
Health Worker Potential for Expanded Exploration of Public “Frontlineness”: A Scientometric Analysis

David M. Bredekamp, Ph.D.
Assistant Professor, Center for Public Administration & Policy
Virginia Tech | School of Public and International Affairs
2810 N. Parham Rd., Ste. 205, Henrico, VA 23294
540-231-5133
bredekamp@vt.edu

Saif Tarek Abdelrasol
Doctoral Student, Center for Public Administration & Policy
Virginia Tech Research Center | School of Public and International Affairs
900 N Glebe, Arlington, VA 22203
saift@vt.edu

Charity L. Boyette
Doctoral Candidate, Center for Public Administration & Policy
Virginia Tech | School of Public and International Affairs
104 Draper Road SW, Blacksburg, VA 24060
boyettecl@vt.edu

C. Cozette Comer
Evidence Synthesis Services Coordinator, University Libraries
Doctoral Student, Center for Public Administration & Policy
Virginia Tech | School of Public and International Affairs
104 Draper Road SW, Blacksburg, VA 24060
cozette@vt.edu

Connie Stovall
Director for Research Impact & Intelligence
Liaison to Innovation & Partnerships and Research & Innovation
Virginia Tech
560 Drillfield Dr., Blacksburg, VA 24062-9001
cjstova@vt.edu

Shahidur Rashid Talukdar, Ph.D.
Presidential Postdoctoral Fellow in Science Policy & Research Ethics
Division of Scholarly Integrity and Research Compliance
The North End Center Room # 4402, Virginia Tech, Blacksburg, VA
shahidur@vt.edu

This paper was prepared for the 2024 Public Management Research Association Annual Conference (PMRC) in Seattle, WA as part of a paper panel. Please contact the first author before citing.

ABSTRACT

Public-sector frontline service scholarship in the field of public administration has been conducted under relatively limited circumstances and contexts. While literature focusing on the topic has been prolific, the context and lenses through which “frontlineness” has been viewed and observed are more limited (Chang & Brewer 2022). The scholarship on street-level bureaucrats (SLBs) has focused on a well-defined, though narrow, set of workers and work environments (e.g., teachers and nurses; schools and hospitals); those concentrated and consistent parameters may present an opportunity for greater generalizability of our understanding of SLBs than previously realized. We seek something of a new beginning: for theoretical exploration, clarity, and eventual reassessment of what frontlineness is and what it means. Healthcare has been a field in which public administration scholars have—either adjacently or directly—explored the nature of frontline work. We hypothesize, however, that there is much territory that goes unexplored due to siloing of disciplines, narrow definitions of what it means to be on the “frontline,” and more limited use in public administration scholarship of available evidence synthesis methods. One such method, scientometric analysis, provides useful tools to explore the potential of fields such as healthcare, with its results providing the “lay of the land” for further exploration. Using a scientometric analytical approach, this paper offers an answer to the following research question: What is the potential for existing research to describe the proximal relationship between a frontline healthcare employee and the frontline itself?

Health Worker Potential for Expanded Exploration of Public “Frontlineness”: A Scientometric Analysis

Public-sector frontline service scholarship in the field of public administration has been conducted under relatively limited circumstances and contexts. While the literatures focusing on the topic have been prolific, the context and lenses through which “frontlineness” has been viewed and observed are more limited (Chang & Brewer 2022). The scholarship on street-level bureaucrats (SLBs) has focused on a well-defined, though narrow, set of workers and work environments (e.g., teachers and nurses; schools and hospitals). However, as the public sector partners with other sectors (Salamon 2002), what we have learned about SLBs over the last four decades could have potentially greater generalizability than we realize. Therein lies the purpose of this paper: to explore potential areas of theoretical expansion for the concept of “frontlineness” in work for the public.

We do not specify the public “sector” because that designation limits the study of frontline workers to mostly public contexts (i.e., government organizations). This limitation excludes those who may serve in public-facing capacities or in functions traditionally viewed as public but that may take place in private or non-profit organizations, thereby preventing its easy categorization as “bureaucratic.” Considering the infeasibility of a comprehensive review of *all* contexts *everywhere*, we explore several contexts that could expand on current frontline worker literature by reviewing existing scholarship focused on a professional field: health workers.¹

Another limitation in the conceptualization of frontline work resides in the narrow swaths of research under which the concept of frontlineness falls. Relying solely on public

¹ Inspired by several narrative-based works on public service: Maynard-Moody, S. & Musheno, M. (2022). *Cops, Teachers, Counselors: Stories from the Front Lines of Public Service*, 2nd ed., University of Michigan Press. -AND- Zavattaro, S. M., Sowa, J. E., Henderson, A. C., & Edwards, L. H. (Eds.). (2023). *Portraits of Public Service: Untold Stories from the Front Lines*. State University of New York Press.

administration literature to conceptualize frontlineness—as Chang & Brewer (2022) do in their systematic review—is limiting, both historically and with respect to school of thought. Like the contextual-setting limitations articulated above, theoretical constructs can impose their own constraints. What potentially relevant frontlineness scholarship is overlooked or given short shrift when viewed solely through a public administration lens? Psychology, sociology, public health, and work in various human services fields are all at risk of being sidelined in favor of a strict interpretation of frontlineness as solely under the purview of the recognized public sector.

In evaluating frontlineness in relation to its conception in the extant literature, we must address the potentially confounding factor of the adjacent term of “essential” when applied to public-facing workers in recent scholarship. During the COVID-19 pandemic, the use of “essential” to describe certain types of work and workers skyrocketed, as demonstrated by a cursory database search combining “essential worker” and “public,” which returned 405 articles published during the four decades before the start of the pandemic and more than eight times as many (3,360) since the start of 2020. As Cantugal (2020) points out, it is important to recognize the political motivations, particularly cultural politics, that can drive much of the usage of terms like “essential” to characterize entire segments of the workforce. However, the realities of the increased appearance of this terminology in recent years, often connected or conflated with frontlineness, necessitates a careful evaluation of both the literal and figurative usage of both concepts in this review.

An important and foundational parameter for our exploration lies in the concept of *proximity*. Proximity is a fundamental concern in SLB research and represents an essential element in the study of service more generally. Goodsell (1981) addresses what qualifies as a “public encounter” (3) by specifying where—and under what conditions and expectations—

bureaucrats and service recipients meet for public purposes. However, several reasons support updating or adjusting the qualifications of a public encounter. Paul Light’s work on the size of government (1999; 2018) indicates that *who* might qualify as a public servant has expanded since Goodsell penned his 1981 definition of “encounter” (3). When organizations are “flattened” (Kettl 2015, 34), sectors “blur” (Wright 2000, 155), and partnerships (Salamon 2002) prevail as mechanisms for public service delivery, how might we distinguish among encounters, public or otherwise? Furthermore, the COVID-19 pandemic-era’s conflation and disambiguation of the terms “frontline worker,” “essential worker,” “customer service worker” (and others)—often for sound logistical or policy purposes—muddles the theoretical landscape defining frontlineness (Blau, et al. 2021; New York State Department of Labor 2021). For these reasons, we seek something of a reset for theoretical exploration, clarification, and (eventual) reassessment of what frontlineness is and what it means for scholars.

This paper offers a scientometric analysis to answer the following research question: ***What is the potential for existing research to describe the proximal relationship between a frontline healthcare employee and the frontline itself?*** Put another way, what heretofore-ignored literature holds potential for offering insights into or expansion of public administration’s current conceptualization of what it means to be on the “frontline?”

LITERATURE AND DEFINITIONS

For our purposes we begin with the following working definition of “frontlineness:” The quality or state of a worker’s direct proximity to the intended beneficiary of an authorized transaction or encounter.

Proximity

Proximity can be defined as being close or near to something or someone. However, this definition is, paradoxically, both general and limited. The history of proximity draws on the notion of closeness in the physical *and* metaphorical senses, implying that it cannot be understood through the former sense only (Merriam-Webster Dictionary, n.d.). Multiple scholars ground their definition of proximity in the degree of closeness to some point or object (Arya & Mount 2017) or to time and occurrence of a relationship (Namiot, et al. 2019). These characterizations underline proximity's conception as not solely reliant on a discrete location but extending to other factors such as time or space. We draw on this scholarly foundation to define proximity as a state of being near or close in space, time, or relationship. This broader definition incorporates various perspectives from disciplines as diverse as information technology (Namiot et al. 2019), mathematics (Koren, et al. 2007; Tao & Zhai 2007), computational geometry (Arya & Mount, 2017), geo-spatial science and urban planning (PGil Solá & Vilhelmson, 2018; Chakraborty & Maantay 2011), and social psychology (Shin et al. 2019; Alter & Balcetis 2011; Zajonc 2001). A multi-disciplinary understanding of this term facilitates the interpretation of proximity beyond mere physicality to include spatial, temporal, and virtual proximities.

Our definition makes space, time, and relationship integral elements in understanding frontlineness and allows the breaking down of space (as an element of proximity) into separate dimensions: physical space and virtual space. While provision of services to beneficiaries through face-to-face interaction is associated with the physical dimension of space, we argue that virtual spaces are, in fact, similar spaces of direct contact and interaction at the disposal of modern frontline workers. In essence, proximity elements of space, time, or relationship bring involved parties (frontline workers and beneficiaries), services, and related activities near one

another, culminating in an authorized transaction—or “encounter” (Goodsell 1981, 1). This culmination is achieved through elimination of intermediary layers between the frontline worker and the beneficiary.

In addition, we propose that virtual spaces have made direct interaction and contact even closer with respect to time, thereby supporting development and maintenance of relationships. A relationship (formal or informal) determines the way a frontline worker and service beneficiary behave and regard each other during an encounter. This relationship element of proximity helps in the mediation of direct interaction and contact between a frontline worker and a service beneficiary. Therefore, “direct contact” and “direct interaction” cannot be used as standalone phrases in the conception of frontline-ness as they risk omitting integral facets of frontline work and frontlineness that proximity embodies. Hence, understanding the diverse facets of proximity is integral to distinguishing frontline workers from non-frontline workers.

Cyberspace is loosely defined as a virtual and digitally created world that is based on a variety of infrastructures that include computers, networks, software, hardware, data, and information (Huansheng et al. 2018). Zoom and Skype are examples of cybersecurity software. For instance, it has become mundane for frontline workers like educators and therapists to use Zoom or Skype to directly contact and interact with service beneficiaries. People and information are integral to the power of cyberspace (Clark, 2010). Most of the literature treats virtual space and virtual reality as synonymous. Mandal (2013) defines virtual reality as technology that enables people to interact with a computer simulated environment which can either be composed of a real-world simulation or an imaginary one. Although the technology is not yet fully developed, big tech companies such as Facebook and Microsoft are in the process of developing virtual spaces that we believe can also be leveraged for use in frontline work in future.

Beneficiaries

In our conceptualization, a “frontline worker” represents one part of an equation in which an individual, in an official capacity, participates in a transaction to the benefit of another party. A beneficiary can be either discrete (e.g., an individual, a defined group) or abstract (e.g., a constituency) depending on the context; however, all beneficiaries are, by definition, recipients of some form of service, tangible or otherwise that makes a “positive difference in [their] health, safety, and well-being” (Grant, 2008, p. 49). As Alexander (2021) notes, benefits may be material (such as financial payments) but may also include the fulfillment of a “moral obligation” that the beneficiary or beneficiaries believe to be valid (p. 992). Therefore, in defining who or what represents a beneficiary, it is important to consider both the object and the purpose of the conferral of the benefit.

An important qualifier is that beneficiaries encounter frontline workers who are acting in their official capacity. Frontline workers can, and often do, interact with beneficiaries in a variety of contexts: as members of their communities; as a conduit to other public officials; or even as members of a beneficiary constituency themselves. However, workers being “on the frontline” is necessarily predicated on the execution of their own public-sector role, in which their work involves delivering a service to one or more beneficiaries. This delivery can be both formal (e.g., a DMV clerk processing a driver’s license application) and ad hoc, such as when non-consular embassy officers assist with an evacuation of Americans from overseas. This officialness, then, connotes a sense of authorization to the frontline worker’s actions, in that the worker is operating within the sphere of the authority granted to them by their employing entity and, therefore, represents the entity in a tangible way.

In considering how best to convey the scope and context that characterizes the target of public services, we considered several related terms. While some alternative terms may seem synonymous with “beneficiary,” important distinctions suggest they may not include facets that we deem critical to defining the concept within the public sector. Using a for-profit business structure as an analogy, Alford (1998) demonstrates that the similar terms of “client” and “consumer” fail to capture adequately the complexity of all who benefit from public services; in his example of public housing tenants, the tenants themselves obviously “consume” the housing, but what about the wider community who enjoys lower tax or crime rates because of the availability of affordable housing? The chosen term for denoting the target of public action can also influence how that target is perceived. A working single parent may qualify for a childcare subsidy and an employee made redundant receives payment from unemployment insurance, but welfare payments go to users, suggesting some judgment of deservingness (Schneider & Ingram, 2004; Hansen et al, 2018).

Interestingly, linguists offer a more nuanced view of the differences between “beneficiary” and the oft-substituted “recipient,” which Kittila (2005) attributes to the presence or absence of “benefaction.” In an examination of a Chinese dialect, Kittila (2005) points out that the same word form denoting “for me” can connote both a benefit and an expectation (or lack thereof) of receiving a tangible good at the same time: “cut an apple for me” results in both a benefit and reception of something (the apple), but “hold the apple for me” offers only the benefit (pp. 269-71).

Interactions

Research by Breit, Egeland, Løberg, and Røhnebæk (2020) calls attention to the significance of recordkeeping in exchanges between public officials and clients:

“One shift that challenges the old power asymmetries that dominated service encounters is frontline workers’ perceptions that written communications required by digital encounters are ‘permanent’ and ‘everlasting’ and can thus be spread across informal networks, in the media or can even end up in court” (Briet, et al. 2020, 843).

Federman (2022) uses the terms “interactions,” “encounter,” and “contact” interchangeably in his examination of outcomes between public safety officials and members of the public, which focuses on those “subject to high-frequency contact with the police” and the strategies they employ to limit that engagement. Heinrich (2016) discusses bureaucratic encounters as part of the broader literature studying administrative burdens. Crediting Kahn, Katz, and Gutek (1976) for developing the concept of “bureaucratic encounters,” Heinrich intersperses the term “transaction” with the phrase “episode of service delivery” to characterize such experiences (Heinrich, 2016, p. 405). “Interaction” is the preferred term in Pautz’s (2009) study of relationships between environmental inspectors and personnel at regulated facilities. Finally, Samanta and Hand (2022) focus on the “processural” elements “within” relationships while exploring both “face-to-face encounters” or “the interaction itself” (p. 130).

Transactions

A frontline interaction can be characterized as a *transaction* when it creates an administrative record of the interaction between the individual acting in an official capacity and another party who is subject to their actions or decisions. A frontline interaction can be characterized as an encounter when no administrative record results from the interaction between them. Over time, repeated encounters may build or erode trust between the official and the

individuals or members of their community, which may lead to an expectation of more records, shifting what were formerly encounters into transactions.

Encounters

Alternatively, transactions may shift into the realm of encounters in contexts of high trust or during complex interactions, which existing recordkeeping is inadequate or unable to capture. The institutional logics of a particular field or organizations may result in tendency toward or preference for encounters or transactions, as may the identity or environment in which an official interaction occurs (e.g., a traffic stop involving people of differing genders, races, ethnicities may result in encounters that end with no ticket or warning, or transactions that leave an administrative trail). Appointed agency heads, political officials, or the public may impose a requirement for transactions when they are seeking an increased monitoring of policy implementation, e.g., the imposition of body cameras for higher level review of the selection by a law enforcement officer to engage in an encounter or a transaction with a member of the public. Professionals in frontline public service roles may push for greater autonomy to select encounters versus transactions to achieve their goals as public servants. Alternatively, they may use transactions (e.g., a work to rule strike) to highlight the need for discretion in their work or to secure protection against claims of malfeasance (or misfeasance) by the public or supervisors.

METHODS & DATA

A scientometric analysis method is appropriate for broad scoped reviews of a large corpus of literature that would be unmanageable for manual review (Donthu, et al., 2021). As stated, we aim to address the following research question: *What is the potential for existing research to describe the proximal relationship between a frontline healthcare employee and the frontline itself?*

In other words, how much literature in the healthcare field might contribute to a richer or more expanded definition of frontlineness or frontline work? What work do we (currently) ignore because it resides in a specialized field with nuances perhaps not shared with the more conventional bureaucratic-type work associated with SLBs?

Given the breadth of literature that may provide insight to the proximal relationship between frontline workers and the frontline in healthcare, this study serves as the foundation for a more thorough manual review of a subset of this literature. For this initial study and subsequent forthcoming analysis, records will be considered relevant if they meet the following criteria:

- Presence of healthcare-related terms in the title, abstract, and/or keywords.
- Presence of proximity-related terms in the title, abstract, and/or keywords within 5 words of a frontline related term.
- Records are classified as a journal article, books, editorial, or organizational report.
- Records must be findable using English-language terms only.
- No limits based upon date of publication, geographic region, or disciplinary focus.

For now, these criteria inform our searches for possibly relevant literature to assess the potential for further exploration.

Data Collection

Searches were executed on February 15, 2024, by an expert scientometric searcher. For initial analysis, the search was limited to the publication year 2023, to be expanded later to ten years. The search strategy was comprised of three concepts – (1) healthcare worker, (2) proximity, and (3) frontline. Exhaustive sets of synonyms were searched for each concept such that at least one term from each concept must appear in either the title or abstract. When available, we also searched for these terms in the keywords. The last two concepts were joined by proximity or adjacency operators that require any two terms from each concept to be within 5 or fewer words away from one another. The Scopus database was used to execute our search.

Figure 1 contains the search terms in Scopus. The search terms limit the results to scholarly works that contain both a reference to health workers and some type of proximity or adjacency to service recipients.

Figure 1.

```
(TITLE-ABS-KEY(("Healthcare worker*" OR "Healthcare volunteer*" OR "Healthcare employee*" OR "Health worker*" OR "Health volunteer*" OR "Hospital worker*" OR "Hospital volunteer*" OR "Hospital employee*" OR "Medical professional*" OR "Medical assistant*" OR "General practitioner*" OR "Direct care worker*" OR "nurse*" OR "doctor*" OR "physician*" OR "Pediatrician*" OR "paramedic*" OR "Emergency responder*" OR "Emergency medical tech*" OR "prosthetist*" OR "Pharmacist" OR "Pharmacy technician" OR "Laboratory tech*" OR "therapist*" OR "Physiotherapist" OR "psychologist*" OR "psychiatrist*" OR "Speech therapist*" OR "Language therapist*" OR "Dietitian*" OR "Chiropractor*" OR "Athletic trainer*" OR "Surgeon*" OR "Surgical tech*" OR "Anesthesiologist*" OR "Podiatrist*" OR "Dentist*" OR "Dental assistant*" OR "Dental hygienist*" OR "Optometrist*" OR "Optician*" OR "Orthoptist*" OR "Audiologist*" OR "Phlebotomist*" OR "Sonographer*" OR "Patient advocate*" OR "Hospice care" OR "Biomedical engineer*" OR "Genetic counselor*" OR "Medical physicist*" OR "Perfusionist*" OR "Radiographer*" OR "Radiologist*" OR "Emergency Responder*")) AND TITLE-ABS-KEY((proximit* OR adjacen* OR close* OR distan* OR relation* OR near* OR access* OR contact*) W/5 ("public" OR "client*" OR "customer*" OR "frontline*" OR "patient*" OR "recipient*" OR "citizen*"))) AND (LIMIT-TO(SRCTYPE, "j") OR LIMIT-TO(SRCTYPE, "b") OR LIMIT-TO(SRCTYPE, "p") OR LIMIT-TO(SRCTYPE, "k")) AND (LIMIT-TO(LANGUAGE, "English")) AND (LIMIT-TO(DOCTYPE, "ar") OR LIMIT-TO(DOCTYPE, "re") OR LIMIT-TO(DOCTYPE, "cp") OR LIMIT-TO(DOCTYPE, "ch") OR LIMIT-TO(DOCTYPE, "bk"))
```

[View less ^](#)

Journals, conference proceedings, reviews, books, and book chapters were included, while works such as editorials or full data sets were excluded. Due to the limitations of the research team with respect to languages, only research published in English was included. A summary of the dataset appears below:

Figure 2.

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2023:2024
Sources (Journals, Books, etc)	2663
Documents	6460
Annual Growth Rate %	-99.97
Document Average Age	1
Average citations per doc	0.9207
References	237035
DOCUMENT CONTENTS	
Keywords Plus (ID)	18103
Author's Keywords (DE)	14499
AUTHORS	
Authors	33718
Authors of single-authored docs	400
AUTHORS COLLABORATION	
Single-authored docs	409
Co-Authors per Doc	5.94
International co-authorships %	17.59
DOCUMENT TYPES	
article	5472
book	32
book chapter	143
conference paper	245
review	568

Selection of Terms & Inclusion Criteria

Each author independently reviewed the top 400 most frequent terms used across the corpus (extracted using Bibliometrix). A final list of relevant terms was selected following discussion using the following inclusion criteria:

Terms deemed too broad or likely to appear in contexts outside our topic of interest were excluded. For example, terms denoting gender (i.e., male, female) were excluded because of their likelihood of being used as control variables in various kinds of medical journal articles (e.g., control trials). Titles of practitioners (e.g., “nurses”) frequently appeared but were excluded because of their likelihood of being incidental or tangential to our topic of interest (e.g., the population of study or focus, but not related to their behavior or interaction with service recipients). Broader terms that *were* included include those that were likely to imply something about the often-dyadic provider-patient relationship or approach; terms like “trust, “empathy,” and “ethics” fell into this category. Finally, terms that implied something about comprehensiveness of care (e.g., “patient care team”) were deemed relevant due to the implied connection with service recipients and service delivery.

The final list of terms was organized into two tiers. Tier 1 terms are terms that best speak to our topic of interest – the relationship between frontline service provider and the frontline they serve. For example, doctor-patient relationship. Tier 2 terms may be used in the context of interest, but are likely to be used in many other, irrelevant contexts too (e.g., communication, trust). Figure 3’s further separation of Tier 2 indicates loose categories of terms that seem to logically group together.

Figure 3.

	From “Most Frequent” list	Additional terms
<i>Tier 1</i>	Doctor patient relationship Physician-patient relations Professional-patient relationship Nurse patient relationship Nurse-patient relationship Patient care team	Patient engagement Patient counseling
<i>Tier 2</i>	Interpersonal communication Interpersonal relations Teamwork Patient satisfaction Communication Conversation Trust Empathy Ethics Morality Medical Ethics Expectation Responsibility	
	Patient attitude Health personnel attitude Attitude of health personnel Physician attitude	
	Delivery of health care health services accessibility Health services Care behavior Social stigma Multidisciplinary team	
	Telemedicine Teleconsultation Video conferencing	
	Patient safety	Doctor safety Health personnel safety

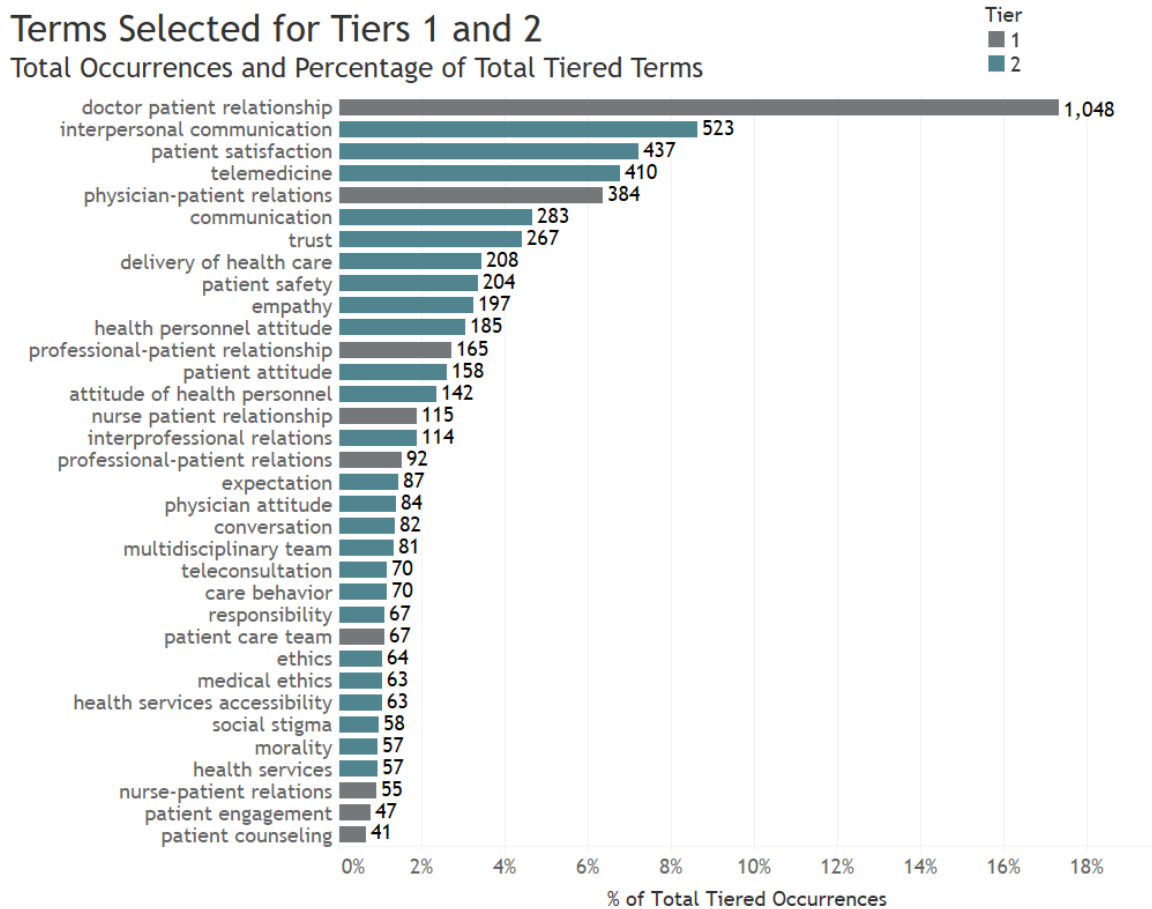
Data Analysis

The metadata (e.g., authors, citations, keywords) were used for analysis in this study. Data from the text itself was not included in our analysis. Thus, the terms of relevance appeared in metadata; the research team did not pursue full text analysis for this paper. The analysis was

performed in the scientometric analysis tool *Bibliometrix* (Aria & Cuccurullo, 2017) by an experienced scientometrics practitioner.

Examination of the differences among our “tiers” of terms was performed, to ascertain the frequency of appearance in possibly relevant literature. Figure 4 shows the distribution of occurrences and percentage of total tiered terms.

Figure 4.



Interestingly, “doctor patient relationship” has the greatest presence in the results and bears the most promise for exploring frontlineness in existing healthcare literature. Another standout result is the frequency of telehealth-related terms in a COVID-endemic environment.

Future exploration should include the differences between pre-pandemic frequency versus current frequency.

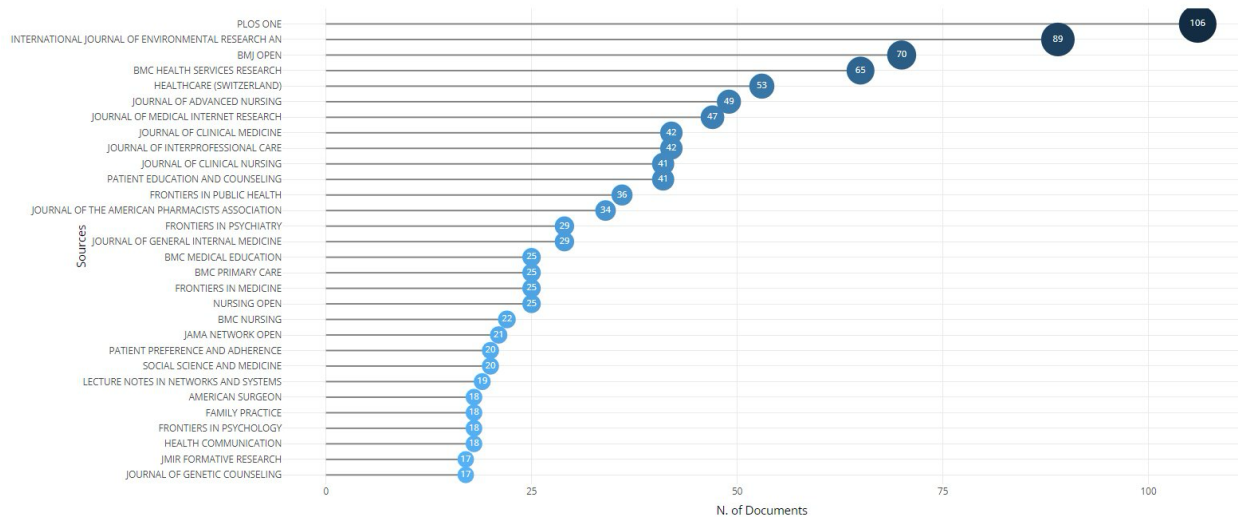
Network analysis

Network analysis methods were used to enrich the findings of our paper (Donthu, et al., 2021:290). We used clustering and visualization but did not use additional network metrics, such as degree of centrality or closeness centrality, as these approaches are not expected to provide important insights into our research question. Our clustering analyses focus upon thematic trends to better understand how the field of frontlineness is conceptualized and discussed in health-related literature. Figure 5 shows where our two tiers of terms spear in relation to 18,000+ term occurrences appearing in over 6000 scholarly works in 2023.

IMPLICATIONS FOR FUTURE RESEARCH

Traditional SLB research and the scholarly discussion around frontline workers is often limited to public administration literature and possibly overlaps with a conceptualization of “frontline” that includes private sector workers in service-industry-related fields (e.g., retail, food service). However, the discussion rarely includes specialized fields of service provision like healthcare, where nuances in service delivery and research complexity may not allow for a full exploration of possibly relevant literature. Our examination offers insight into typically ignored literature. Figure 6 offers insight into the top 30 journals hosing our most relevant terms, and the results are illuminating.

Figure 6.



The journals listed are rarely, if ever, included or cited in public administration scholarship on frontlineness or SLBs. This reality is unsurprising but also concerning if the field of public administration seeks a clear definition of what it means to be a frontline employee in public service.

Given the wealth of literature pertaining to healthcare and health workers specifically appearing in our searches (of even just one year of publication), we are optimistic about not only

being able to provide a more complete picture of the health worker frontline landscape, but also that we might be able to draw concrete conclusions for where more research, refinement, and consideration of frontlineness might be warranted and possible within the healthcare field. Even so, there will be limitations to our approach, particularly with generalizability beyond the health field into other prominent fields where frontline workers are also prevalent. Further, a limitation of scientometric analysis--that it only indicates what may be relevant rather than a deeper dive into the content of scholarly works—requires further study into this topic. Scoping or mapping reviews could provide a clearer picture of the scholarly landscape; however, abundant transparency concerning processes and decision making on inclusion and exclusion require more resources and systematic review of article content, which are beyond the scope of this paper. Our contribution here, coupled with a future systematic review could help to further illuminate the potential learning opportunity for public administration scholars and practitioners about the nature of frontlineness in the healthcare field and beyond.

REFERENCES

- Alexander, S. (2021). When does a beneficiary benefit? *Trusts & Trustees*, 27(10), 989-992.
- Alford, J. (1998). A public management road less traveled: Clients as co-producers of public services. *Australian Journal of Public Administration*, 57(4), 128-137.
- Alter, A. L., & Balcetis, E. (2011). Fondness makes the distance grow shorter: Desired locations seem closer because they seem more vivid. *Journal of Experimental Social Psychology*, 47, 16-21.
- Aria, M. & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis, *Journal of Informetrics*, 11(4), pp 959-975, Elsevier, DOI: 10.1016/j.joi.2017.08.007
- Arksey, H. & Lisa O'Malley (2005) Scoping studies: towards a methodological framework, *International Journal of Social Research Methodology*, 8:1, 19-32, DOI: 10.1080/1364557032000119616
- Arya, S., & Mount, D., M. (2017). Computational Geometry: Proximity and location. In Mehta & Sahni (Eds.), *Handbook of Data Structures and Applications* (2nd ed.). Chapman and Hall/CRC. <https://doi.org/10.1201/9781315119335>
- Blau, F., D. Koebe, J., & Meyerhofer, P., A. (2021). Who are the essential and frontline workers? *National Association for Business Economics*, 56:168–178. <https://doi.org/10.1057/s11369-021-00230-7>
- Bredenkamp, D.; Dull, M.; LaRiviere, L.; and Sogodogo, A. (2022). “Frontline Service Narratives and Workplace Identities in Behavioral Health and Developmental Services.” DC Public Management Research Consortium. Conference Paper (Presented with coauthors October 2022).
- Breit E., Egeland C., Løberg I.B., Røhnebæk M.T. (2021). Digital coping: How frontline workers cope with digital service encounters. *Social Policy & Administration* 55, 833–847. <https://doi.org/10.1111/spol.12664>
- Catungal, J. P. (2021). Essential workers and the cultural politics of appreciation: sonic, visual and mediated geographies of public gratitude in the time of COVID-19. *Cultural Geographies*, 28(2), 403–408. <https://doi.org/10.1177/1474474020978483>
- Chakraborty, J., Maantay, J.A. (2011). Proximity Analysis for Exposure Assessment in Environmental Health Justice Research. In: Maantay, J., McLafferty, S. (eds) *Geospatial Analysis of Environmental Health*. Geotechnologies and the Environment, vol 4. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0329-2_5
- Chang, A. & Brewer. G.A. (2022). Street-Level bureaucracy in public administration: A systematic literature review, *Public Management Review*, DOI: 10.1080/14719037.2022.2065517
- Clark, D. D. (2010). Characterizing cyberspace: Past, present, and future (ECIR Working Paper No. 2010-3). MIT Political Science Department. <https://hdl.handle.net/1721.1/141692>
- Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia. Available at www.covidence.org.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>.

- Federman, P.S. (2022). Cop Wisdom and the Democratic Consequences of Citizen-State Interactions. *Administration & Society*, 54(4), 857-877.
<https://doi.org/10.1177/0095399721104659>
- Grant, A. (2008). Employees without a cause: The motivational effects of prosocial impact in public service. *International Public Management Journal*, 11(1), 48-66.
- Haddaway, N. R., Grainger, M. J., Gray, C. T. (2021) citationchaser: An R package and Shiny app for forward and backward citations chasing in academic searching. DOI: 10.5281/zenodo.4543513
- Hansen, H., Lundberg, K., & Syltevik, L. (2018). Digitalization, street-level bureaucracy, and welfare users' experiences. *Social Policy & Administration*, 52(1), 67-90.
- Heinrich, C.J. (2016). The Bite of Administrative Burden: A Theoretical and Empirical Investigation. *Journal of Public Administration Research and Theory*, 403-420.
doi:10.1093/jopart/muv034
- Huansheng, N., Xiaozhen, Y., Bouras, M. A., Dawei, W., & Daneshmand, M. (2018). General cyberspace: Cyberspace and cyber-enabled spaces. *IEEE Internet of Things Journal*, 5(3).
<https://doi.org/10.1109/JIOT.2018.2815535>
- Kahn, R.L., Katz, D., and Gutek, B. 1976. Bureaucratic encounters—An evaluation of government services. *The Journal of Applied Behavioral Science* 12:178–98
- Kettl, D. F. (2015). From intergovernmental to intersectoral. In *Public administration evolving* (pp. 18-37). Routledge.
- Koren, Y., North, S. C., & Volinsky, C. (2007). Measuring and extracting proximity graphs in networks. *Association for Computing Machinery*, (3), 12–12.
<https://doi.org/10.1145/1297332.1297336>
- Kittila, S. (2005). Recipient-prominence vs. beneficiary-prominence. *Linguistic Typology*.
- Light, P. C. (1999). *The true size of government*. Brookings Institution Press.
- Light, P. C. (2018). *The government-industrial complex: The true size of the federal government, 1984-2018*. Oxford University Press.
- Merriam-Webster Dictionary. (n.d.). Proximity. In the Merriam-Webster Dictionary. Retrieved October 02, 2022, from <https://www.merriam-webster.com/dictionary/proximity>
- Namiot, D., Sneps-Sneppe, M., & 24th Conference of Open Innovations Association FRUCT, FRUCT 2019 24 2019 04 08 - 2019 04 12. (2019). On content models for proximity services. Conference of Open Innovation Association, Fruct, 2019-april, 277–284.
<https://doi.org/10.23919/FRUCT.2019.8711983>
- New York State Department of Labor (2021). Characteristics of frontline essential workers in New York state. <https://dol.ny.gov/system/files/documents/2021/09/characteristics-of-frontline-workers-09-22-21.pdf>
- Mandal, S. (2013). Brief introduction of virtual reality & its challenges. *International Journal of Scientific & Engineering Research*, Volume 4(4).
<https://www.ijser.org/researchpaper/Brief-Introduction-of-Virtual-Reality-its-Challenges.pdf>
- Munn, Z., Peters, M.D.J., Stern, C. et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol* 18, 143 (2018). <https://doi.org/10.1186/s12874-018-0611-x>
- Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil, H. Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z (Editors). *JBIM Manual for Evidence*

- Synthesis, JBI, 2020. Available from <https://synthesismanual.jbi.global>.
<https://doi.org/10.46658/JBIMES-20-12>
- Pautz, M. (2009). Trust between Regulators and the Regulated: A Case Study of Environmental Inspectors and Facility Personnel in Virginia. *Politics and Policy*. 37(5), 1047-1072.
- PGil Solá, A., & Vilhelmson, B. (2018). Negotiating proximity in sustainable urban planning: A Swedish case. *Sustainability*, 11(1), 31.
<http://dx.doi.org/10.3390/su11010031>
- Salamon, L. (2002). The New Governance and the Tools of Public Action: An Introduction in Elliott, O. V. (ed.). *The tools of government: A guide to the new governance*. OUP Us, pp. 1-47.
- Samanta, A. and Hand, L. (2022). Examining the “in-between” of public encounters: Evidence from two seemingly disparate policy contexts. *Public Policy and Administration*. 37(2), 129-153.10.1177/0952076721102098
- Schneider, A. & Ingram, H. (2004). *Deserving and entitled: Social constructions and public policy*. State University of New York Press.
- Shin, J., Suh, E. M., Li, N. P., Eo, K., Chong, S. C., & Tsai, M.-H. (2019). Darling, Get Closer to Me: Spatial Proximity Amplifies Interpersonal Liking. *Personality and Social Psychology Bulletin*, 45(2), 300–309. <https://doi.org/10.1177/0146167218784903>
- Tao, T., and Zhai, C. (2007). An exploration of proximity measures in information retrieval, in SIGIR 2007, pp. 295–302, 2007.
- Wright, V. (2000). Blurring the public-private divide. *Governance in the twenty-first century: Revitalizing the public service*, 155-177.
- Zajonc, R. B. (2001). Mere exposure: A gateway to the subliminal. *Current Directions in Psychological Science*, 10, 224-228.
- Zavattaro, S. M., Sowa, J. E., Henderson, A. C., & Edwards, L. H. (Eds.). (2023). *Portraits of Public Service: Untold Stories from the Front Lines*. State University of New York Press.

ACKNOWLEDGMENTS

- A special thank you to the graduate students at Virginia Tech’s Center for Public Administration and Policy who participated in the advanced topics course upon which this manuscript is partially based:

Saif Tarek Abdelrasol, PhD Student
 Janet Arrechea, PhD Student
 Charity L. Boyette, PhD Student
 C. Cozette Comer, PhD Student
 Lauren Nicole Gilbert, MPA Student
 Dereck L. Hamunakwadi, PhD Student
 Aparajita Sengupta, PhD Student
 Katherine Morrow Stigers, PhD Student
 Kyla Lucinda Yeadon, PhD Student

- Thank you to fellow researchers at Virginia Tech’s Center for Public Administration and Policy—Dr. Matthew Dull, Leisha LaRiviere, and Amady Sogodogo (along with Dr. David Bredekamp)—whose current collaborative research on “Frontline Narratives” (stories of public servants) has inspired and serves as a theoretical and practical foundation for this paper. This earlier work—with specific contributions from Leisha LaRiviere concerning possible “dimensions” of frontlineness—has served as a vehicle for discussion and helped to frame our current work.