grulich et al. 2018).

Despite its efficacy, access to PrEP in both the U.S. and the U.K. & Ireland has been uneven. In the U.S., the Centers for Disease Control and Prevention (CDC) has reported that while an estimated 1.1 million Americans are at substantial risk for HIV, only 90 000 PrEP prescriptions were filled in 2018 (CDC 2018), with pharmacies accounting for 85-90% of all PrEP prescriptions. Furthermore, the study found that the use of PrEP was especially low among African-American and Latino populations. In December 2019 the U.S. government launched the 'Ready, Set, PrEP' program to make the medications available at no cost to individuals who lack prescription drug coverage as part of its plan for *Ending the HIV Epidemic* (<https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview>) and in addition to reducing new infections, the Office of National AIDS Policy (ONAP) cites increasing access to care, reducing health inequalities and achieving a more coordinated

national response to the HIV epidemic as its key goals (Office of National AIDS Policy 2020).

In the U.K., the government announced in March 2020 that English local authorities would receive £16 million in 2020-2021 to deliver PrEP through sexual health clinics to "anyone who is at a high risk of contracting HIV" (UK Government, 2020). This development followed legal proceedings beginning in 2016 in which the National Aids Trust (NAT) challenged NHS England's decision that it would not be considering PrEP among its specialised commissioning treatments, deferring responsibility for commissioning PrEP to local authorities (NHS England 2016). Over this period, PrEP provision in the U.K. has been sporadic, with access limited to restricted trial spaces offered in sparse locations and backed by the national health services of the U.K. at different times.² In response to the March 2020 announcement, the NAT stated that while trials co-ordinated by the National Health Service have successfully engaged with gay and bisexual men, other people at risk of HIV were not accessing places and a failure to address this would "risk embedding inequalities from the outset" (National Aids Trust 2020). For advocates of PrEP, then, there are concerns about the risk of health inequalities; in contrast, concerns about 'risk compensation' behaviours (Adams, 2002) have been shown to inhibit public and state support for PrEP (Card et al., 2019). Furthermore, associations with risk compensation have contributed to the stigma surrounding PrEP, which in turn is reported to be an obstacle to uptake of the treatment (Calabrese and Underhill, 2015; Eaton et al. 2017; Golub 2018).

The news media have long been cited as having an important role in communicating or reformulating the ideologies that can lead to felt and enacted stigma (Kasperson et al. 1988; Douglas 2003) and the print media are purported to "reflect broader social debates, set the agenda for science and other media, and contribute to shaping public perceptions and policy debates" (Jaspal & Nerlich, 2016). The news coverage of PrEP in both the U.S.

(Schwartz and Grimm, 2016) and across the U.K. & Ireland (Jaspal and Nerlich 2016; Jaspal and Nerlich 2017; Mowlabocus 2019) has been shown to be a source of contrasting ideologies around PrEP and the communities perceived to include its primary beneficiaries – ideologies that are articulated with respect to various 'risks'. Zinn (2010, 107) reports that "Corpus linguistics can help to improve our definition of the concept of risk by giving empirically founded insights into the discursive usage of 'risk' in the media" and methods from corpus linguistics have been applied, for example, to a study of reporting on water contaminants (Tang and Rundblad 2017, 682) to "provide linguistic evidence to support the range of content-based studies pointing toward the media's role in the social amplification of risk".

Here, I explore expressions of 'risk' in news coverage from the U.S. and the U.K. & Ireland over the period 2016-2019. Using approaches from corpus linguistics, I demonstrate that forms of the word 'risk' are prevalent in the data and reflect various ideological positions with respect to PrEP. Looking at how these terms were used by particular publications, I show that references to 'risk' variously contribute to support for PrEP, highlight the need to identify those who would benefit from the treatment, castigate those same people for their (assumed) sexual behaviours and, subsequently, point to the 'risks' associated with seeking treatment. This work demonstrates how computational methods allow us to determine the prevalence of 'risk' in media coverage, to capture the range of (contrasting) views expressed in relation to PrEP, and consider how these reflect and contribute to the public's understanding of PrEP provision in the respective national contexts.

The impact of PrEP coverage

Researchers have analysed the news coverage of PrEP to critically consider its contribution to raising awareness around the treatment. Schwartz and Grimm (2016) analysed Truvada® coverage in the U.S. and found that few articles mentioned African American and Hispanic communities, raising concerns that certain communities were not encouraged to think of themselves as at risk of HIV infection and therefore, as potential beneficiaries of PrEP. Card et al. (2019, 1883) argue that in giving dissenting voices to PrEP an 'out-sized' focus, "news media coverage of PrEP provides subtle reinforcement of arguments that do not necessarily represent informed scientific consensus" and the media coverage given to 'PrEP denialists' is also seen to be both a source of confusion for potential beneficiaries of PrEP and an obstacle to wider uptake (Mayer and Krakower 2015). In a thematic analysis of U.K. news coverage of PrEP between 2008 and 2015, Jaspal and Nerlich (2017) identified what they call a 'risk representation', capturing references to uncertainties associated with PrEP (i.e. in relation to efficacy and its effect on sexual behaviours), which served to delegitimise and discourage interest in PrEP. They report examples of assertions that the introduction of PrEP would actually be a threat to HIV-prevention efforts, due to i) encouraging 'laziness' with respect to safe-sex practices, and ii) directing limited NHS funding away from other treatments.

In addition to potentially being misinformed, those who might benefit from PrEP are also subject to stigmatisation in the media. In a critical discourse analysis of U.K. news coverage of PrEP 2012-2016, Mowlabocus (2019) highlights an emphasis on 'personal responsibility' among potential PrEP users, in contrast to the state's 'funding' of heterosexual 'lifestyles' through the provision of birth control, erectile dysfunction medication and fertility treatment. Rather than being represented as another group concerned about their sexual health, beneficiaries of PrEP are positioned in competition with – and even a threat to – other health service users, with particular news publications playing a significant role in producing such representations (as is discussed below). Card et al. (2019, 1883) report that in PrEP

coverage in the Canadian news media, "the most commonly identified rationale for stigma was scientific uncertainty regarding the effectiveness of PrEP and the potential for risk compensation". 'Risk compensation' refers to a form of behavioural adaptation in response to perceived risk (Adams 2002). In the context of PrEP, the oft-cited concern is that users will engage in higher risk sexual behaviours i.e. neglecting to use condoms to protect themselves from other sexually transmitted infections (against which PrEP offers no protection) because they perceive themselves to be 'protected'. However, there is mixed evidence to suggest that PrEP users engage in risk compensation. While Traeger et al.'s (2018) systematic review found that most open-label studies of PrEP use that reported sexual risk outcomes showed evidence of an increase in condomless sex among PrEP users (HIV-negative MSM and transgender women), there is evidence to suggest that PrEP does little to alter pre-existing behaviour (Hojilla et al. 2016; Ortblad et al. 2020) and participants' decision-making regarding safe sex practices appears to be influenced by various personal, psychosocial, and health-related factors, which PrEP does little to change (Hojilla et al. 2016; Gafos et al. 2019).

Following a review of the clinical evidence, Powell et al. (2019, 27) conclude that "While drug resistance and risk compensation can occur with PrEP use, these are not valid reasons to withhold PrEP from patients given its substantial protective benefits". Nevertheless, it is clear that concerns about risk compensation are impacting perceptions of and access to PrEP. Researchers have found that stigma – and the idea that PrEP users are promiscuous and engage in particularly risky sexual behaviours – is an obstacle to uptake of PrEP (Calabrese and Underhill, 2015; Eaton et al. 2017; Golub 2018). For those seeking PrEP, there can also be gate-keeping issues borne from ideas about risk compensation that lead to health inequalities: Calabrese et al. (2013) investigated U. S. medical students' views about sexual risk compensation and found that participants rated a Black patient as more

likely to engage in increased unprotected sex if prescribed PrEP, compared with a White patient seeking PrEP and that this led to a reduced willingness to prescribe PrEP to the Black patient. Furthermore, "Social policies aimed at benefiting stigmatized groups, such as racial and sexual minorities, tend to receive lower support, advance more slowly, and be allocated fewer resources than policies serving more positively regarded, advantaged social groups" (Calabrese et al. 2016, 1499).

While the efficacy of PrEP is contingent upon governance and the capacity of health services to provide the treatment, it is clear that public awareness of the availability and risks of PrEP, as well as the impact of stigma are also key. This prompted a focus on the news coverage over the period 2016-2019, which also constituted a continuation of the existing studies of PrEP in the news in both the U.S. (Schwartz and Grimm 2016;) and the U.K. (Jaspal and Nerlich 2016; Jaspal and Nerlich 2017; Mowlabocus 2019), covering the earliest coverage of the treatment up until 2016. These studies employed different types of qualitative analysis (content analysis, thematic analysis, critical discourse analysis) to identify recurring themes relating to, for example, social representations of PrEP (Jaspal and Nerlich 2016), 'uncertainty' in PrEP information (Schwartz and Grimm 2016), and changing representations of gay men (Mowlabocus 2019). In what follows, I report the findings of a corpus-assisted analysis that demonstrates the prevalence of 'risk' in the news coverage and consider how 'risk' is used to support different points of view relating to PrEP, as PrEP provision has gradually been extended in the U.S. and in the U.K. & Ireland.

Materials and Methods

The data comprise news articles collected from the online database Nexis® using the search terms 'PrEP' and 'HIV' or 'prophylaxis' or 'Truvada' or 'Descovy' in the period 1 January 2016

to 31 December 2019.³ This included all 'English-language news', incorporating, for example, national and regional print newspapers; web-based publications and blogs; and commercial and trade magazines. Manual relevance-checking and de-duplication resulted in: 809 articles from the U.S., totalling 639 517 words; and 615 articles for the U.K. & Ireland, amounting to 378 226 words. Table 1 shows which publications provided the largest contributions to each sub-corpus and demonstrates how the dataset captures a range of political views, according to the editorial stance of various major news sources (discussed below).

[Table 1. Publications with the largest number of articles for each sub-corpus]

The prominence of the concept of 'risk' in (U.K.) news coverage of PrEP has been shown by Jaspal and Nerlich (2017), though their thematic analysis of news articles 2008-2015 was not tied to a specific lexis. Such work is therefore more interpretative and requires thorough manual investigation, coding and analysis. Computational methods from corpus linguistics can (semi-)automatically determine large-scale patterns across the data, though it is important that observations at this level are combined with close, detailed examination of the material in the context of the original article (cf. Partington, Duguid and Taylor 2013, 10). As summarised by Mautner (2009, 131):

Corpus linguistic software offers both quantitative and qualitative perspectives on textual data, computing frequencies and measures of statistical significance as well as presenting data in such a way that the researcher can assess individual occurrences of search words, qualitatively examine their collocational environments, describe salient semantic patterns and identify discourse functions.

Approaches such as those reported in Jaspal and Nerlich (2016; 2017) and Card et al. (2019) can draw on a wider set of terms that the analysts determine are conceptually related to 'risk', such as 'hazard', 'danger', 'safety' and 'security' etc. (Boholm 2018, 483), however it is difficult to determine how prevalent they are in the data. In capturing the quantity and distribution of such terms, corpus linguistics can determine if such terms appear frequently enough in the data to be considered 'overused' to a statistically significant degree and which terms are 'characteristic' of the data (Scott 1999), providing a quantitative basis on which to focus subsequent analysis. In this way, it can support researchers in targeting their analysis to features of the data pertinent to their interests, based on a pre-determined set of terms, or to take a more exploratory approach to find what is quantitatively significant in the data.

Keyness analysis compares frequencies of terms in the data to corresponding frequencies in a reference corpus: typically, a larger, more general language corpus. Using the corpus analysis toolkit *#LancsBox* (Brezina, Weill-Tessier and McEnery 2020), I compared the U.S. and the U.K. & Ireland news coverage data to the 'news' subset of the BNC2014: representing 1 078 051 words of news coverage from a range of national and regional newspapers.⁴ Keyness was defined with respect to a minimum frequency and statistical tests for significance (measured by log likelihood, (Rayson and Garside 2000)) and effect size (measured according to Log Ratio (Hardie 2014)). Terms were considered 'key' if they occurred 10+ times in the data; had a log likelihood value of 3.84+ (equivalent to $p < 0.05$); and a log ratio value of 1.00+ (indicating that the term appeared in the data at least twice as often as in the reference corpus). Risk-related terms are discussed briefly in the analysis below, however based on the results of the keyness analysis, I focus on forms of 'risk' in the subsequent qualitative analysis, discussing the contexts in which those terms appear. This demonstrates how a corpus-based method facilitates a quantitative and qualitative analysis of 'risk', which could

then be extended to include other (key) semantically related terms (such as 'hazard', 'danger' etc.).

The concordance tool in *#LancsBox* provides an interface that allows researchers to scan the instances of their chosen language feature (in this case, risk words) in the context of the words that appear immediately before and after the terms (the 'co-text'), to discern patterns in its use. Focusing on publications shown to feature a higher-than-average proportion of risk words, I refer to the co-text to investigate phraseological and broader rhetorical patterns of risk words, discussing who or what is described in terms of 'risk'. This enabled me to consider how particular PrEP-related risks are defined and foregrounded by different news outlets and assess whether these are broadly in support of wider PrEP provision, or cautious against it.

Results

Key risk-related terms

Following Boholm (2018), I conducted a search for the different linguistic realisations (i.e. 'risk' but also 'risks', 'at-risk', 'risky' etc.) of a shortlist of terms semantically related to the concept of 'risk' to determine their frequency and whether they were 'overused' in the data to a statistically significant degree (i.e. 'key'). Table 2 shows the most frequently-occurring forms resulting from the searches **risk**,⁵ **hazard**, **danger**, **threat**, **safe** and **secur**, indicating where the results met the criteria for keyness, according to frequency, significance and effect size in bold.

[Table 2. Key risk-related words]

This table shows that 'risk', 'high-risk', 'at-risk', 'risky' and 'risks' were key terms in both the U.K. & Ireland and the U.S. sub-corpora, but forms of **danger** and **hazard** did not meet the criteria for keyness and many forms of **threat** and **secur** were actually 'underused' in the data (only 'life-threatening' was key and only in the U.S. data). The term 'risk-taking' was key in the U.K. & Ireland data only, however this was used almost exclusively by one particular publication (*The Daily Mail*) and is discussed further below. Forms of **safe** were also shown to be key, offering an interesting contrast to discussions of 'risk' (along with the more semantically comparable 'unsafe'), as journalists assert that PrEP is 'safe' and commentators advocate for 'safer' sex practices; however, due to limitations of space, this will not be investigated further here. Based on these results, the subsequent analysis focuses specifically on forms of the word 'risk', which exceeded the thresholds for frequency, significance and effect size by some way.

Risk words in context

The next stage of the analysis was to consider how **risk** featured in relation to PrEP across different publications, with a view to uncovering if and how certain news sources promote particular ideologies and concerns around PrEP according to their editorial stance. The keyness analysis showed that a restricted set of five/six forms of **risk** were 'overused' to a statistically significant degree compared to their use in the reference corpus. This finding supports the investigation of a set of **risk** words, so in order to provide a more comprehensive analysis and align my work with previous research, I extended my subsequent investigation of these terms in context to a full set of 'risk words', as defined in Zinn (2018) and Zinn and McDonald (2018, 70), i.e. "any lexical item whose root is risk (risking, risky, riskers, etc.) or any adjective or adverb containing this root (e.g. at-risk, risk-laden, no-risk)". A search for all realisations of risk words showed that there were 1633 instances in the U.K.

& Ireland data, with 2389 instances in the U.S. sub-corpus and the key risk words account for 98.5% and 97.6% of these, respectively. Taking into account the different sizes of the sub-corpora, the relative frequencies of risk words are similar: 43.18 risk words per 100 000 words in the U.K. & Ireland data, compared with 37.36 in the U.S. data. Table 3 delineates the risk words in order of frequency, reiterating that those terms shown to be key were the most frequently-used forms.

[Table 3. Frequency of risk words]

Table 4 shows which publications in the U.K. & Ireland sub-corpus used a higher number of risk words per article than the overall average (2.66), which promised a range of perspectives according to the different editorial stances and readership associated with, for example, *The Daily Mail*, who have traditionally aligned themselves with the Conservative Party, and *The Independent*, whose readership aligns with the Liberal Democrat and Labour parties (<https://www.ipsos.com/ipsos-mori/en-uk/voting-newspaper-readership-1992-2010>). *iIndependent* was launched as a sister publication to *The Independent* in October 2010, though after being bought by Johnston Press in April 2016 and acquired by JPIMedia in November 2018, it has continued to distinguish itself from *The Independent* and positions itself at the centre of the political spectrum; for example it did not endorse any political party for the 2017 General Election (<https://inews.co.uk/opinion/editor/2017-election-manifesto-60185>).

[Table 4. Publications with the highest number of risk words per article (U.K. & Ireland)]

Table 5 shows which publications in the U.S. sub-corpus used a higher frequency of risk words per article than the overall average (2.95), showing that those publications referring to risk generally favoured a Left-leaning stance. *The New York Times* has a reputation for a liberal stance, having endorsed the Democratic Party candidate in every election since 1960 and the *Cable News Network (CNN)* is rated as having a Left bias by <https://mediabiasfactcheck.com/>. While *The National Broadcasting Corporation (NBC)* television news programme has a reputation for being politically left-aligned, the website is editorially separate.

[Table 5. Publications with the highest number of risk words per article (U.S.)]

Risk (Noun)/at-risk/high-risk

The word 'risk' accounted for roughly three-quarters of risk words across the data (U.K. & Ireland: 77.7%; U.S.: 74.6%) and predominantly appeared as a noun (U.K. & Ireland: 98.3%; U.S.: 98.9%) that was subject to quantification, as shown by the pre-modifying terms 'high/er', 'substantial', and 'increased', in addition to 'reduced' and 'lower', along with the compound 'high-risk'. Studies of 'risk discourses' have shown that risk has become increasingly associated with notions of quantification (Hamilton, Adolphs and Nerlich 2007; Boholm 2019; Li et al. 2020) and 'high-risk' conveys a sense of urgency and priority, justifying the health providers' and journalists' focus on these groups through this quantitative scale. Zinn (2018) observes that characterising a group or object in terms of its risk status is common in health discourses and, consistent with his findings, identifying particular individuals and groups in this way tended to foreground vulnerabilities or circumstances that those individual are not solely responsible for, presenting them as 'in need' and avoiding the

implication that their 'risk status' is the result of their behaviour(s). This can serve to avoid reinforcing potentially stigmatising associations between risk of infection and sexual behaviours.

The terms 'high-risk' and 'at-risk' most frequently referred, in the U.K. & Ireland sub-corpus, to: 'individuals' (37), 'group/s' (35), 'people' (35) and 'gay (and bisexual) men' (20); and in the U.S. data, to: 'individuals' (64), 'populations' (44) and 'group/s' (38). Fuller descriptions of the 'individuals' or 'groups' in the immediate co-text of the term 'high-risk' were limited, but there was a clear focus on gay (and bisexual) men, which is in part informed by the recruitment strategies of the clinical trials that were reported in the news coverage. Other descriptions identified in the co-text of 'at-risk' included "gay men, sex workers, transgender people and anyone in a relationship with an HIV patient" (TheDailyMail_04-08-2017); "gay and bisexual men, black and minority ethnic groups (BAME), and prisoners" (GlobalDataPoint_31-01-2019); "MSM, IV drug users and serodiscordant couples" (FDAWeek_29-01-2016); and "the lesbian, gay, bi-sexual and transgender community or IV drug users" (CentralPennBusinessJournal_01-12-2016). Furthermore, "trans men and women, and women of colour" were described as 'other' high-risk groups, i.e. in addition to MSM as the primary 'at-risk' group (TheStandard_22-08-2017).

Instances of 'at [higher/substantial/increased] risk' overlap somewhat with the description of individuals as 'at-risk'. Distinct from the hyphenated form, there were 327 instances of 'at risk' in the U.K. & Ireland data and 434 instances of 'at risk' in the U.S. data, most frequently referring to 'those' (U.K. & Ireland: 91; U.S.: 57) and to 'people' (U.K. & Ireland: 72, U.S.: 118) at risk. References to 'people at risk' more often included further modification, including quantification ('1.1 million people', '10 000 people', 'many people', 'not enough people') and other descriptors (e.g. 'young people', 'transgender people', 'seronegative people', 'African Americans, Latinos and people living in the South').

Looking at references to the various groups described as 'at risk' highlights how the separate publications focused on different population groups and the significance of their behaviours to their risk status. In the U.K. & Ireland, for example, *iIndependent* highlighted the efficacy of PrEP in terms of its risk reduction and general relevance to 'at risk' groups, supporting calls for wider provision "to all those at risk" (iIndependent_11-04-2017). Risk status is also linked to awareness, with "demographics such as women, heterosexual men and black African males being less likely to believe they are at risk" (iIndependent_29-10-2019). As a dedicated web-based medical and health news service focused on research, *Medical Xpress* highlighted the problem areas that are driving clinical research e.g. "PrEP is largely underutilized by women who are at risk for infection and little is known about the role of stigma among women" (MedicalXpress_04-11-2019). Looking at the groups associated with 'risk' also showed who is attributed with bringing about risk, with *The Independent* critical of the NHS's position to shift responsibility for providing PrEP to local authorities, asking "why are they prepared to put so many people's lives at risk?" (TheIndependent_03-06-2016). At times, however, introducing risk was attributed to a more general 'we' at a national level, as in: "If we don't invest in our services, we run the risk of undoing all this great work" (TheIndependent_01-12-2018).

In the U.S. coverage, occurrences of risk words in *Pharma & Healthcare Monitor* principally referred to risk status (96 occurrences, 54.9%), with specification of "women at risk of HIV infection" (Pharma&HealthcareMonitor_09-11-2018); "younger at-risk populations" (Pharma&HealthcareMonitor_17-05-2018); and "the sub-groups at greater risk of acquiring HIV", who are reported to be "African-American and Hispanic men who have sex with men (MSM) and transgender people of colour ages 13 to 34" (Pharma&HealthcareMonitor_15-05-2019). As a noun, 'risk' was presented as something that could be possessed or owned, in that "The transgender community's HIV risk is 49 times

greater than the general population" (Pharma&HealthcareMonitor_05-05-2016), 'othering' the transgender community from the 'general population' and encouraging a link between risk status and the identification as 'transgender'. *CNN* highlighted that the risks for young women, for whom there are "limited educational or economic opportunities", actually comes from their sexual encounters with another group: older men, given that "men's HIV risk steadily increases with age" (CNN_30-11-2016). *The New York Times* provided a focus on minority groups with 'disproportionate risk' (notably, Black and Latino men), which we are told "is not due to higher rates of personal risk behavior", i.e. "gay black men are no more likely than gay white men to have sex with multiple partners or to have sex without a condom" (TheNewYorkTimes_08-03-2016). Indeed, *The New York Times* was critical of the "stubbornly held notion that gay and bisexual black men have more sex than other men", quoting commentators that dismiss this 'false perception' that is "fueled by stereotypes of black men as hypersexual" (11-06-2017). Rather, the publication focused on the "structural barriers around lack of employment, lack of education and opportunities, transportation and, of course, very, very overt institutional racism" as what "puts [black communities] at disproportionate risk" (TheNewYorkTimes_11-06-2017), along with the elevated risk of violence, harassment and discrimination faced by the LGBT community, with "black and Latino men are at higher risk because sex between men continues to be strongly stigmatized in those communities" (TheNewYorkTimes_29-02-2016), leading to a lack of testing and of seeking treatment.

Unsurprisingly, what the subjects of such risk were most frequently reported to be at risk of in this data was 'HIV' and other sexually transmitted infections. *Medical Xpress* emphasised the compounding of risks, reporting that "the same factors that place people at substantial risk for HIV (e.g. low condom use, barriers to accessing or using condoms, having more than one sexual partner) are also the factors that increase their risk for acquiring other

STIs" (MedicalXpress_12-12-2019). Looking at the links between who is at risk and what they are at risk of did expose how *The Daily Mail* conflated sexual identity with sexual practices, switching between asking 'Why are gay men most at risk?' (e.g. TheDailyMail_03-10-2017) and reporting that "anal sex carries a 10 times higher risk of infection than vaginal" (e.g. TheDailyMail_07-06-2018). In *The Independent*, we find attempts to normalise the idea of risk in relation to sex more generally – "Having sex involves taking risks" (TheIndependent_24-10-2016) – and along with *iIndependent*, *The Independent* challenged the view of 'critics' who argue that "putting yourself at risk of HIV is a 'lifestyle'" (TheIndependent_24-10-2016) by making the comparison with other prophylactic treatments that are routinely available through the NHS and which enable a "safe, worry-free sex life that most of us would take for granted" (iIndependent_04-08-2016).

In the U.S. data, coverage in *CE Noticias Financieras* prioritised health education and the efforts of the FDA towards informing consumers and practitioners about "the risks and prevention methods of HIV infection", but also "the risk of development of resistant HIV-1 variants" (CENoticiasFinancieras_17-07-2019). Similarly, *Pharma & Healthcare Monitor* were cautious about the documented side effects associated with PrEP i.e., "risk of post treatment acute exacerbation of hepatitis B and risk of drug resistance" (Pharma&HealthcareMonitor_17-05-2018). *NBC* focused on the importance of (consistent use of) condoms, which we are told "decreases risk of HIV acquisition by approximately 80 per cent and also decreases the risk of other STIs" (NBC_20-11-2018). Furthermore, complacency with respect to condom use was linked with, for example, intoxication rather than taking PrEP.

Risk (Verb)

Verb forms of the specific word 'risk' were minimal (U.K. & Ireland: 16 (1.2%); U.S.: 11 (0.6%)), though referred both to individual risks and to risks at the community level. In the U.S. data, the impact of providing effective treatments was reported as empowering individuals, in that we "can give women more control over whether they risk getting infected" (USNews_22-02-2016). Conversely, in the U.K. & Ireland, individuals were lambasted as being "foolish enough to risk infection or their lives" (TheExpress_07-08-2016) at a point when then national provision of PrEP was being debated. However, denying access to PrEP was reported to lead to 'desperate' patients "risking their health" – indeed, "risking their lives" – as they resorted to buying generic forms of the treatment through unregulated online outlets (TheIndependent_15-09-2016). Furthermore, castigating those seeking PrEP would "risk undoing the progress we have made against HIV" (TheConversation_07-12-2018) and community-level concerns about reduced funding and access were articulated in both sub-corpora through the risks that a universal 'we' are responsible for. For example:

"we risk people losing access to treatment" (e.g. TheBaltimoreSun_09-11-2017)

"If we don't adequately promote HIV prevention in black women, we risk seeing HIV infection boomerang in this population" (KUNM_08-02-2019)

"we risk a terrifying rebound of the epidemics that we will struggle to get a grip on again" (TheGuardian_10-10-2016)

"we seriously risk the progress that we have made" (TheMirror_29-11-2018)

"we risk failing other gay and bisexual men" (TheDailyMail_19-12-2018).

This showed that the coverage more often focused not on individual behaviours but a collective (i.e. institutional/national/societal) response to HIV/AIDS.

Risky

Comparative and superlative forms of 'risky' ('riskier', 'riskiest') provided an emphasis on individual action, with 52 (66.7%) of 78 instances of *risky/riskier/riskiest* in the U.S. sub-corpus referring to '(sexual) behavior'; and of the 51 instances of *risky/riskier/riskiest* in the U.K. & Ireland sub-corpus, 18 (35.3%) referred to '(sexual) behaviours', ten (19.6%) referred to 'sex' and eight (15.7%) referred to 'lifestyles'. This contrasts with the use of 'at-risk'/'high-risk' discussed above, where implications of individual responsibility were minimised.

Looking at specific publications, *The Daily Mail* emphasised 'risky (sexual) lifestyles' alongside references to 'sexual risk-taking' and 'high-risk sexual behaviours', most notably in the period following the High Court decision to hold NHS England responsible for providing PrEP. In these articles, other treatments were described as 'at risk' because of funding being directed toward providing PrEP, leading to 'risks' for other patients. There were no comparable references to the risks faced by those seeking PrEP if they were unable to access it, who were described as 'promiscuous' and 'hedonistic', potentially contributing to the stigmatisation of such individuals. Through 2017 and 2018, *The Daily Mail* continued to refer to "warnings that [PrEP] will be encouraging risky behaviour" (TheDailyMail_12-07-2018), despite reporting, for example, a study that "didn't find an increase in sexually risky behaviours" (TheDailyMail_05-09-2017). This raises concerns about a commitment to presenting different points of view, despite an imbalance in the scientific evidence for those views.

In the U.S. data, twenty-five (20.3%) instances of risk words in *CE Noticias Financieras* referred to 'risky behaviors' or 'risky sexual practices', including as a key component of an assessment "to determine if you are a candidate to use PrEP" (CENoticiasFinancieras_06-08-2019). This suggests that groups are being defined by their (risk) behaviours, though the possibility of discouraging condom use was reported to make PrEP itself 'risky' (CENoticiasFinancieras_05-09-2018). Furthermore, *CE Noticias*

Financieras incorporated the views of commentators who point out that "by not making the distinction between behaviors and groups of risk, it only helps the stigmatization of certain people" (CENoticiasFinancieras_05-08-2019). References to 'risky sexual behaviors' from *CNN* tended to be contextualised among other factors, for example attributed to "a user's existing tendency", rather than their use of PrEP or HIV status (CNN_02-08-2016) and while reporting the view that PrEP leads to "a dangerous increase in risky sex" (TheNewYorkTimes_30-04-2017), *The New York Times* characterised such a view as "Unlike nearly all other AIDS activists" (TheNewYorkTimes_30-04-2017).

Other risk compounds

There were more examples of compounding in the U.S. data, with 'risk-reducing', 'risk-reduction', 'risk-assessment', 'risk-free', 'risk-management', 'risk-assessed', 'risk-takers' and 'risk-prediction'. These indicate a greater concern for risk appraisal and co-ordinated responses to risk, referring, for example, to 'interventions' and 'strategies'. This, to some extent, reflects the priorities outlined in the U.S. ONAP's strategy report, originally published in 2015, which identified 'Achieving a more coordinated response to the HIV epidemic' as one of its key goals (see Office of National AIDS Policy 2020). The importance of the CDC and such reports to PrEP coverage in the U.S. is also reflected in the forms of 'risk' that are hyperlinks, directing readers to either the official guidance and reports of the CDC.

Discussion

Over fifty countries have implemented national policies or issued guidelines recommending PrEP for populations at high risk of HIV acquisition (Hodges-Mameletzis et al. 2018), yet health inequalities, linked to PrEP provision and uptake, persist and research has shown that

these are likely to be exacerbated by the effects of COVID-19 (Nydegger and Hill 2020).

This study has investigated the news coverage in the U.S. and the U.K. & Ireland to consider how PrEP – and issues of uneven provision of the treatment – are reported, considering how media messages reflect ideologies that can lead to stigmatisation and discourage those who need the treatment from seeking it.

The concept of 'risk' has been shown to manifest in a restricted set of risk words in the data, principally referring to PrEP's capacity to 'reduce risk of HIV infection' and to 'at-risk' individuals/groups 'at risk'. Defining groups in terms of their risk status, which was shown to be gradable, offers some explanation as to why certain groups are prioritised over others and arguably, a focus on (gay and bisexual) MSM as the group 'most at risk' of HIV infection is guided by the recruitment strategies of the clinical trials they report. Nevertheless, there is a tension in targeting particular groups in PrEP coverage, in that while there is a clear need to ensure that at-risk individuals are aware both of the risk of infection and the available treatments, other groups can be neglected by omission. Having limited awareness – of HIV status and of the available treatments – can itself position people as 'at risk'. Furthermore, Calabrese et al. (2016, 1509) warn that targeting minority groups could "risk perpetuating existing stereotypes of promiscuity attached to these groups", who may already be subject to stigmatisation. This emphasises the importance of the manner (i.e. the language) of the message, given that the same strategy can potentially be both informing, yet stigmatising.

An emphasis on 'reducing risk' and identifying those 'most at risk' shows that the coverage in the U.K. & Ireland is, in part, introducing PrEP as a relatively new treatment. An emphasis of PrEP efficacy and 'at risk groups' was also observed in the U.S. coverage, through there was also more coverage on health inequalities and the need to support minority groups in gaining access to PrEP. PrEP has been available – in a restricted sense – in the U.S. long enough to gather statistical information about access and consumption, as well as for

cultural ideas relating to stigma to come to the fore. This, then could be a foreshadowing of what to expect in the U.K., where more conservative views, such as those purported by *The Daily Mail* were reflected in its continued emphasis on the cost of PrEP to the NHS (and taxpayers) as well as the consequences for other treatments, in contrast to, for example, *The Independent*, which highlighted the risks of failing to provide PrEP to those that need it. Characterising potential PrEP users as engaging in 'risky sexual lifestyles' and putting other treatments and patients 'at risk' perpetuates a stigma that has been documented, in some cases, to lead to "maladaptive coping strategies, such as sexual compulsivity, engagement in chemsex and unprotected anal intercourse" (Jaspal & Page 2018, 472). As such, messages that contribute to stigma obstruct treatment provision and can further entrench health inequalities among already-marginalised groups.

In both the U.S. and the U.K. & Ireland coverage, there was, generally, a critical view of the argument that PrEP leads to increased sexual risk-taking. Calabrese et al. (2016, 1509) argue that health messaging around PrEP needs to "present PrEP-qualifying behavior as being within the range of normal human sexual behavior rather than unusually risky or deviant" and while the adjective 'risky' was shown to typically refer to 'behaviours' and 'lifestyles', there were attempts to normalise both the inherent risks of sex and prophylactic treatments. Nevertheless, *The Daily Mail* – in particular – continued to refer to warnings that PrEP would encourage 'risky behaviour', demonstrating that references to individual responsibility are still being utilised in coverage that is cautious about wider PrEP provision. Zinn and McDonald (2016, 237) highlight a tension in 'risk discourse' between the increasing emphasis on individualisation and the everyday lives of people as risk bearers, in contrast with powerful people and organisations as decision makers; we can see in relation to the news coverage on PrEP that concerns about individual risk behaviours are broadly contextualised among discussions of PrEP provision at the institutional level. *The New York*

Times and *CNN*, for example, focused on the social structures that result in the 'disproportionate risks' faced by black and Latino communities. Furthermore, the possibility of 'risk compensation' was reported as a reason to ensure that the messaging on using condoms in addition to PrEP is clear (as in the coverage from *NBC*). That 'risk compensation' can be presented as a precaution against the wider provision of PrEP but simultaneously, a reason to contextualise PrEP advocacy within a broader program of sexual health shows that the how these issues are covered i.e. the manner in which they are reported can shape awareness and understanding.

A focus on risk words has not provided an exhaustive analysis of the concept of 'risk'; though terms such as 'danger' and 'hazard' were shown to be marginal in the data, exploring the concept of 'safety' – which related both to the treatment and behaviours of potential users of the treatment – would offer a logical extension of what has been discussed here. The procedures of the analysis of 'risk words' reported here could readily be extended to other, conceptually relevant terms. Nevertheless, this work builds on previous studies of the news coverage of PrEP – such as Schwartz and Grimm (2016), Jaspal and Nerlich (2017), Mowlabocus (2019) – by providing observations of PrEP news coverage in subsequent years. Furthermore, while studies have examined extended periods of time using qualitative methods, I have presented an application of corpus methods that established a quantitative basis on which to highlight particular areas of interest and offer some reflections on the broader lexical patterns in the data. Keyness analysis showed that expressions of 'risk' were particularly significant in this dataset, prompting a focus on risk words in context. Measures of frequency pointed to the prominence of particular risk-related terms and to particular publications, as important contributors to a collective representation of PrEP and its associated risks. Corpus methods provide both a view of the wider context, as well as supporting the researcher in conducting a more locally-contextualised analysis of key features

in relation to specific articles, publications and time periods. As such, corpus linguistics can provide a systematic approach to the study of 'risk' and contribute to comparative and longitudinal research in this area.

Disclosure Statement

No potential conflict of interest.

¹ The pill has been manufactured and made available by Gilead Sciences Inc. under the trade names Truvada® (emtricitabine/tenofovir disoproxil fumarate) and, more recently, Descovy® (emtricitabine/tenofovir alafenamide).

² In April 2017, the Scottish Medicines Consortium announced that Truvada® would be made available through the NHS in Scotland and in Wales, the All Wales Medicines Strategy Group announced a three-year trial of Truvada®; NHS England launched the Impact Trial in October 2017; in Ireland, it was announced in December 2017 that a generic version of PrEP (emtricitabine/tenofovir disoproxil Teva) would be available in pharmacies by prescription; and in Northern Ireland, a two-year pilot programme for providing PrEP was announced in June 2020.

³ The search terms were selected to include all references to the treatment, including its trade names while excluding uses of 'prep' as short for 'preparation' (frequently found in recipes e.g. 'preparation time') and in reference to 'prep school'.

⁴ *BNC2014 Baby+*, version 1. 2019. Compiled by Vaclav Brezina, distributed by Lancaster University, available via #LancsBox <http://corpora.lancs.ac.uk/lancsbox>. For more information about the composition of the corpus, see: <http://corpora.lancs.ac.uk/lancsbox/docs/pdf/BNC2014Baby.pdf>.

⁵ The asterisk (*) represents a wildcard character, allowing for a search of terms that have additional characters e.g. riskING, hazardOUS, UNsafe.

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Tables

U.S.			U.K. & Ireland		
Publication	Articles	Words	Publication	Articles	Words
Pharma & Healthcare Monitor	58	36 242	The Daily Mail	86	71 005
The New York Times	41	50 700	The Independent	45	35 108
CE Noticias Financieras	39	22 264	The Guardian	43	37 792
The Washington Post	32	30 341	The Times	37	18 667
HIS Global Insight	28	9 781	Pink News	36	21 384
CNN	21	16 639	The Daily Mirror	26	13 553
NBC News	21	17 696	The Belfast Telegraph	23	13 374
FiercePharma	19	10 929	The Irish Times	22	14 719
LGBTQNation	18	10 545	The Evening Standard	21	8 732
TheFlyOnTheWall	14	3 078	The Telegraph	20	14 783
The Pink Sheet	13	17 266	The Pharma Letter	18	7 165
Biospace	12	8 145	iIndependent	13	6 474
MonthlyPrescribingReference	12	4 087	Medical Xpress	11	5 080
NewsTexBlogs	12	9 079	BreakingNews	10	3 737
The Hill	11	6 190	The Sun	10	3 382

Table 1. Publications with the largest number of articles for each sub-corpus

U.K. & Ireland	Frequency	Log Likelihood	Log Ratio
risk			
risk	1269	2463.96	4.38
high-risk	128	345.13	9.51

	at-risk	114	307.38	9.34
	risky	46	80.42	3.86
	risks	42	17.10	1.29
	risk-taking	10	26.96	5.83
<i>*danger*</i>				
	dangerous	36	1.35	0.27
	danger	26	0.02	0.58
	dangers	10	3.29	0.47
<i>*hazard*</i>				
	hazards	1	0.08	0.51
<i>*threat*</i>				
	threat	38	0.79	0.25
<i>*safe*</i>				
	safe	170	178.61	2.44
	safer	75	119.02	3.49
	safety	62	12.10	0.84
<i>*secur*</i>				
	security	21	24.72	-1.46
	secure	13	8.53	-1.14
U.S.		Frequency	Log Likelihood	Log Ratio
<i>*risk*</i>				
	risk	1781	2507.29	4.11
	at-risk	213	420.87	9.49
	high-risk	188	371.47	9.31
	risks	79	31.39	1.44
	risky	79	31.39	3.73
<i>*danger*</i>				
	danger	19	11.36	-1.17
<i>hazard*</i>				
	hazard	2	37.00	-4.00
	hazardous	2	0.27	0.75
<i>*threat*</i>				
	threat	36	4.47	-0.58
	threatened	11	10.74	-1.43
	life-threatening	10	19.76	5.08
<i>*safe*</i>				
	safety	259	181.79	2.14
	safe	227	155.71	2.10
	safer	106	120.60	3.23
	unsafe	27	45.65	5.51
	safely	20	3.71	0.91
<i>secur*</i>				
	security	17	74.32	-2.53
	secured	12	9.36	-1.31
	secure	11	30.51	-2.14
	securing	10	0.94	0.62

Table 2. Key risk-related words (values meeting keyness criteria indicated in bold)

high-risk	128
at-risk	114
risky	46
risks	42
risk-taking	10
highrisk	4
riskier	4
low-risk	3
risking	3
highest-risk	2
risk-free	2
higher-risk	2
riskiness	1
riskiest	1
https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hiv-fact-sheet	1
risk-averse	1

U.S. (2389 hits; relative frequency: 37.36)

risk	1781
at-risk	213
high-risk	188
risks	79
risky	71
low-risk	5
riskier	5
risk-reducing	4
risk-reduction	4
https://www.cdc.gov/hiv/risk/prep/index.html	3
riskiest	2
highest-risk	2
risked	2
hiv-risk	2
risk-taking	2
https://www.cdc.gov/hiv/risk/art/index.html	2
https://www.cdc.gov/hiv/risk/estimates/preventionstrategies.html	1
https://www.nytimes.com/2019/07/25/well/live/most-high-risk-men-dont-take-prep-to-prevent-hiv.html	1
risk-assessment	1
http://www.healthdatamanagement.com/news/ehr-analysis-identifies-patients-at-risk-for-hiv-and-drug-candidates	1
risk-free	1
www.cdc.gov/hivrisk	1
risk-management	1
2017/risk	1
https://www.cdc.gov/hivrisk	1
risk-assessed	1
higher-risk	1
risk-adults	1
atrisk	1
https://healthfeedback.org/claimreview/hiv-drug-truvada-linked-to-kidney-damage-and-bone-density-loss-but-risks-are-low-and-usually-outweighed-by-the-drugs-benefits/	1
https://www.gilead.com/news-and-press/press-room/press-releases/2012/7/us-food-and-drug-administration-approves-gileads-truvada-for-reducing-the-risk-of-acquiring-hiv	1
behavioral-risk	1

risk.131	1
risk-takers	1
www.cdc.gov/hiv/risk/prep/index.html	1
wwwn.cdc.gov/hivrisk	1
risk-prediction	1
content: http://www.prnewswire.com/news-releases/pivotal-echo-study-provides-reassuring-evidence-on-hiv-risk-and-contraceptives-300867142.html	1

Table 3. Frequency of risk words

Publication	Risk words	Articles	Risk words per article
The Daily Mail	355	86	4.13
Medical Xpress	34	11	3.09
i-Independent	36	13	2.77
The Independent	120	45	2.67

Table 4. Publications with the highest number of risk words per article (U.K. & Ireland)

Publication	Risk words	Articles	Risk words per article
NBC	87	21	4.14
The New York Times	139	41	3.39
The Pink Sheet	43	13	3.31
Monthly Prescribing Reference	39	12	3.25
CE Noticias Financieras	123	39	3.15
CNN	64	21	3.05
Pharma & Healthcare Monitor	175	58	3.02

Table 5. Publications with the highest number of risk words per article (U.S.)