

REBECA CARDOSO PEDRA

COVID-19 and oral health taxonomy development and validation process

São Paulo

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"Knowing is not enough; we must apply. Willing is not enough; we must do."

Goethe

RESUMO

Pedra RC. Processo de desenvolvimento e validação de taxonomia de COVID-19 e saúde bucal [dissertação]. São Paulo: Universidade de São Paulo, Faculdade de Odontologia; 2022. Versão Original.

Formuladores de políticas, stakeholders, e pesquisadores não conseguiam encontrar facilmente evidências de pesquisa sobre COVID-19, sistemas de saúde e saúde bucal. Isso ocorreu devido à ausência de uma taxonomia que disponibilizasse tópicos que possibilitassem realizar uma busca abrangente aos diversos tipos de evidências de pesquisa, ou identificar rapidamente informações relevantes para a tomada de decisão nos resultados da pesquisa. Além disso, não haviam ferramentas que possibilitassem a compreensão da complexidade do problema da pandemia para entender seus impactos e desenvolver uma solução cientificamente rigorosa, inovadora, ágil e orientada pelo design. Para suprir essas lacunas, trazemos a aplicação prática dos conceitos de inovação e Design Thinking guiados pela metodologia SUPPORT e desenvolvemos um inventário centrado no usuário, gratuito e de fácil busca por evidências científicas. O inventário fornece informações relevantes para a tomada de decisão sobre saúde bucal e COVID-19. O inventário COVID-END Oral Health (COVID-ENDOH) foi desenvolvido considerando os princípios de inovação e seguindo o rigor da metodologia SUPPORT associada as abordagens ágeis de design Thinking do Policy Lab. O inventário COVID-ENDOH é classificado nas categorias: medidas de saúde pública, gestão clínica, arranjos do sistema de saúde, e respostas econômicas e sociais. Foi validado por vários profissionais da saúde bucal originários de 4 continentes. Também desenvolvemos um estudo transversal, com análises quantitativas usando métodos de estatística descritiva para comparar as diferenças entre a primeira e a segunda versão do COVID-ENDOH, bem como entre o COVID-ENDOH e inventários gerais de saúde analisando a presença de evidências de Saúde Bucal. Nosso objetivo foi avaliar a evolução da produção de evidências de saúde bucal, a disponibilidade de evidências de COVID-19 e Saúde Bucal em inventários gerais, além de analisar a relevância de um inventário temático para informar a tomada de decisão. Desenvolvemos uma

metodologia inovadora, a Design Evidence Informed Policy (DEIP), que foi testada através do desenvolvimento do inventário COVID-ENDOH. Assim, desenvolvemos o inventário COVID-ENDOH que provou ser uma solução baseada em evidências centrada no usuário que reflete as necessidades e problemas dos dentistas em todo o mundo. Identificamos 166 evidências como revisões sistemáticas e produtos derivados por meio de pesquisas manuais em vários bancos de dados, 95 decisões e 53 lacunas de pesquisa. O domínio Gestão Clínica concentra o maior número de decisões (50), evidências (revisões completas (27) e protocolos (67)) e lacunas (20). Publicamos duas versões do inventário, dois e-books em inglês, espanhol e português para facilitar a utilização e divulgação do inventário em vários países, além de dois artigos submetidos com os resultados deste trabalho. O COVID-ENDOH mostrou-se uma solução útil e específica quando comparado aos inventários gerais para incluir e dispor evidências e problemas de saúde bucal. Atribuímos essas características à metodologia DEIP utilizada. O inventário de Saúde Bucal disponibilizado de forma gratuita e atualizada, COVID-ENDOH, pode ser uma ferramenta poderosa para informar a tomada de decisões políticas, evitar sobreposição de pesquisas, e induzir a resposta a perguntas de pesquisa que ainda não estão recebendo investimento e atenção da comunidade científica, além de ser útil também para promover a integração da saúde bucal a saúde geral. Essas questões nos levaram a desenvolver um mapa de evidências para entender como as pesquisas estão distribuídas sobre em relação ao tema. Além disso, este trabalho é um processo completo de Design Thinking, passando por todos os momentos de design, identificação de problemas, ideação, implementação e, finalmente, o compartilhamento do percurso ou história, buscando inspirar outras pessoas para a ação.

Palavras-chave: COVID-19, Saúde Bucal, Difusão de Inovação, Política de Inovação e Desenvolvimento Odontologia Baseada em Evidências, Política Informada em Evidências, Taxonomia.

ABSTRACT

Pedra RC. COVID-19 and oral health taxonomy development and validation process [dissertation]. São Paulo: University of São Paulo, Faculty of Dentistry; 2022. Original Version.

Policymakers, stakeholders, and researchers have not been able to easily find research evidence about COVID-19, health systems, and oral health. That occurs due to the absence of taxonomy topics that would make it possible to conduct a comprehensive search of the many types of relevant research evidence, or rapidly identify decision-relevant information in search results. Besides, there were no tools that embraced the complexity of the pandemic problem to understand its impacts and develop a solution that was scientifically rigorous, innovative, agile, and design oriented. To address these gaps, we bring the practical application of the concepts of innovation and design thinking guided by the Support methodology and developed a user-centered, free, and easy inventory for searching for scientific evidence. The inventory provides relevant information for decision-making regarding oral health and COVID-19. The COVID-END Oral Health (COVID-ENDOH) inventory was developed considering innovative principles following the rigorous support methodology associated with the policy lab, and design thinking agile approaches. The COVID-ENDOH inventory is classified into the categories: public health measures, clinical management, health system arrangements, and economic and social responses. It was validated by several oral health professionals from 4 continents. We also developed a cross-sectional study, with quantitative analyses using descriptive statistics methods to compare the differences between the first and the second versions of COVID-END Oral Health (COVID-ENDOH) and between COVID-ENDOH with general health inventories for Oral Health. We aimed to assess the evolution of oral health evidence production, the availability of COVID-19 and Oral Health evidence in general inventories, and the relevance of a thematic inventory to inform decision-making. We devise an innovative methodology, the Design Evidence Informed Policy (DEIP), which was tested by developing the COVID-ENDOH

inventory. We developed the COVID-ENDOH inventory that proved to be a user-centered evidence-informed solution that reflects the needs and problems of dentists around the world. We identified 166 pieces of evidence as being systematic reviews and derived products through hand searches of several databases, 95 decisions, and 53 research gaps. The domain of Clinical Management concentrates the highest number of decisions (50), evidence -full reviews (27) and protocols (67)-, and gaps (20). We published two versions of the inventory, two e-books in English, Spanish and Portuguese to make the inventory easier to use in multiple countries and spread it, besides two articles submitted with the results. The COVID-ENDOH proved to be a useful and specific solution when compared to general inventories for containing and disposing of Oral health evidence and problems. We attribute these characteristics to the DEIP methodology used. The available, free, and updated COVID-END Oral Health inventory can be a powerful tool to inform political decision-making, avoid overlapping research, answer research questions that are not yet receiving investment from the scientific community, and also to integrate oral health into general health. This also led us to develop a gap map to understand the evidence distribution. Besides, this work comprises a complete design thinking process, passing through all the moments of design, problem identification, ideation, implementation, and finally, story sharing seeking to inspire others towards action.

Keywords: COVID-19, Oral Health, Innovation Diffusion, Innovation and Development Policy, Evidence-Based Dentistry, Evidence-Informed Policy, Taxonomy.

SUMMARY

1.	INTRODUCTION	17
1.1.	DEFINITION OF INNOVATION	17
1.2.	RESEARCH IN HEALTH, EVIDENCE INFORMED POLICY (EIP), AND INNOVATION	18
1.3.	DEFINITION OF THINKING DESIGN.....	19
1.4.	RESEARCH IN HEALTH, EIP, INNOVATION, AND DESIGN THINKING	21
1.5.	THE RELATIONSHIP BETWEEN TERRITORY AND SOCIETY VERSUS PROBLEM EDUCATION AND SCIENCE WITH INNOVATION	22
1.6.	WICKED PROBLEMS OF SOCIAL NATURE, DESIGN THINKING, AND EVIDENCE-INFORMED POLICY-MAKING.....	24
1.7.	SUPPORT METHOD AND EIP VERSUS INNOVATION AND DESIGN THINKING	26
1.8.	COVID-19, COVID-END, DENTISTRY, EIP, AND DESIGN THINKING	27
2.	OBJECTIVES	29
3.	METHODS	31
3.1.	COMPLIANCE WITH BIOETHICS STANDARDS.....	32
4.	RESULTADOS	33
5.	CHAPTER I - COVID-END ORAL HEALTH TAXONOMY AND INVENTORY DEVELOPMENT WITH DESIGN THINKING AS INNOVATIVE METHOD	35
5.1.	INTRODUCTION	37
5.2.	METHODS.....	38
5.3.	RESULTS	44
5.4.	DISCUSSION	45
5.5.	CONCLUSION.....	47
	REFERENCES	48
	ANNEX - TABLES AND FIGURES	53

6.	CHAPTER II - COVID-END OH AND THE IMPORTANCE OF THEMATIC INVENTORIES TO INFORM DECISION MAKING	63
6.1.	INTRODUCTION.....	65
6.2.	METHODS	66
6.3.	RESULTS.....	69
6.4.	DISCUSSION.....	70
6.5.	FINAL CONSIDERATIONS.....	72
	REFERENCES:.....	74
	ANNEX – GRAPHICS AND FIGURES.....	79
7.	FINAL CONSIDERATIONS	83
7.1.	DEVELOPING THE DESIGN EVIDENCE INFORMED POLICY METHOD .	83
7.2.	TESTING THE DESIGN EVIDENCE INFORMED POLICY METHOD BY DEVELOPING COVID-ENDOH.	83
	REFERENCES.....	85
	ANNEX	89

1. INTRODUCTION

The pandemic has changed the world quickly, and has highlighted the need to rethink the way and speed with which we produce and use science to build evidence-informed policies [1, 2], opening a window of opportunity for us to incorporate innovation methodologies, in order to make these steps quick, effective and align with reality. Thus, it is possible to follow the various changes that have occurred and contribute to effective solutions that address the diversity and complexity of the general and specific problems that affect our society.

The changes brought about by the pandemic also impacted dentistry. An area that was greatly affected around the world due to the place of clinical performance. In dentistry, there is a high risk of contamination of the oral health working team during procedures for saliva droplets and spray [3], producing a change in the dental work process. It was necessary to broaden the clinical practice and change the way of thinking about dental care to fit this new complex and challenging scenario [3]. Nevertheless, the pandemic brought a window of opportunity to rethink our practice and innovate in care.

The pandemic has also opened up the demand to understand scientific evidence so that it is practical to inform and guide professionals, health systems, and decision-makers. In addition, it revealed the usefulness of science and how much we need it, making the necessity to produce scientific evidence centered on the needs of society more evident. It also opens a window of opportunity for the scientific community to rethink the purpose and logic of producing evidence and incorporate innovative methodologies in their study design and work process.

1.1. DEFINITION OF INNOVATION

Innovation is the development and implementation of creative ideas to generate breakthroughs and evolution through an iterative process that begins with the perception of a new market and (or) service opportunity for a technology-based

invention which leads to development, production, and marketing tasks striving for the success of the invention [4, 5].

The “innovation” process comprises the technological development of an invention to end-users through adoption and diffusion, being the final process the introduction of a new innovation or the reintroduction of an improved innovation. It is important to define technological innovations, which are innovations linked to industrial arts, engineering, applied sciences, and(or) pure sciences. Examples might include innovations from electronics, aerospace, pharmaceuticals, and information system industries. However, innovation is not restricted to basic and applied research but extends to product development, services, manufacturing, marketing, distribution, production adaptations, and upgrading [4].

While all innovation involves change, not all changes are innovative, as innovation involves testing and translating ideas into value-generating solutions, be they new products, services, or systems[6]. Furthermore, an invention does not become an innovation until it has been processed through production and marketing tasks and is diffused into the marketplace. Therefore, a discovery that remains only in a laboratory environment or among its developers is considered an invention. In other words, unless they create value by solving a problem outside the context of its creation, they are not innovative [4, 6].

We then define innovation as the intentional creation of change that adds value and is diffused to parties other than its developers [4–6]. Innovation to improve health research development and evidence-informed policy development can certainly involve technology but it also encompasses a wide range of new operating procedures, service enhancements, processes, strategies, and partnerships.

1.2. RESEARCH IN HEALTH, EVIDENCE INFORMED POLICY (EIP), AND INNOVATION

Innovation requires creativity, but it also requires discipline in adhering to goals and processes, careful attention to the capabilities and priorities of practice, informed decision-making, determined execution, and careful communication[5]. These are

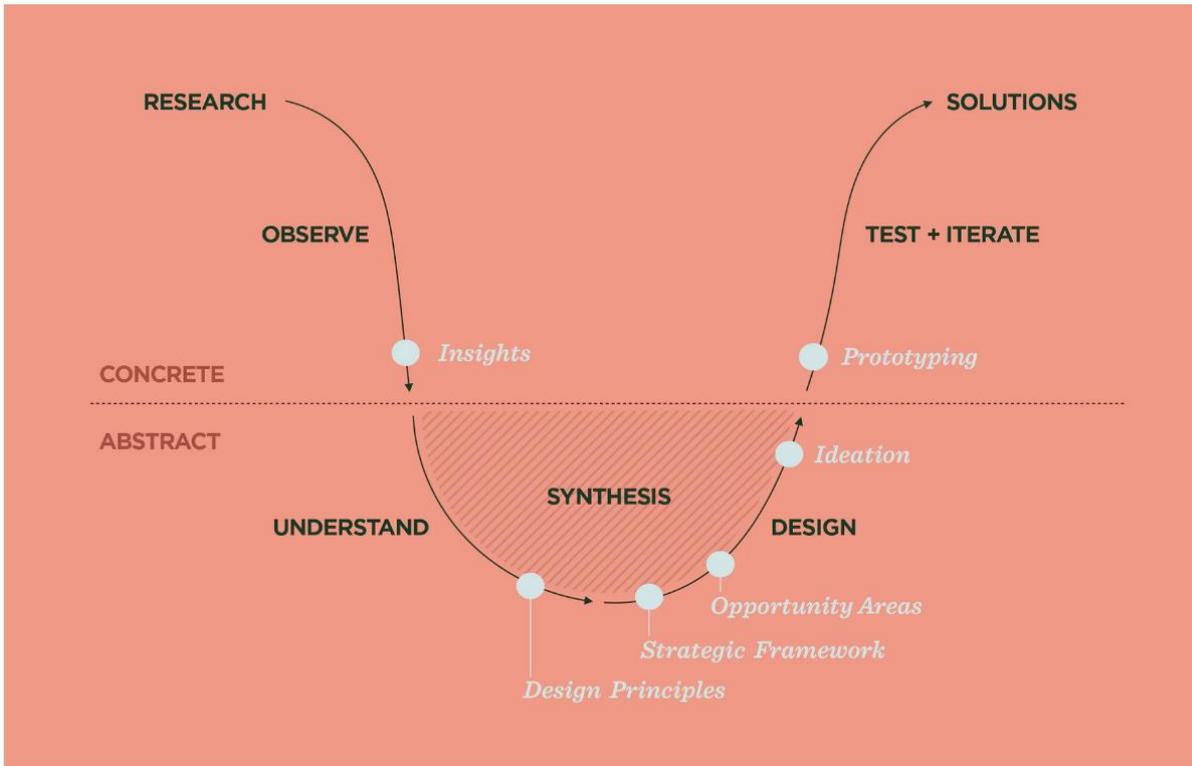
characteristics that align with methods for the development of health research and evidence-informed policies [7–11] .

In addition, the research starts from the perception of opportunities and the development/construction of policies based on needs, converging once again with the principles of creating innovation. However, innovation and research diverge in terms of time taken for problems and opportunities to become solutions. With that in mind, EIP is closer to innovation as it aims to respond quickly to complex policy problems [2, 12]. The development time of health research is slow, especially if we consider scientific evidence, such as systematic reviews that are useful to inform political decision-making, which can take years to complete. On the other hand, the innovation field focus on rapid methods for idea generation and for running experiments to test them. New disciplined techniques are being utilized for testing potentially value-producing ideas faster, less expensively, and more reliably [6]. Those principles fill the gap in the need for increased speed in the production of research and EIP solutions.

1.3. DEFINITION OF THINKING DESIGN

Design thinking (DT) taps into capabilities we all have but are overlooked by more conventional problem-solving practices. It doesn't just focus on creating human-centric products and services. The DT process itself is deeply human. Design thinking depends on our ability to be intuitive, recognize patterns, to build ideas that have emotional and functional meaning. Design thinking is an approach where rationality, analysis, feeling, intuition, and inspiration meet, keeping people at the center of each process and having a mindset that embraces empathy, optimism, iteration, creativity, and ambiguity [13, 14]. The design process (Figure 1.1) goes through three stages: inspiration, ideation, and implementation. Inspiration would be the problem or opportunity that motivates the search for solutions; ideation would be the process of generating, developing, and testing ideas; and implementation is the path that leads from the design phase to people's lives [13].

Figure 1.1 - The journey of the design process



Source: Speicher [15].

Walking through these moments in design thinking is not always linear or sequential. Since the design is user-centric, it allows for the constant refinement of the solution and the adaptation of it to the changing needs of the user. This way, projects can return to inspiration, ideation, and implementation more than once as the team refines its ideas and explores new directions. So, at first glance, design thinking may seem chaotic. However, over the life of a project, participants realize that the process makes sense and achieves results, even though it is different from a traditional linear process [13].

Analyzing the definition and moments of DT, we also observed points of convergence with health research and EIP. Health research is naturally centered on the user/patient problem, as are EIPs, and both are constantly being updated, that is, moving between spaces of inspiration, idealization, and implementation. However, unlike Design thinking, research and EIP have a linear solution formulation process, which does not consider the user's vision and agility in the same way as DT.

1.4. RESEARCH IN HEALTH, EIP, INNOVATION, AND DESIGN THINKING

Research has, by nature, the potential to be innovative and has intrinsically in its DNA similarities with design thinking. However, it is necessary to incorporate in research the perspective of innovation, agility, and user-centered vision in its process to advance to the implementation phase and become a real innovation. So, research might frequently proceed from the initial stages of the Technology Readiness Level (TRL) scale [16], where the knowledge produced keeps retained in academia, and move towards the final stages of TRL where the transfer of knowledge, processes, or products to society takes place. Furthermore, transforming research into innovation that generates value for its end-users or society.

In addition to direct transfer in the form of products, research can still be transferred to society when used for policy formulation in EIP processes. The process of building EIP and its products can be a complete design thinking process. It is in the planning and implementation phases of the EIPs that the research transfer to society can occur more clearly, whether in the form of a product or information. It is at this meeting between research evidence and public policy formulation that research has the potential to become useful products for the construction of policies and policy products informed by scientific evidence that will generate value for society.

However, to design evidence-informed Policies in a user-centered way, they must pass through and meet the three moments of design thinking. Nevertheless, unlike most studies where validation does not take place, disregarding the perspective of potential users, EIPs go through phases similar to the three design phases: inspiration, ideation, and implementation. Although, the implementation phase requires a more iterative perspective for validating, refining, and continuously improving the solution. For this to happen, it is necessary to evaluate indicators and collect user feedback and economic analysis of these policies and their products to measure their impacts. Thus, proceeding with the policy update and improvement of the constant changes that its users and the environment in which they are inserted suffer.

For a better understanding of this perspective, it is crucial to understand the relationship between the concepts of innovation and design thinking with classic aspects of public health that influence the elaboration of policies and the practice of health professionals, namely the territory and its influence on society [17], and the concepts of "problem" in teacher education and its impact on science and health [18].

1.5. THE RELATIONSHIP BETWEEN TERRITORY AND SOCIETY VERSUS PROBLEM EDUCATION AND SCIENCE WITH INNOVATION

Milton Santos [17] points out that science influences globalization and is affected by the financial market. All these factors influence the geographical distribution of productive sectors, which influence our way of living, purchasing power, and the characteristics of the territory where we live. Therefore, all those factors impact health in different ways.

Therefore, this text and these reflections will be presented considering that we are in the field of complexities. Dina Czeresnia says that health problems and public health are complex, a priori. It is impossible to think about health without considering the divergent, convergent thoughts that, historically, health and public health have approached in a reductionist way [19]. Some aspects that deserve reflection are: What is the origin of these problems? Who suffers from these problems? Who feels them, and who is affected by them?

Saviani [18] helps us to answer the questions above, as he affirms that the problem is closely related to need. When we consider **Saviani's** [18] point of view on the philosophy of education and how he reflects on the problems that arise in educational activities, we observe that they have an impact on science, which is closely linked to health professionals' education and should also be related to innovation. According to Saviani -The essence of the problem is the necessity-. Therefore, a question whose answer is unknown and needs to be known is a problem [18].

From the educational perspective of health professionals' training, universities work by considering the study of health problems and their solutions. Science shares this same environment and the same way of working and thinking about problems and solutions. Our hypothesis is that science and scientists might propose solutions without contemplating the needs of those who suffer the - pain -, thus prevailing on the vision of the creator of the solution. Koch reiterates our hypothesis as he states that the Flexenerian model, still very present in health courses and practices, results in a professional who believes he knows what is best for the patient [20]. Would this model be replicated in doing science?

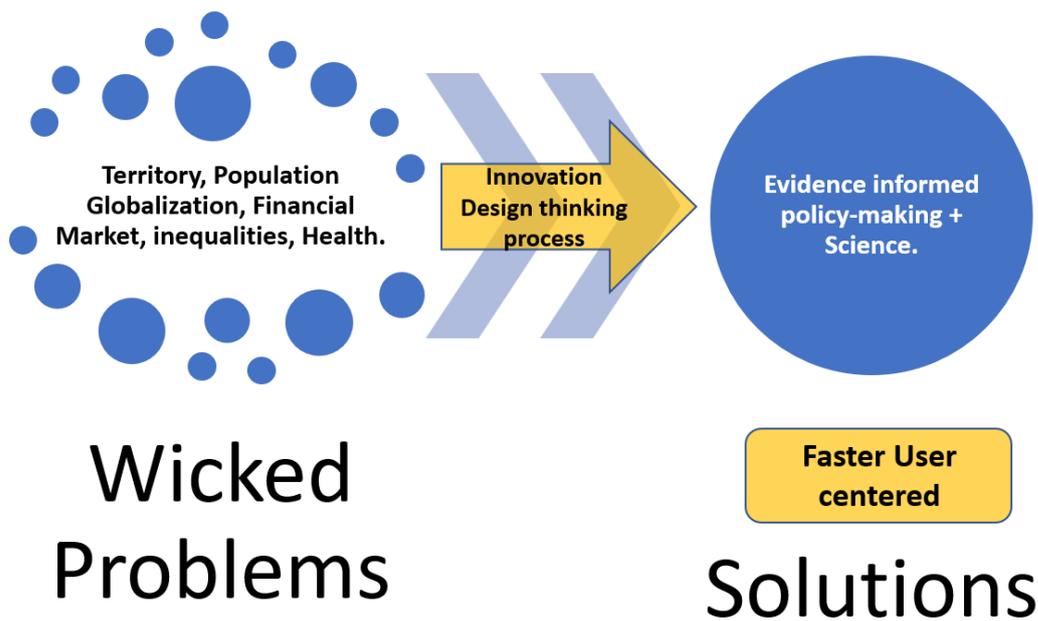
When we practice the biopsychosocial model, in which we consider the patient as a whole, the territory in which he is inserted, and his needs, that is, what he understands as a problem, we achieve better results in treatments [21].

It is possible to observe the relationship between user-centered health care (singular therapeutic project) and innovative thinking, as it considers the user's perspective to solve a problem, including it in the co-creation of the solution. Innovation has the premise of falling in love with a problem, seeking a solution that considers the perspective of those who suffer the problem and what they see as needs, thus generating value for the end-user and transforming their reality.

Science has a high potential for generating innovation to solve several problems, not only regarding health but also social problems in general. This potential can become even more exponential if innovative thinking and innovative methodologies are included in the stages of traditional scientific methodology. In this way, we could accelerate the transfer of this knowledge, products, and processes to society, generating various values such as financial and the reaching of SDGs. The EIPs enter this scenario by helping to transfer this knowledge to society, inserting them more easily in the formulation of assertive public policies.

1.6. WICKED PROBLEMS OF SOCIAL NATURE, DESIGN THINKING, AND EVIDENCE-INFORMED POLICY-MAKING

Figure 1.2 - The relation between wicked problems, complexity, innovation/Design thinking, EIP and the solutions development



Source: The autor.

The design theorists Horst Rittel and Melvin Webber described problems of social policy as “wicked” problems for being complex and challenging to address as well as to develop a solution. They point out the difficulty to describe them and the use of science for confronting these problems as science deals with linear problems. They also call into question equity and the attempt to develop policy solutions in a pluralistic society [22].

Because of the “wicked” problems (WP) of social nature, Buchanan linked design thinking to innovation specifically to address them. So, design has evolved from a linear model to a nonlinear one due to two points of weakness: first, the sequence of design thinking and decision making is not a simple linear process; and

second, the problems addressed by designers do not yield to any linear analysis and synthesis [23].

Buchanan [23] suggested then utilizing systems thinking when facing complex design problems. Systems thinking seeks to understand how the components of a system influence each other as well as other systems, being ideal for WP. System thinking can be enhanced if combined with an agile methodology with an iterative approach to design. Agile methodology helps to improve solutions through collaboration building an environment that breeds the ability to be efficient and effectively meet the stakeholders' changing requirements. Combining these systems can lead us to refined solutions at each iteration that evolve with the WP (Figure 1.2) [24].

Since then, solutions for policy problems have been developed, and different approaches to policy development arose, such as evidence-informed policy-making (EIP) based on Support tools [7]. An acknowledged path developed by Evipnet/WHO that includes science and translates it to build solutions considering the diversity of social problems. Besides this significant advancement in policy-making, our society keeps changing rapidly so are the problems, increasing the need for faster, specific, and more complex solutions. Policy lab, on the other hand, developed the Open policy-making toolkit to be an innovative, design-based agile approach for user-centered policy making.

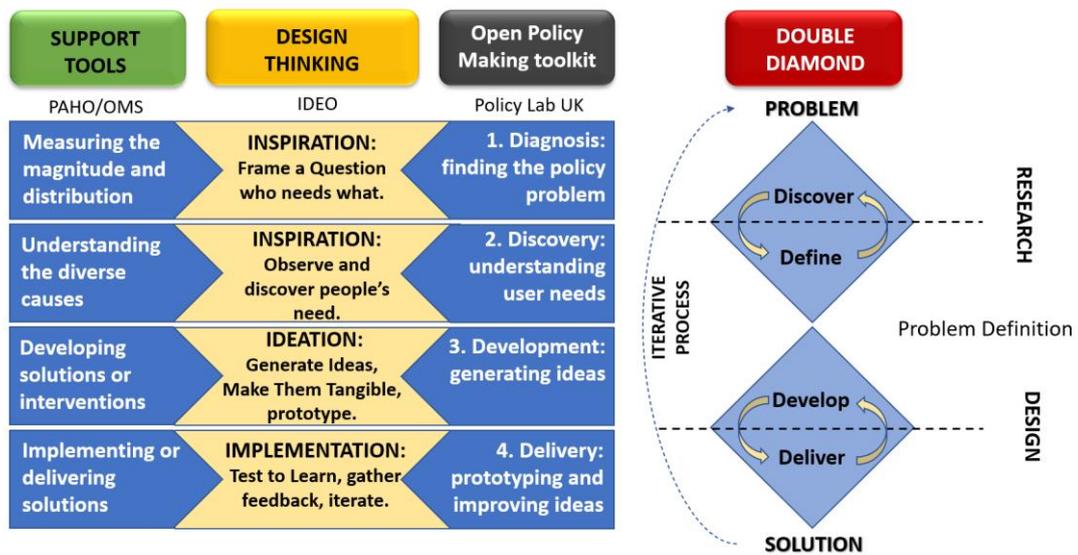
Almost 50 years passed since Horst Rittel and Melvin Webber described social policy issues as wicked problems due to their complexity. Nevertheless, until now, we have not reached a change for the best in our environment, evolving the term WP for the now-called "complex socio-technical systems" [25]. The COVID-19 pandemic accelerated changes and turned our reality even more into a BANI World, an acronym for the terms Brittle, Anxiety, Non-Linearity, and Incomprehensible [26, 27].

With that in mind, it creates a propitious time to consider innovative perspectives to merge evidence-informed policy-making, which is science-centered, with methods such as design thinking used by policy lab, that consider the problem and the user perspective allowing rapid changes in building solutions according to the user's needs in challenging scenarios.

1.7. SUPPORT METHOD AND EIP VERSUS INNOVATION AND DESIGN THINKING

Figure 1.3 - The Design thinking process to Evidence informed policy-making

Design Thinking Process to Evidence informed policy-making



Source: The author.

The SUPPORT methodology tools [7] for Evidence-Based Health Policy Development (STP) are exquisite tools for using research evidence suited to the needs of Policymakers and those who help them to improve and make a more efficient policy approach [7]. Considering the Support methodology as a guide for policies informed by evidence, it has a natural tendency towards innovation and Design, including in its various stages the perspective of actors outside the group that contributes to the elaboration of policies.

The Support methodology has much in common with design (Figure 3). Support begins with the phase of problem understanding and includes the vision of stakeholders and actors so that the team involved can develop a policy solution. The development and delivery phase of the solution is where we most clearly see the opportunity to incorporate design thinking principles and tools to formulate and deliver agile and user-centered solutions. The toolkit provided by Policy Lab has

agility and design as guiding bases but can benefit from systematic analysis to use scientific evidence from the Support methodology. It is possible to use the two methodologies combined at all stages in order to build an evidence-informed and user-centered policy formulation process at all stages, being agile and assertive (Figure 1.3).

1.8. COVID-19, COVID-END, DENTISTRY, EIP, AND DESIGN THINKING

The pandemic evolves, revealing itself as a truly wicked problem or a “complex socio-technical system” [22, 24, 25, 28], affecting and being affected by a variety of factors, with no clear solution or formula to solve it. And finally, it also involved social nature factors and people’s culture, changing the way they saw, explained, and behaved in face of the problem. Decision-making with constantly changing evidence is a challenge, and it is necessary to find a safe place for consultations. The COVID-END was created with the purpose to be this safe place. With that in mind, it was built considering accessible methods such as the one-stop-shop used in health system evidence and Epistemonikos, which are significant for decision-making. On account of COVID-19, these one-stop shops are even more essential [29].

The “COVID-END” project (available at: <https://www.mcmasterforum.org/networks/covid-end>) had an exceptional impact during this pandemic. It is a network of 50 of the world's leading evidence synthesis groups that developed an inventory of the best summaries of evidence for general health. With its evolution, the pandemic generates constant changes in the world and also in the dentistry field. Including oral health in these rapid-response systems is critical to enabling an adequate pandemic response in oral health worldwide. This unstable environment makes design thinking and EIP ideal methods to respond to this dynamic perspective of the COVID-19 pandemic.

The design thinking processes are innovation methods that are problem and user-centered, which includes considering the uncertainty of a problem, and being creative to solve people’s problems, with a constant iterative perspective for testing the solution and receiving feedback [30]. This leads us to the need of comprehending

innovative and agile methods already being used by [31], a multidisciplinary team working across the United Kingdom (UK) government, and understand the problems imposed by COVID-19 in dentistry, the evidence, and identifying research gaps are essential to confronting the COVID-19 pandemic.

Those ways of thinking about problems, delivering policies, and policy products, of COVID-END and Policy Lab, are best suited to address complex and systemic policy problems such as the COVID-19 pandemic. A problem that requires fresh thinking to build potentially transformative solutions amid this chaotic environment [31–33].

Given the above, it seems to be fundamental and urgent to develop a "one-stop-shop" solution, based on innovative methods, which is comprehensive, free, and easy to search for research evidence on COVID-19 and Oral Health. A user-centered solution capable of providing relevant information for decision-making about the many types of questions asked by policymakers, stakeholders, and researchers about health systems, COVID-19, and oral health.

2. OBJECTIVES

Develop a two-phase study. The first phase encompasses the establishment of an innovative methodology for formulating complex policy solutions that use the SUPPORT tool as a scientific method and design thinking and policy lab tools as strategies to ensure the whole process is agile and user-centered. In phase two, the new method was tested to create a specific taxonomy of oral health and COVID-19, as well as to make oral health and COVID-19 evidence available in an environment of free access to decision-makers and related professionals. In addition, it analyzes the scientific production of oral health and COVID-19 in the period 2020 and 2021 and the contribution of a thematic inventory to inform decision-making.

3. METHODS

A taxonomy guided by a structure of problems that COVID-19 triggered in dentistry was developed. This taxonomy is the basis of the COVID-ENDOH inventory and guided the search for classified and categorized answers to the identified issues, resulting in a relationship between problems and evidence. The oral health and COVID-19 taxonomy that generated COVID-ENDOH had its development guided by the methodologies of COVID-END, the one-stop shop [29], and the innovative methods to apply design in policy from Policy LAB. We used the double diamond innovation methodology to guide the entire process of creating our taxonomy and the inventory. This process took place in 4 stages described below and which will be detailed in the first chapter of this dissertation:

- Discovery: Stage 1 of the first diamond, where we carried out a panel of experts to identify the problem using the Evidence Safari methodology from POLICY Lab.
- Definition - Validation of the pre-taxonomy: Stage 2 of the first diamond, where we used the “snowball” methodology by BIERNACKI P. & WALDORF [34] to identify the research participants for validation. Later, to perform the validation, we used the Idea Jam methodology from Policy Lab to conduct interviews via Google Meet® also using Google Jam board® (Google, Mountain View CA).
- Development of the oral health and COVID-19 inventory: Step 1 of the second diamond was performed in three stages: search strategy, data extraction, and quality access using the 11-question AMSTAR [35].
- Delivery of the inventory - prototyping: Stage 2 of the second diamond. We used the Experience Prototyping tool [36] to conduct the usability tests of the prototype that took place online by testing the usability of the inventory with users to verify the ease of use and good categorization. We collected user feedback that was analyzed by the expert panel and used to refine the inventory for final delivery.

As described in detail in the second chapter of this dissertation, a cross-sectional study was carried out with quantitative analyzes using descriptive statistics to establish a comparison from a portrait of three bases that have easily accessible scientific evidence to inform decision-making in health: COVID -END, COVID-ENDOH and Health Evidence. We analyzed the evolution of COVID-ENDOH, as well as the presence of literature related to oral health and COVID-19 in the COVID-END and Health Evidence databases compared to the former.

3.1. COMPLIANCE WITH BIOETHICS STANDARDS

This study was approved by the Research Ethics Committee of the Faculty of Dentistry of the University of São Paulo under protocol 4.690.744 (ANNEX)

4. RESULTADOS

We bring the practical application of the concepts of innovation and design thinking guided by the Support methodology that resulted in the creation of the Design Evidence Informed Policy (DEIP) method used to develop COVID-END Oral Health. The first chapter discusses the method for developing the inventory, and the second presents an analysis of the importance of creating specific solutions for health problems in politics.

COVID-END Oral Health taxonomy and inventory development with design thinking as an innovative method

The first chapter describes the process of developing the first oral health taxonomy as well as the oral health and COVID-19 inventory to inform clinical and policy decision-making during the pandemic. This chapter describes the methodologies used: design thinking, and one-stop shop, besides the steps we went through, culminating in the availability of the inventory in three languages, English, Spanish and Portuguese.

COVID-END OH and the importance of thematic inventories to inform decision-making

The second chapter establishes a comparison between two general inventories, COVID-END and Health Evidence, with the specific COVID-END Oral Health. The aim was to identify the presence of useful oral health evidence to inform decision-making amidst the inventories and to understand the contribution and importance of this thematic inventory in the pandemic context.

5. CHAPTER I - COVID-END ORAL HEALTH TAXONOMY AND INVENTORY DEVELOPMENT WITH DESIGN THINKING AS INNOVATIVE METHOD

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ABSTRACT

Policymakers, stakeholders, and researchers have not been able to easily find research evidence about COVID-19, health systems, and oral health due to the absence of taxonomy topics that would make it possible to conduct a comprehensive search of the many types of relevant research evidence, or rapidly identify decision-relevant information in search results.

To address these gaps, we developed a comprehensive, free, and easy inventory for searching for scientific evidence that provides relevant information for decision-making. It was developed considering innovative principles following the design thinking and one-stop shop methodologies. The inventory is classified into the categories: public health measures; clinical management; health system arrangements; economic and social responses. It was validated with several oral health professionals from 4 continents.

We identified 166 evidence being systematic reviews and derived products through hand searches of several databases and 53 research gaps. The domain Clinical Management concentrates the highest number of evidence, full reviews (27) and protocols (67). The domain with the fewest studies included was Health System Arrangements.

The available, free, and updated COVID-END Oral Health inventory can be a powerful tool to inform political decision-making, and avoid overlapping research, answering research questions that are not yet receiving investment from the scientific community, and also to integrate oral health into general health.

Keywords: COVID-19, Oral Health, Innovation Diffusion, Evidence-Based Dentistry, Taxonomy

5.1. INTRODUCTION

COVID-19, a disease that spreads by aerosol, generated mainly by the mouth, is the area of expertise of the dental surgeon¹⁻³. With its area of activity affected and classified as having a high risk of spreading infection, there was a suspension of dental services around the world, generating a high impact on dentistry⁴. With calls suspended, services interrupted, dental offices were paralyzed or closed⁵⁻⁷. However, the need for dental care has not stopped, so decision-making in dental health has become urgent⁸.

In this complex and uncertain scenario, the decision-maker needs reliable sources to obtain information ⁹. An Oral Health and COVID-19 Inventory could be a solution to gather in one place a list of problems that the pandemic has caused in dentistry and relate them to the answers from the best available evidence. As with other more general inventories without a focus on oral health, such as COVID-END (<https://www.mcmasterforum.org/networks/covid-end>), and Health Evidence™ (<https://www.healthevidence.org/>).

Accessible methods such as the above-mentioned one-stop-shop and others as health system evidence (HSE) and Epistemonikos are significant for decision making. On account of COVID-19, these models are even more essential ⁹. As decision-making with constantly changing evidence is a challenge, it is necessary to find a safe place for consultations and avoiding misinformation. Purpose by which the COVID-END was created, to be this safe place. Including oral health in these rapid-response systems is critical to enabling an adequate pandemic response in oral health, around the world.

The “COVID-END” project (available at: <https://www.mcmasterforum.org/networks/covid-end>) had an exceptional impact during this pandemic. It is a network of more than 50 of the world's leading evidence synthesis groups who developed an inventory of the best summaries of evidence for general health. An inventory organizing the available evidence about COVID-19, as well as the existing research “gaps”. Allowing researchers, research formulators, and stakeholders to know the evidence and apply it in the clinical routine, health systems,

and public policies. However, it does not address oral health and its specificity, not having this objective. It is a general health inventory.

Although dentistry is an integral part of general health, it is sometimes invisible in general health platforms and inventories. On the other hand, this pandemic increasingly shows that all areas of health are connected, and need to be seen, so that we can work on the logic of integral health ¹⁰⁻¹⁴. Moreover, we can understand the complexity of COVID-19, build better solutions, anticipate problems, and prepare for the next pandemics. Thus, it was proposed to develop an oral health inventory, COVID-END Oral Health (COVID-ENDOH), which would allow giving more visibility of oral health issues. In this article, we describe the methodological steps for this inventory development which brings the specificity of dentistry. Furthermore, it has the mission of integrating it into general health.

Given the above, our objective was to develop a "one-stop-shop" method similar to that of Lavis et al. ⁹, for oral health related to COVID-19. A solution that presents the problems pointed out by the dental community - around the world- who delivers sorted and synthesized research evidence.

5.2. METHODS

This study was approved by the Research Ethics Committee of the Faculty of Dentistry, University of São Paulo under protocol 4.690.744.

To develop the COVID-ENDOH inventory, we initially developed a taxonomy guided by a framework of problems that COVID-19 triggered in dentistry. This taxonomy may guide the search for classified and categorized answers to the problems derived from COVID-19 in dentistry. The taxonomy is the basis of the inventory, which presents a relationship between the problems and the evidence that answers these questions.

The taxonomy for oral health related to COVID-19 was developed based on the COVID-END¹⁵ and the Policy Lab (Open Policy Making toolkit)¹⁶ framework for innovation methods to apply design in policy. The framework for innovation

(Figure 1), formerly called the double diamond design process, is popularized by the British Design Council¹⁷, and adapted from Bela Banathy's divergence-convergence model.

An oral health team (Brazil and India) was formed and different roles were assigned: harvesting evidence and research questions, discovering problems at health systems, compounding the ideas and finding participants for the validation process of the project. The steps of the Innovative framework used are described below:

5.2.1. Discover:

The problem of oral health related to COVID-19 requires more than one idea and research path to be understood. It also requires working collaboratively with a human-centered approach that accelerates solving this complex problem through innovation. To create an oral health taxonomy that is incorporated into COVID-END's inventory for best evidence synthesis, we empathize with users, decision-makers, managers, stakeholders, university representatives, and policymakers.

As a first step, we conducted searches for primary research articles, reviews and guidelines in PubMed to understand the problem and know the existing scientific knowledge produced regarding oral health related to COVID-19. Following the evidence safari method (Policy Lab)¹⁸, questions were formulated based on this search as to:

Who is being affected by this and how (Professionals, population, students, decision-makers)?

What problem are they facing?

What are their views on this problem?

What are other countries/organizations doing?

What future changes could impact oral health and health systems?

The evidence obtained from the online searches with our professional experience and insights were gathered and broken into a list of topics, words, and phrases to compose the domains and taxonomy classes related to COVID-19 and

Oral Health. These domains and classes were reclassified into the COVID-END's inventory ¹⁹ for best evidence synthesis project categories to construct an initial taxonomy,

5.2.2. Define – Pre-Taxonomy validation

A “snowball” methodology ²⁰ was used to identify the research participants. Subsequent to the key informant's identification 15 participants were invited and signed terms of free and informed consent. (Chart 1) The participants were oral health professionals (students, academicians, clinicians from government and private sector, policy holders, researchers) from Brazil, Bolivia, Porto Rico, Colombia, England, Oman, India, and Egypt. With their contribution the authors discussed, assessed, adjusted and made changes to the pre taxonomy.

The online interviews (via Google Meet®) were conducted using two methods: a semi-structured script associated with an Idea jam ¹⁸. An Idea Jam is an example of ‘design thinking’ that builds, service, policies and government around user’s needs and experiences that can highlight the needs of users and help policymakers understand what kind of solution they need to create. The Idea Jam was done with the participants creating a place where the interviewers could talk about their problems and brainstorm together. One board per domain was made (Figure 2), which was shared during meetings where participants could access and write directly on Google Jam board® (Google, Mountain View CA) or talk while the presenter wrote the inputs during the discussion. As such, each domain was discussed till all the participants felt satisfied with the inputs and ideas were saturated. Those methods were chosen to ensure that the meetings allowed the participants' creativity without any kind of judgment, so the problems were best harvested and the solutions were built collaboratively.

The details were organized in an excel sheet where changes were done frequently and discussed via Google Meet weekly. All meetings were recorded and their contents transcribed and evaluated to clarify doubts. All the evidence found was stored in a shared google drive accessible to all the team members.

5.2.3. Develop: Inventory on oral health related to COVID-19

After defining, validating and formulating the taxonomy, an inventory was developed in order to make available the best available (i.e., most up-to-date, highest quality, and transparently presented) evidence synthesis in the four domains of taxonomy²¹ (public-health measures; clinical management; health-system arrangements / economic and social responses; education), creating a one-stop-shop platform, which provides users with an overview of the thematic area of oral health and COVID-19.

This step was done in three stages:

- Search strategy;
- Data extraction;
- Quality accessing - AMSTAR rating.

5.2.3.1. *Search strategy*

The searches were done by two authors independently on the following bases: MEDLINE/PubMed, VHL, Cochrane Library, Prospero, MedRxiv, Ebscohost, Health System Evidence (HSE). The search had at least two domains with the following words (Dental or DENTIST or DENTISTRY or oral health or dental practice or dental health services) and (COVID or coronavirus infection or coronavirus infections or COVID-19 or severe acute respiratory syndrome or coronavirus or SARS-CoV-2 or pandemic and others). Supplement Chart 1 presents the search strategy.

Inclusion Criteria: All systematic reviews, meta-analysis, living systematic reviews, rapid reviews, evidence synthesis, scoping reviews, economic analyses and PROSPERO protocols published in English, Spanish and Portuguese language were

included from January 2020 to August 2021 were included. Exclusion Criteria: Narrative reviews.

Titles and abstracts were screened by five researchers using Rayyan (an App for Intelligent Systematic Review articles selection), and the duplicates were removed. Any disagreements that arose were resolved through discussion, or with an additional researcher. The full text of selected citations was then assessed in detail by the team. Figure 3 presents the process of search, identification, inclusion, and exclusion of Studies.

5.2.3.2. *Data extraction*

Following the search, the articles were then titled as systematic review, rapid review, living systematic review and evidence synthesis, scoping reviews, economic analyses and protocol. The key findings of the articles, the last search date and available GRADE profile was documented. These findings were entered into Microsoft Excel.

One staff member draws on the available data to identify the ‘best’ evidence synthesis for each issue and writes a specific decision that provides decision-relevant details like the interventions or exposures examined, and proposes any change to the taxonomy needed to accommodate the new evidence synthesis. To decrease the bias, two other researchers double checked all the steps. A senior advisor edits and revised the re-worded decisions before it is posted.

5.2.3.3. *Quality assessment (AMSTAR 1)*

An appraisal of each of the included reviews was done with AMSTAR 1²² by two researchers and cross-checked by two others. Any disagreement that arose was resolved by a fifth researcher.

5.2.4. Deliver - Prototyping

Prototyping is the ultimate part of our method where we tested the inventory with people running the user research. We followed and adapted the COVID-END structure for COVID-ENDOH. The prototyping purpose was to identify if it was clear, with good categorization, and easy to use.

During the Experience prototyping ¹⁸, we presented the product/inventory for the users so they could experience the usage of it. This phase was also conducted online via Google Meet®. During the interviews the users gave their impressions and inputs to refine the inventory. Afterwards the expert's panel met and analyzed the user's feedback and then did the alterations in the inventory.

5.3. RESULTS

The methodological developments described in this paper have led to the creation of the COVID-END Oral Health (<https://www.mcmasterforum.org/networks/covid-end/resources-to-support-decision-makers/inventory-of-evidence-syntheses/adaptation-to-oral-health>).

The first important result of this study is the creation of an unprecedented taxonomy that expresses the dental community needs in relation to COVID-19, establishing the relationships between the evidence produced and the domains of COVID END (Figure 4). An oral health taxonomy conforming to COVID-END's best evidence synthesis was made. We delivered two versions of the inventory and a taxonomy, both in English. Besides, we also did two e-books that are short versions of the inventories in English, Spanish and Portuguese.

This study made it possible to identify and classify the evidence in the taxonomy. We identified 3607 potential articles in the searches, with 2776 articles remaining after the duplicate's removal by title and abstract screening. Afterwards, applying the inclusion and exclusion criteria defined in this study, 166 articles/evidence (articles and protocols) were identified to be included in the

taxonomy after the full-text screening. Amidst these studies, 58 could have the quality assessed with AMSTAR, and among them 22,4% had a high-quality score, and 31,03% had a medium-quality score. The CM domain showed higher activity, with a considerable number of evidence, decisions, and GAPs to be answered. Another aspect that deserves to be highlighted is the fact that this study allows the identification of research gaps. (Table 1).

Most studies included Prospero's protocols (92), followed by full reviews (58). The domain that concentrates the highest number of full reviews (27) and protocols (67) is the CM. It is also possible to observe that there were only two studies of economic analysis included, both in the ESH domain. The domain with the fewest studies included was HSA. There are a few scoping reviews, rapid reviews, and evidence synthesis in all taxonomy domains (Table 2).

This study allowed the publication of inventories in an e-book format ²³ in 3 languages to facilitate access and storage of user information.

5.4. DISCUSSION

COVID-ENDOH is a solution designed considering innovation methodologies in its process and inspired by the COVID-END inventory. It is an incremental innovation solution ^{24,25} to the original inventory in order to give visibility to the themes and pains experienced by Dentistry in the context of COVID-19. The use of design thinking, an ideal innovation methodology to face turbulent contexts, allowed us to think from a co-creative perspective centered on the user's need from understanding the problem, ideation phase, prototype, delivery and solution refinement ^{26,27}. In addition, some of the premises necessary to develop innovation are adaptability and flexibility²⁸⁻³⁰, fundamental characteristics to accompany the changes generated by the pandemic.

The pandemic is constantly evolving, as is COVID-ENDOH. The COVID-ENDOH inventory has the flexibility to keep up with the changes of the pandemic and the constant emergence of new questions. Therefore, it may undergo periodic updates according to the emergence of decisions resulting from the changes derived

from the impact that the pandemic brings to oral health. The elaboration of a taxonomy made it possible to organize the numerous factors that relate oral health to COVID-19 into domains and categories, establishing a conceptual system to classify these problems (decisions). This system facilitates users' access to available information. It also identifies knowledge gaps that must undergo investments and be answered by new research. This type of inventory also makes it possible to avoid wasting resources, directing researchers and funding agencies to relevant research topics.

The databases search was quite broad and diverse, with more than 3400 articles identified. However, the inclusion criteria applied allowed a detailed selection, making available to the reader only the most relevant studies to address the problems, thus characterizing COVID-END OH as a thematic one-stop shop. Lavis et al.⁹, argue that one-stop shops are justified in decision making because they are essential to ensure that policymakers have easy access to research evidence when urgent issues arise, one of the main factors that increase the use of surveys by policymakers.⁹ Among the 166 studies included, most are of medium and low quality, a phenomenon that follows the global trend³¹. This fact is justified given the health urgency imposed by the pandemic, and this result certainly leads us to reflect on the quality of the studies available in the literature, besides the need to increase the quality of future studies.

In general, COVID-19 studies conducted during the first wave were of lower quality than non-COVID-19 studies conducted during the same period. This difference can be an unavoidable consequence of conducting research during a pandemic, however bad papers should not be accepted³¹. The publication process of COVID-19 studies was speeded up, another factor that might have affected the quality of the studies. They suffer a significant reduction in the time of peer review, something necessary for the rapid dissemination of information, but in the other hand, raises concerns about the quality of the study, as well as the quality of the resulting publications³².

Most studies included were Prospero's protocols (92), followed by full reviews (58). The domain that concentrates the higher number of full reviews (27) and protocols (67) is the CM. It is also possible to observe that there are only 2 studies of economic analysis included, both in the ESH domain (Table 2). The domain with the

fewest studies included was HSA. There are a small number of scoping reviews, rapid reviews, evidence synthesis in all taxonomy domains (Table 2).

These domains are closely related to public health, being this a possible explanation for the absence of evidence on them. The questions at them should emerge from governments and decision-makers, where oral health is not contemplated as being absent in most health systems worldwide. Another possible hypothesis might be that these research topics might be less engaging to researchers or that fewer researchers are working in the area^{11,33,34}.

5.5. CONCLUSION

Given the above, our objective was to develop a "one-stop-shop" method similar to that of Lavis et al.⁹, for oral health related to COVID-19. A solution that presents the problems pointed out by the dental community - around the world- who delivers sorted and synthesized information to inform decision making. This solution had two main objectives: to inform decision making and help researchers to avoid waste by reducing duplication in and better coordinating the COVID-19 evidence syntheses. We delivered an inventory done from a global perspective in three languages published on an international website. We not only provide a place to inform decision-making and advocacy. In COVID-ENDOH it is possible to identify gaps in the current stock of research evidence and domains being useful for researchers and research funding agencies. Considering this we achieved the first objective, although according to our preliminary analysis the research concentration was not avoided as we expected. We identified that further studies need to be done to analyze the evidence stock, the problems and research concentration. This will be a subject addressed in our future studies. In addition, it could also benefit from primary research, systematic reviews, and overviews of reviews. Furthermore, it is a useful solution for the dental community, delivering the syntheses in a simple and easy way to be understood by the public.

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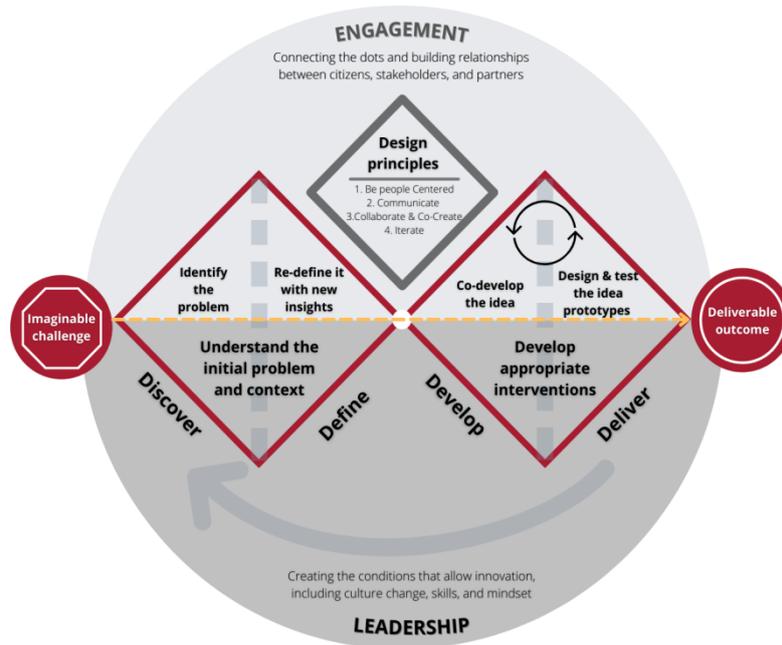
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ANNEX - TABLES AND FIGURES

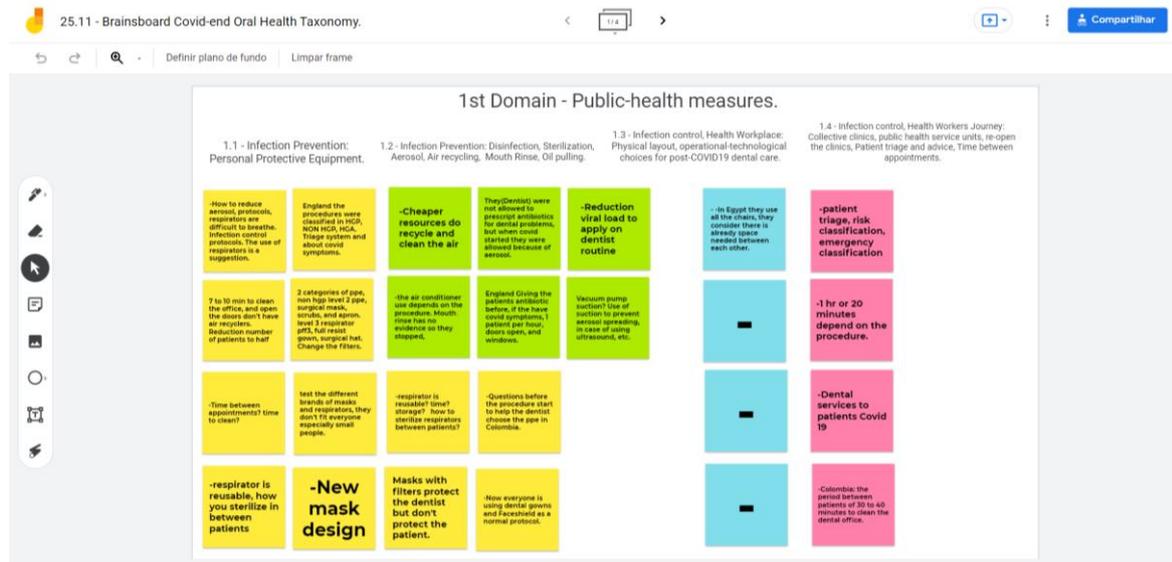
Figure 1 - Framework for Innovation adopting the Double Diamond



Source: The autor.

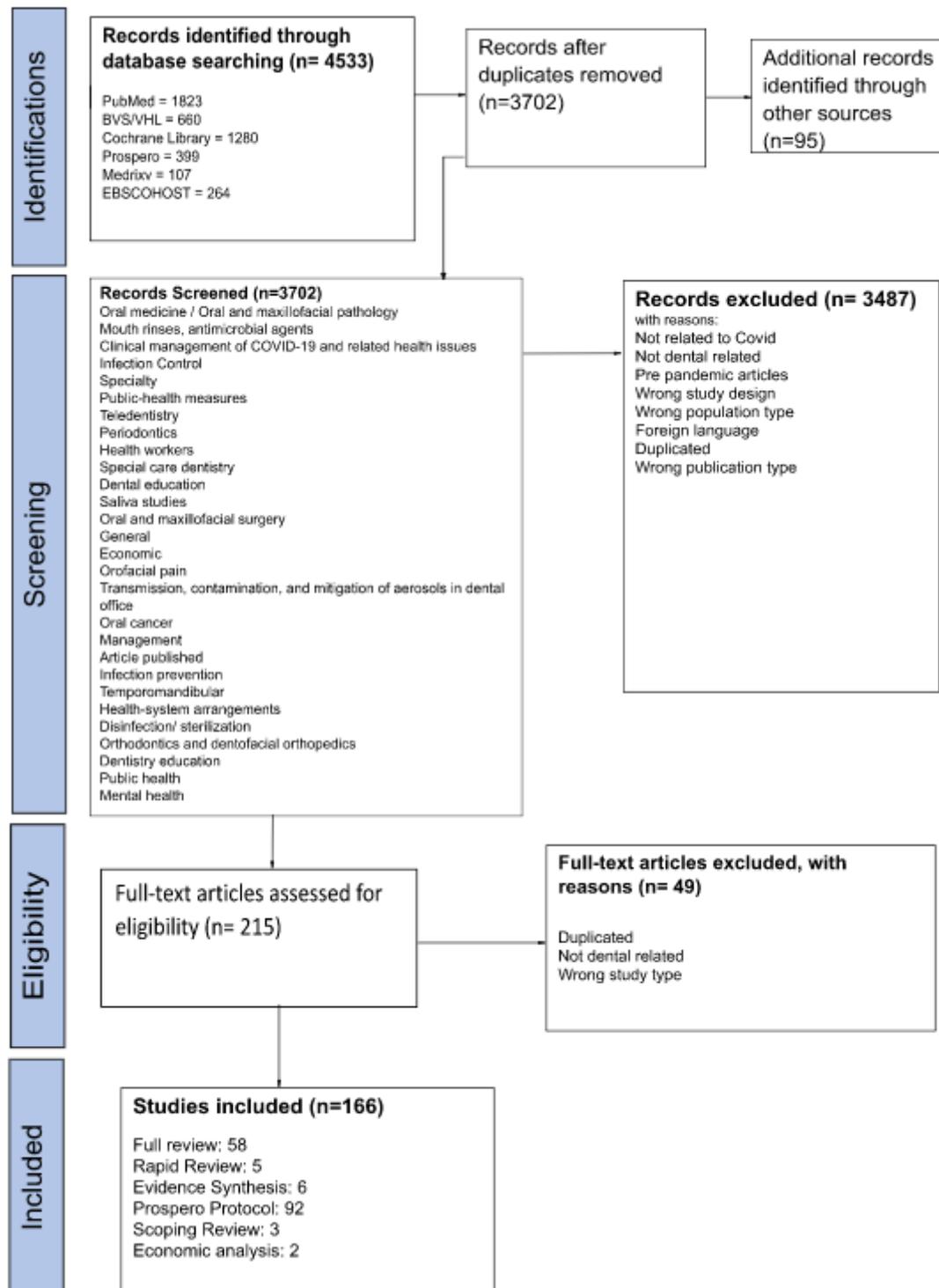
Preprocess preparation: Figure 1 is the COVID-END ORAL HEALTH approach to policy design challenges using Design Council and Policy Lab double diamond.

Figure 2 - Idea Jam - Jam board of the first domain (Source: self-elaboration).



Source: The autor.

Figure 3 - Flowchart regard the process of studies selection.



Source: The autor.

Figure 4 - COVID-END ORAL HEALTH TAXONOMY

COVID-END Oral Health taxonomy of public-health measures, clinical management of COVID-19, health-system arrangements, economic and social responses, and Dentistry Education

Program and service areas				
Public-health measures				
<ul style="list-style-type: none"> • Infection prevention <ul style="list-style-type: none"> ○ Personal protective equipment <ul style="list-style-type: none"> • Health consequences of new protocols • Recycle protocols for gowns and other personal protective equipment • Masks <ul style="list-style-type: none"> • Effectiveness of personal protective equipment in dentistry • New protocols about personal protective equipment for dental offices ○ Aerosol generating procedures <ul style="list-style-type: none"> • Mitigation of Aerosol Generating Procedures in Dentistry • Procedures classified as bio-aerosols sources and contamination in dental offices • Time between appointments ○ Disinfection/ sterilization <ul style="list-style-type: none"> • Mouth rinses, antimicrobial agents • Wearing masks • Disinfection and infection prevention protocols • Disinfecting surfaces and facilities • New sterilization methods for dental offices • Infection control <ul style="list-style-type: none"> ○ Health workplace <ul style="list-style-type: none"> • Routes of transmission in Dental Care • Environmental Detection of SARS-CoV-2 • SarCov-2 infection among healthcare workers • Infrastructure planning and resource allocation in dentistry • Layout adaptations • Electronic medical records and technology in oral health • Suspension of school dental programs • Changing home and community care procedures • Biosafety Measures at the Dental Office ○ Changes in health workers service delivery <ul style="list-style-type: none"> • Sequencing of services re-starting, by sector, conditions, treatments (including diagnostics), and populations 	<ul style="list-style-type: none"> • Managing Emergency and elective /non-emergency procedures and delaying return visits • Patient-mediated interventions <p>Clinical management of COVID-19 and pandemic-related Oral health issues</p> <ul style="list-style-type: none"> • General and specialty management of oral health and related impacts <ul style="list-style-type: none"> ○ General <ul style="list-style-type: none"> • Acute care dental conditions • Dental materials for possible use during the COVID-19 • Dental staff working outside dental area with covid-19 patients (swab tests, follow up and hospital care) • Strategies to overcome PPE-related communication challenges • Combatting oral-health related misinformation • Dentists' knowledge, perceptions and attitude during covid-19 pandemic • Laser therapy • Ozone therapy ○ Teledentistry <ul style="list-style-type: none"> • The application of teledentistry in geriatric settings • Usability and effectiveness of teledentistry • Remote management of existing conditions • Online health education (collective and individual) ○ Patients <ul style="list-style-type: none"> • Suspension of elective treatments • Suspension of school dental programs • Fear of patients from contamination in the dental office • Patient behaviors • Domestic violence, abuse • Dental trauma 	<ul style="list-style-type: none"> • Oral Microbiology • Nutritional changes and oral health impact <p>Management/guidelines/r recommendations according to dental specialties</p> <ul style="list-style-type: none"> ○ Dental public health <ul style="list-style-type: none"> • Oral health prevention and promotion actions ○ Endodontics <ul style="list-style-type: none"> • Protocols to reduce COVID-19 exposure during endodontic treatment ○ Hospital <ul style="list-style-type: none"> • Dentists Improving Oral Hygiene in intensive care units ○ Oral and maxillofacial radiology <ul style="list-style-type: none"> • Protocol changes for user protection ○ Oral and maxillofacial surgery <ul style="list-style-type: none"> • Prevention and impacts of COVID-19 • Moulding for pre-surgical orthopaedics in cleft lip and palate patients ○ Oral medicine / Oral and maxillofacial pathology <ul style="list-style-type: none"> • Olfactory and gustatory symptoms and salivary compositional changes • SARS-CoV-2 infection in the oral cavity tissues and cells • Oral manifestations in COVID-19 infected patients • Oral disorders related to SARS-CoV-2 in children • Mucormycosis and post Covid-19 oral manifestations • Association between oral diseases and the severity and mortality of COVID-19 • Saliva Studies <ul style="list-style-type: none"> • Temporomandibular joint dysfunction increase ○ Orthodontics and dentofacial orthopaedics <ul style="list-style-type: none"> • Aerosol generating procedural risks and mitigation strategies in orthodontics • Cross-infection in orthodontic practice ○ Pediatric Dentistry <ul style="list-style-type: none"> • Clinical practice guidelines and management • Impact of COVID-19 on dental prophylaxis in child programs 	<ul style="list-style-type: none"> ○ Periodontics <ul style="list-style-type: none"> • Risk of contamination by dental periodontal procedures • Pre-procedural Mouth Rinses in Reducing Aerosol Contamination During Periodontal Prophylaxis • Periodontal Diseases and COVID-19 Severity ○ Prosthodontics <ul style="list-style-type: none"> • Increased demand • Prosthesis disinfection, prosthetic infection control and protection of technical workers ○ Restorative dentistry <ul style="list-style-type: none"> • Protocol changes • Dental caries management with non-aerosol restorative treatment ○ Special care dentistry <ul style="list-style-type: none"> • Pregnant women • Medically compromised patients (diabetes, hypertension, etc.) • Elderly • Children and adults with disabilities • Oral cancer patients ○ Forensic Dentistry <ul style="list-style-type: none"> • Infection control methods in forensic dentistry <p>Health-system arrangements</p> <p>Delivery arrangements</p> <ul style="list-style-type: none"> ○ Workflow <ul style="list-style-type: none"> • Triage protocols- risk classification • Training to avoid transmission risk in the dental office • Specialty service relocation • Changes to oral health emergency procedures <p>Governance arrangements (decisions and protocols)</p> <ul style="list-style-type: none"> ○ Policy authority <ul style="list-style-type: none"> • Centralization/decentralization of policy authority 	<ul style="list-style-type: none"> • Adhering to the international health regulations • organizations ○ Organizational and professional authority <ul style="list-style-type: none"> • Guidance of dental-health • Financial arrangements for oral health • Budget adjustments for oral health care in federal, state, and city levels <p>Economic and social responses</p> <p>Economic and social consequences to private and public dentistry</p> <ul style="list-style-type: none"> ○ Public policy issues <ul style="list-style-type: none"> • Managing suppressed demand in oral health due to the suspension of elective appointments during the COVID-19 pandemic ○ Dental staff <ul style="list-style-type: none"> • Concerns of dental and oral health workers and the coping strategies • Economic impacts on dental practices • Biosafety expenditure • Dentists' mental health • Covid-19 Infection, Illness and Deaths Among Healthcare Workers <p>Dentistry Education</p> <p>Facilities alterations in dental schools</p> <ul style="list-style-type: none"> • Construction and physical layout changes • Circulation flow <ul style="list-style-type: none"> ○ Pedagogical issues <ul style="list-style-type: none"> • Curriculum adaptations • Broadband Internet access (inequality of access to internet / computers) • Psychological health of dental students • Collective clinics • Covid-19 impacts in the teaching-learning process in dental education ○ Other Research matters <ul style="list-style-type: none"> • Evidence mapping and quality of published dental literature

Pedra RC, Cheriai SA, Carrer FCA. COVID-END Oral health taxonomy of public-health measures, clinical management of COVID-19, health-system arrangements, and economic and social responses. São Paulo, Brazil: EvipOralHealth, University of São Paulo/ Hamilton, Canada: McMaster Health Forum, 2021.

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Chart 1 - Interviewed key informants by jurisdiction, specialty, organization and country.

Jurisdiction	Name Initials	Title, Specialty	Organization	Country
America	GO	Dentist, Family Health	Brazilian Health System	Brazil
	FMLA	Cariology	UNICAMP	Brazil
	FCM	Orthodontics	USP	Brazil
	GCLSA	Periodontology	USP	Brazil
	FT	Decision Maker	SES-SP	Brazil
	WBT	Periodontology	UNG	Bolivia
	VC	Public Health	Universidad Porto Rico	Porto Rico
	GMR	Periodontology	USP	Colombia
	DIOB	Generalist	USP	Colombia
	DFPL	Researcher	UDEA	Colombia
	SMZS	Researcher	UDEA	Colombia
	CMGT	Decision maker	IPCs	Colombia
Europe	PH	Endodontics/ Practice manager	NHS Dentist	England
Asia	TJC	Endodontics	Private dentist	Oman
	AQA	Prosthodontics	Private and public dentist	India
Africa	MH	Periodontology	USP	Egypt
Oceania	-	-	-	-

Source: The autor.

Table 1 - Issues, articles, protocols, and GAPS per domain at the inventory

Domains	Decisions	Evidence	Gaps
Public-health measures	23	50	7
Clinical management of COVID-19 and related health issues	50	98	20
Health-system arrangements	14	12	8
Economic and social responses	8	6	5
Total	95	166	40

Source: The autor.

Table 2 - Type of review at the inventory						
--------------------------------------------------	--	--	--	--	--	--

Type of review	PHM	CM	ESR	HSA	Total
1= Full review	24	27	6	1	58
2= Rapid review	4	1	0	0	5
3= Evidence Synthesis	3	2	0	1	6
4= Prospero Protocol	18	67	5	2	92
5= Metha-Analysis.	0	0	0	0	0
6= Scoping review	1	1	1	0	3
7= Economic Analysis	0	0	2	0	2
Total	50	98	14	4	166

Source: The autor.

Supplement Chart 2 - Database, search strategy and number of articles by two independent researchers	
Database	Search strategy
PubMed	(((((("coronavirus infection"[Text Word] OR "COVID"[Text Word] OR "coronavirus infections"[MeSH Terms]) AND "oral health"[MeSH Terms]) OR "oral health"[Text Word]) AND ("systematic review"[Filter] AND 2020/01/01:2021/08/03[Date - Publication])) OR ("dent pract"[Journal] OR "dent pract ewell"[Journal] OR "aust dent pract"[Journal] OR ("dental"[All Fields] AND "practice"[All Fields]) OR "dental practice"[All Fields]) OR "dental"[Text Word] OR "dentistry"[Text Word] OR "dental health services"[MeSH Terms] OR "dentistry"[MeSH Terms]) AND ((systematicreview[Filter] AND (2020/1/1:2021/8/3[pdat])) AND ((systematicreview[Filter] AND (systematicreview[Filter] AND (2020/1/1:2021/8/6[pdat])) Filters: Systematic Review, from 2020/1/1 - 2021/8/6
PubMed	(((((((((COVID-19[Title/Abstract] OR (CORONAVIRUS[Title/Abstract]) OR (CORONAVIRUS INFECTION[MeSH Terms]) AND (oral health[MeSH Terms])) AND (oral health[Title/Abstract] AND ((meta-analysis[Filter] OR systematicreview[Filter] AND (humans[Filter] AND (systematicreviews[Filter] AND (2020/1/1:2021/8/6[pdat])) AND ((meta-analysis[Filter] OR systematicreview[Filter] AND (systematicreviews[Filter] AND (2020/1/1:2021/8/6[pdat]))) AND (Covid-19[Text Word])) OR (Coronavirus infection[Text Word])) AND (ORAL HEALTH[Text Word])) OR (DENTISTRY[Text Word]))
Cochrane Library	(Covid) AND (Dental) OR (dentistry) OR (Oral Health) AND (Systematic Review):pt"
Cochrane Library	(Covid) AND (Dental) OR (dentistry) OR (Oral Health) AND (Systematic Review):pt" Filters: Dentistry & oral health
Cochrane Library	COVID in All Text OR "coronavirus infection" in All Text AND Oral Health in All Text OR "dental" in All Text OR "dentistry" in All Text - with Cochrane Library publication date Between Jan 2020 and Aug 2021, in Cochrane Reviews, Cochrane Protocols, Special Collections (Word variations have been searched)
Cochrane Library	("dentistry") AND (Covid) OR ("coronavirus"):ti,ab,kw OR ("coronavirus infection"):ti,ab,kw AND ("systematic review"):pt"
VHL/BVS	(dental) AND (covid-19) AND (type_of_study:("systematic_reviews" OR "health_economic_evaluation" OR "policy_brief")) AND (year_cluster:[2020 TO 2021])
VHL/BVS	(dental) AND (covid-19) AND (type_of_study:("systematic_reviews" OR "policy_brief" OR "health_economic_evaluation" OR "sysrev_observational_studies")) AND (year_cluster:[2020 TO 2021])
PROSPERO	Dental and covid
PROSPERO	Dental OR Oral Health or Dentistry and covid-19 or coronavirus infection Filters: Health Area of Review Oral Health
MedRxiv	Covid-19 or Coronavirus infection or COVID and Dentist or Dentistry or Oral Health or Oral Medicine and Systematic Review Filters: 01.01.2020 to 14.08.2021
EBSCO Host	Interface - Bancos de dados de pesquisa EBSCOhost Tela de busca - Busca avançada: "TX (Covid-19 or Coronavirus infection or COVID) AND TX (Dentist or Dentistry or Oral Health or Oral Medicine) AND (systematic review or meta-analysis) Aplicar assuntos equivalentes on 2021-08-14 08:06 PM" Base de dados - Academic Search Premier;AgeLine;Art Full Text (H.W. Wilson);Business Book Summaries;Business Source Complete;CAPES FSTA Full Text Collection;CINAHL with Full Text;Computers & Applied Sciences Complete;Dentistry & Oral Sciences Source;eBook Collection (EBSCOhost);EconLit with Full Text;Educational Administration Abstracts;Food Science Source;FSTA - Food Science and Technology Abstracts;Historical Abstracts;Human Resources Abstracts;Information Science & Technology Abstracts (ISTA);Library, Information Science & Technology Abstracts with Full Text;MEDLINE Complete;MLA Directory of Periodicals;MLA International Bibliography;Public Administration Abstracts;Regional Business News;Rehabilitation &

	Sports Medicine Source;RILM Abstracts of Music Literature;Shock & Vibration Digest;SocINDEX with Full Text;SPORTDiscus with Full Text;Urban Studies Abstracts Filters: 2020-2021
HSE	COVID-19 AND DENTISTRY/ COVID-19 AND ORAL HEALTH/ COVID-19 AND DENTIST
MedRxiv	"Covid AND dental" and posted between "01 Jan, 2020 and 15 Aug, 2021"
PROSPERO	COVID AND dental
VHL	("severe acute respiratory syndrome" OR "COVID-19" OR "COVID 19" OR "coronavirus" OR "SARS-CoV-2" OR "SARS CoV 2" OR "pandemic" OR "lockdown" OR "Coronavirus Infection" OR "Coronavirus Infections" OR "severe acute respiratory syndrome coronavirus 2" OR "2019-nCoV" OR "2019 nCoV" OR "social isolation" OR "patient isolation" OR "Social Distance" OR "Social Distances" OR "infection control" OR "human coronavirus" OR "coronaviruses" OR "SARS virus" OR "betacoronavirus") AND (oral health OR dental OR dentistry) AND (type_of_study:("systematic_reviews" OR "policy_brief")) AND (year_cluster:[2020 TO 2021])
Cochrane	("severe acute respiratory syndrome" OR "COVID-19" OR "COVID 19" OR "coronavirus" OR "SARS-CoV-2" OR "SARS CoV 2" OR "pandemic" OR "lockdown" OR "Coronavirus Infection" OR "Coronavirus Infections" OR "severe acute respiratory syndrome coronavirus 2" OR "2019-nCoV" OR "2019 nCoV" OR "social isolation" OR "patient isolation" OR "Social Distance" OR "Social Distances" OR "infection control" OR "human coronavirus" OR "coronaviruses" OR "SARS virus" OR "betacoronavirus"):ti,ab,kw AND ("PPE" OR "personal protective equipment" OR "RPE" OR "respiratory protective equipment" OR "dental clinic" OR "dental care" OR "oral health" OR "dentistry" OR "dental surgery" or "dental practice" OR "dental" OR "teledentistry" OR "dental hygiene" OR "dental hygienist"):ti,ab,kw
EBSCO Host	("PPE" OR "personal protective equipment" OR "RPE" OR "respiratory protective equipment" OR "N95 mask" OR "mask" OR "reuse" OR "face shield" OR "economic" OR "social" OR "governance" OR "policy" OR "financial" OR "social" OR "professional" OR "education") AND ("dental clinic" OR "dental care" OR "oral health" OR "dentistry" OR "dental surgery" or "dental practice" OR "dental" OR "teledentistry" OR "dental hygiene" OR "dental hygienist" OR "reopening" OR "prosthodontic" OR "endodontic" OR "pedodontic" OR "maxillofacial surgery" OR "oral medicine" OR "oral radiology" OR "oral pathology" OR "endodontic" OR "public health dentistry" OR "dental implant" OR "orthodontic" OR "dentofacial orthopedic" OR "temporomandibular joint" OR "special child" OR "oral cancer" OR "oral manifestation" OR "geriatric" OR "old aged" OR "special health care needs" OR "periodontal" OR "gingival" OR "Dental scaling" OR "ultrasonic" OR "handpiece" OR "extraction" OR "cavitation" OR "filling" OR "preparation" OR "air polishing" OR "air abrasion" OR "aerosol transmission" OR "spatter" OR "aerosol" OR "droplet generation") AND ("severe acute respiratory syndrome" OR "COVID-19" OR "COVID 19" OR "coronavirus" OR "SARS-CoV-2" OR "SARS CoV 2" OR "pandemic" OR "lockdown" OR "Coronavirus Infection" OR "Coronavirus Infections" OR "severe acute respiratory syndrome coronavirus 2" OR "2019-nCoV" OR "2019 nCoV" OR "social isolation" OR "patient isolation" OR "Social Distance" OR "Social Distances" OR "infection control" OR "human coronavirus" OR "coronaviruses" OR "SARS virus" OR "betacoronavirus") AND (systematic review or meta-analysis)

Source: The autor.

6. CHAPTER II - COVID-END OH AND THE IMPORTANCE OF THEMATIC INVENTORIES TO INFORM DECISION MAKING

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ABSTRACT

Background: This project aimed to evaluate the evolution of high-impact scientific production on COVID-19 concerning oral health and observe the usefulness and specificity of a thematic inventory of evidence syntheses addressing oral health.

Method: A cross-sectional study was developed, with quantitative analyses using descriptive statistics methods to compare the differences between the first and the second versions of COVID-END Oral Health (COVID-ENDOH). Also, it assessed the availability of COVID-19 and Oral Health evidence in general inventories.

Results: The second COVID-ENDOH inventory showed a total growth of 46% compared to the first. It increased 221% in evidence and 20% in new specific decisions, and decreased 22% in the number of gaps. The Clinical Management domain showed the highest growth (63%), increasing 280% in responses, 22% in specific decisions, and had a reduction in gaps of 26%, a pattern observed in the other domains, except in the economic and social responses domain, where there was no reduction in GAPS. COVID-ENDOH has 166 studies, while COVID-END has 5006, 28 of which are related to oral health, on the other hand, Health evidence has 232 articles about COVID-19, of those 7 are on oral health and COVID-19.

Conclusion: We observed a notable evolution of the production of oral health among the COVID-ENDOH inventories in the studied period. The Thematic Oral Health Inventory proved to be useful to inform decision-making in oral health and effective for finding oral health evidence. The results may indicate research concentration on the same subjects, leaving others unexplored by the scientific community. The broadly focused inventories COVID-END and Health Evidence addresses effectively general health, although they have insufficient coverage of oral health topics. Inventories on specific health topics are needed to understand the evolution of COVID-19 in those areas. Doing this follow-up on specific health topics regarding COVID-19 allows us to understand the course of the disease, inform policymakers, and anticipate future problems allowing for appropriate planning of health systems, including specific health topics.

Keywords: Oral Health; Public policy; COVID-19; Pandemic; Quantitative Analysis, Evidence-based practice/Evidence-Based Health Care Management

6.1. INTRODUCTION

The COVID-19 pandemic has overloaded health systems, drastically affecting the population's right to health, especially the most vulnerable groups in society. It has generated a great need for quality, synthesized, and accessible scientific information to inform decision-making and guide clinical practice ¹. Particularly considering the context of fragility and under-investment of health systems worldwide, an additional challenge is to fulfill the obligations defined in the International Covenant on Economic, Social, and Cultural Rights² .

The extraordinary scientific production observed reflects a scientific community focused on answering the many doubts generated in society during this pandemic³ and also making it possible for countries to accomplish the UN Sustainable Development Goal (ODS) 16 ⁴. The scientific community's efforts to get pandemic understanding to generate evidence urgently in times of medical crisis may occur in a rapid and unstable way for primary evidence, and with systematic reviews rarely being registered and frequently duplicated during the early stages of the COVID-19 pandemic ⁵. It created tremendous amounts of duplication and research waste due to a lack of coordination and communication between research groups during the pandemic crises. Some initiatives with great potential to reduce research waste globally emerged as COVID-END⁶.

The scientific community effort was enormous, with different initiatives to help society. However, this evidence was dispersed in various scientific journals and databases, not always accessible to decision-makers. In this context of uncertainties and rapid updating of scientific evidence, decision-makers needed a secure platform to be informed³. Therefore, global initiatives have emerged, such as COVID-END^{3,7,8}, a general inventory focused on answering a broad range of topics related to COVID-19 that would be applicable to most decision makers ⁹. COVID-END is a vast network that comprises a group of initiatives to respond to the COVID-19 pandemic. It makes the best-synthesized research evidence available in one place. Based on the “One-Stop Shops” strategy, highlighting it as a central pillar of broader efforts to support evidence-informed decision-making about health systems^{3,10,11}.

The most urgent questions were answered, however specific health issues, such as oral health, which were not the focus of these general inventories, were not sufficiently addressed. But targeted approaches in specific areas are needed so that these questions might be answered, the evidence organized and made available to decision-makers in the most useful, and comprehensive way possible. One of the main objectives of this inventory, COVID-ENDOH, is the dissemination of high-quality knowledge and information produced on Oral Health and COVID-19, translating science from the clinic to the field of public policy.

Therefore, it seems important to evaluate the contribution and evolution of a thematic inventory of Oral Health and COVID-19 to give visibility and quick access to high-quality evidence to inform decision-making while comparing it with general inventories.

6.2. METHODS

This project evaluated the contribution and evolution of COVID-END Oral Health from a general perspective and compared it with other inventories seeking to understand its contribution to the oral health decision-making process. Accordingly, a cross-sectional study was developed, with quantitative analyses using descriptive statistics methods. The analysis was conducted to investigate the evolution of oral health literature regarding COVID-19 by comparing the first and the second versions of COVID-END Oral Health. Also, a comparison between COVID-END Oral health and two general health inventories aims to inform decision-making in health. The inventory is updated twice a year, following the changes of the COVID-19 pandemic, with new decisions and evidence being added to the updates.

Important inventory components:

- Domains - Domains divide the inventory into four major groups of subjects: Public-health measures (PHM), Clinical management of COVID-19 and related health issues (CM), Health-system arrangements (HSA), Economic and social responses (ESR).
- Decisions - They compound the domains. The Broad decisions categorize the domains by grouping the specific decisions related to them. Specific decisions are questions raised during the inventory validation with dental surgeons and decision-makers, and it needs answers from the literature.
- Gaps - Gaps are knowledge lacunas linked to a specific decision in which no evidence was found during the searches, that is, evidence that responds to the problem presented by the specific decision.
- Evidence - Evidence is articles and protocols, answers we seek in the literature to respond to the specific decisions that make up the inventory.

Step 1 - Studies extraction and selection:

A simple search was performed, similar to what a decision-maker would do, in two general health one-stop-shops, COVID-END and Health Evidence™¹², to identify oral health articles on 07/12/2022 using the terms oral health OR dental in COVID-END and oral health and COVID-19 on Health Evidence. The search was similar to what a decision-maker would do in the COVID-END and Health Evidence databases. The studies from COVID-END Adaptation to Oral Health McMaster Health Forum ¹³ were selected and manually inserted in an Excel spreadsheet considering the original domains: Public-Health Measures; Clinical Management; Health-System Arrangements; Economic and Social Responses. The spreadsheet available on 12/23/2021 from COVID-ENDOH was downloaded.

The second version of the COVID-END Oral Health inventory was also used, which was updated in August 2021.

The inclusion criteria comprised: all the studies present in the inventories analyzed about COVID-19 and Oral Health, being full reviews, rapid reviews,

evidence synthesis, Prospero protocol, meta-analysis, scoping reviews, and economic analysis. The exclusion criteria enclosed studies absent from the inventories and that did not meet the inclusion criteria.

Step 2 - Comparison among COVID-END Oral Health volume 1 versus volume 2

First, we compared the two versions of the oral health inventory in order to understand the evolution of scientific production in the area of oral health between the two updates. The search date of the first version was 11/01/2021, and the second was 08/03/2021. We compared the number of specific decisions, evidence, and GAPS in total and amongst the domains in each version. We calculated the numbers and percentage of specific decisions, evidence, and GAPS to compare the first version with the second version of the inventory. Analyses were done considering the following categories: specific decisions, evidence, and GAPS in total and per domain between Inventory 1 vs Inventory 2.

Step 3 - Identification of Oral health and COVID-19-related studies and comparison between the inventories COVID-ENDOH, COVID-END, and Health Evidence.

Finally, we disposed of the COVID-END and Health Evidence studies regarding Oral health and COVID-19 in Excel spreadsheets. These bases were chosen because they provide evidence to inform decision-making in order to observe whether oral health invisibility only happened in COVID-END or if it is a common feature in other general inventories. The inventories were compared regarding the total number of COVID-19 studies, and the number of oral health studies specifically. Two reviewers did the analysis, and a third expert reviewer checked the selection and solved the conflicts. Studies that do not encompass oral health and COVID-19-related

issues, or did not contain the words Oral Health, Dental, Dentist, dentistry, Oral Cancer, or Head and Neck cancer were not included. Later, we measured the effectiveness of the three inventories for finding oral health articles using the total number of articles in the inventory versus the number of oral health articles in the inventory.

6.3. RESULTS

COVID-END OH Volume 1 versus Volume 2

COVID-END Oral health has evolved from the first version to the second, showing a substantial increase in evidence, also an increase in specific decisions, and a slight decrease in gaps (Graphic 1, table 1).

The second inventory showed a total Growth of 46%, contrasted with the first version. It had a high increase of evidence and a slight reduction of gaps, close to the rise in the number of specific decisions. Concerning the domains individually, as for the total growth between the first and second versions of the COVID-ENDOH inventory, the domain CM had increased the most, followed by the domains ESR, HSA, and PHM. Regarding evidence the domain that showed the highest percentage increase were HSA and ESR followed by CM and PHM. As for decisions, the CM domain showed the highest rise, followed by PHM, HSA, and ESR. Concerning GAPS, we did not observe an important reduction in the domain CM, while it has more questions answered. Whereas the domains PHM and HSA presented a decrease of 22% and 20% respectively of GAPS. The domain ESR remained with the same GAPS number. Although the domains HSA and ESR showed the highest rise in evidence, they had less total activity and were the most ineffective in answering gaps in contrast with the domains CM and PHM (Graphic 2, table 1). The domain that grew the most, PHM, regardless of a high increase in answers (evidence), they were not enough to cause a substantial reduction in GAPS, decreasing by 26%, especially if we consider the decisions increase by 22%, which is a pattern in the other domains (Table 1).

COVID-END and Health evidence versus COVID-END OH

In the COVID-END INVENTORY OF EVIDENCE SYNTHESIS searching at all syntheses, 28 articles were found, of which all of them were on oral health. The Health Evidence returned 11 articles, of which 7 are on oral health and COVID-19. On the other hand, COVID-ENDOH has a hundred and sixty-six studies included. We identified that on 07/12//2022 the COVID-END and COVID-19 exclusive database had a total of 5006 studies in its inventory. While at Health Evidence, a database not exclusive to COVID-19 literature, the search for COVID-19 articles presented the result of 232 studies. It shows that in general health inventories, many issues related to oral health are unnoticed. Regarding the effectiveness, the generally focused inventories were less effective for finding oral health and COVID-19 evidence, especially if compared to the COVID-ENDOH inventory (Graphic 3).

6.4. DISCUSSION

The pandemic affected health systems and generated a high production of scientific evidence. Oral health is one of the health areas that has also been greatly affected by COVID-19 and has followed the trend of rapid growth in evidence production ¹⁴⁻¹⁶. We observed this trend when we compared to version 1 with version 2 of the COVID-ENDOH inventory with an interval of only six months between the search dates. We observed an important growth in the publication of evidence (Graphic 1). It can be explained - partly - by the pandemic economic impact pandemic on dentistry ¹⁷.

Due to the health urgency imposed, scientific production took place quickly and decentralized, in addition to increasing the need to make this knowledge available in an easy and accessible way to decision-makers and policymakers ¹⁸⁻²⁰. It is a need that seems obvious and easily observed in medical areas directly related to the

treatment of patients diagnosed with COVID-19. However, in dentistry, we also observed this pattern; scientific production is concentrated in some areas, with high productivity in some subjects and leaving others with knowledge gaps (Table 1).

This hypothesis is confirmed when we observe that the CM and PHM domains have been prioritized, suffering substantial growth in general and in the number of evidence in relation to the other domains. On the other hand, these are the domains that concentrate the most significant number of decisions, and it is coherent that they have a pronounced production of studies/answers. Besides that, the HSA and ESR domains that bring up decisions related to the arrangements of the health systems, and economic, social and education issues remain less studied.

It might occur since these domains are closely related to public health. They answer questions that should come from governments and decision-makers, and oral health is not contemplated in most health systems worldwide. Another possible hypothesis might be that these research topics could be less attractive to researchers or that fewer researchers are acting in the area²¹⁻²³.

COVID-END is an initiative that came to occupy this space, centralizing and facilitating the availability of high-quality evidence, in addition to coordinating research efforts, and bridging knowledge to society⁶. However, when we look for evidence on SB and COVID-19 in these databases focused on general health, we do not find them easily (Graphic 2), even because they do not have this objective. Demonstrating that a thematic inventory - although inspired by the original inventory structure - is substantially different in being able to address the specificities of the topic studied. Being something crucial to inform decision-making in these areas. In this way, in inventories on specific health topics, the decision maker can perform his search and obtain more accurate results, finding more easily the evidence he needs on the subject in question. However, it is crucial to consider that thematic inventories that address specific topics are complementary to general inventories that are broader in their content.

Although dental scientific production is not so voluminous, as we can observe the difference in size between COVID-END and COVID-ENDOH, cannot be ignored (Graphic 2). The COVID-ENDOH inventory demonstrates the impact that dentistry suffered by COVID-19, and it also brings evidence that needs to be made available to

decision-makers in an easy way, in addition to the need for organization and coordination of production to avoid waste and duplication of research efforts.

This is a cross-sectional study with inherent limitations of this type of study. We made a portrait of three bases for comparison exclusively on the presence of oral health and COVID-19 studies. However, it reveals the importance of oral health and the need for thematic inventories in health so that these strategic themes could be spotted. Since general bases often do not contemplate them satisfactorily. Thematic inventories like ours bring visibility to specific health topics. They are significant to inform clinical and policy decision-making for making available evidence on the oral health topic.

As oral health and other strategic health topics such as mental health gain visibility, they might encompass health debates. Inventories can change their production logic so that these topics could be more and more included in the content and discussed, increasing the dissemination and translation of knowledge about oral health and covid-19. For example, the Health Systems Evidence²⁴, a General Health inventory that identified this kind of GAP a few years ago and included an oral health filter. In this way, we will be able to induce new research, avoid overlapping efforts and bring more and more information needed to inform policy decision-making.

In addition to observing the large production in oral health, the preparation of this inventory showed us several windows of opportunity in research, as well as the need to organize and systematically identify where the evidence and gaps in oral health and COVID-19 are. This need has led us to produce new works and evidence in this regard, such as the production of an evidence map and overviews of reviews²⁵ under the number CRD42022323787 at https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022323787.

6.5. FINAL CONSIDERATIONS

The main goals of COVID-END are to inform decision-making and avoid waste through an extensive and organized inventory. However, we note that the second objective has not been achieved yet, concerning COVID-ENDOH. The analysis of the

oral health inventory shows that it has not yet been able to induce new research that responds to the identified gaps. Partnerships with Oral Health Cochrane and the Evidence Commission, for example, for the wide dissemination of this inventory as well as the construction and dissemination of a GAPMAP might be appropriate solutions to solve this issue.

Our results show that environments focused on specific topics are necessary to understand the evolution of the COVID-19 disease within these areas in terms of generated problems, produced literature, and knowledge gaps. Tracking the disease's progress allows us to understand its course and anticipate future issues for the appropriate planning of health systems ⁷. In addition, mapping GAPs makes it possible to observe research topics unexplored by the scientific community that needs to be answered for policymakers to inform themselves. Especially considering that COVID-19 and its related impacts are likely to be felt for many years to come, it is necessary to accelerate investment to enable infrastructure for evidence synthesis and to promote evidence use in those health topics as COVID-END did for general health⁷.

Finally, this study allowed us to observe some of the contributions that the thematic inventory of oral health made to the field of research and decision-making. COVID-ENDOH was able to give more visibility to oral health in the overall COVID-END project and became the first ecosystem on the topic available to stakeholders, policymakers, researchers, and dentists, which makes searches on oral health and Covid19 faster and more efficiently, facilitating the translation of high-impact evidence into clinical practice and policy decisions.

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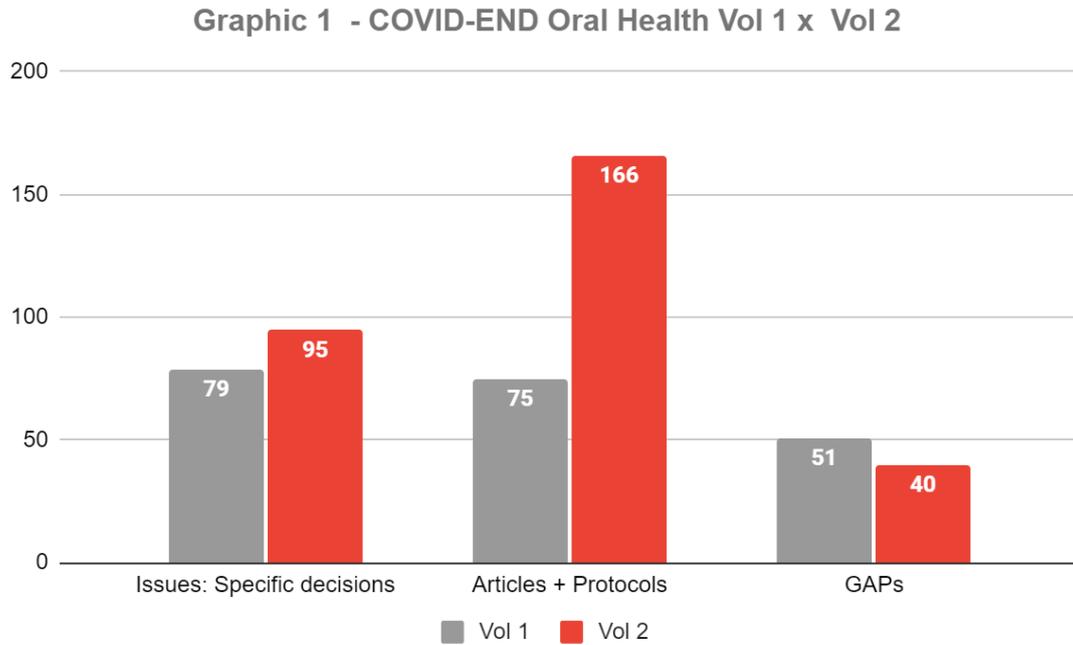
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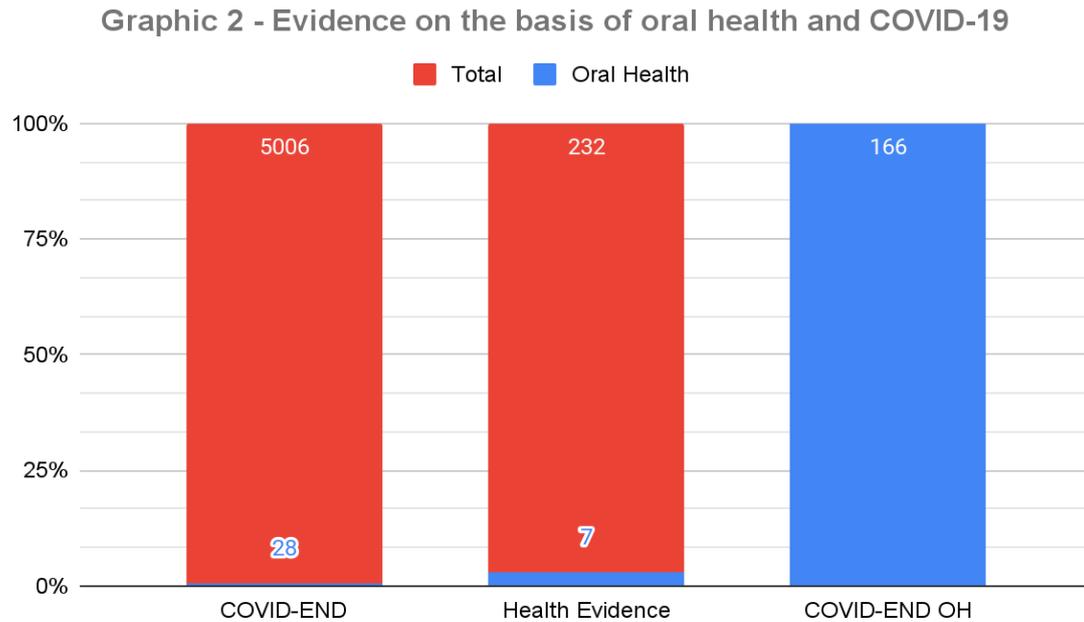
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ANNEX – GRAPHICS AND FIGURES

Graphics



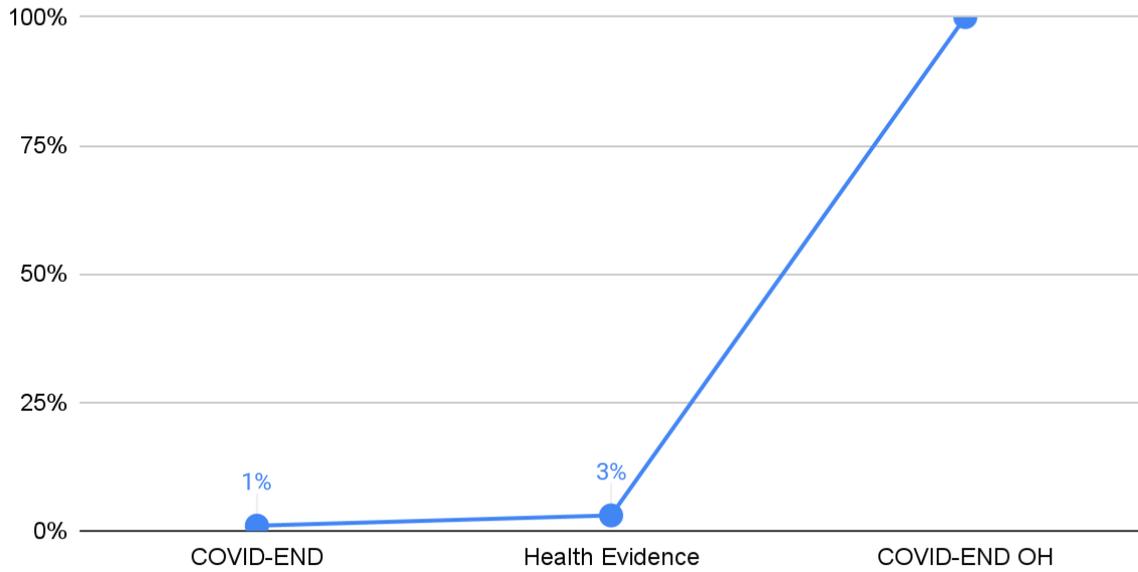
Source: The autor.



Source: The autor.

Graphic 2 - Oral health articles in COVID-END, Health Evidence and COVID-ENDOH

Graphic 3 - Effectiveness of inventories regarding the presence of evidence of oral health and COVID-19



Source: The autor.

Tables

Table 1 - Issues, articles, protocols, and Gaps per domain Inventory 1 vs 2												
Domains	N of Decisions			Articles + Protocols			Gaps			Total		
	I 1	I 2	% ↑	I 1	I 2	% ↑	I 1	I 2	% ↓	I 1	I 2	% ↑
PHM	19	23	21	34	50	47	9	7	22	62	80	29
CM	41	50	22	35	98	280	27	20	26	103	168	63
HSA	12	14	17	4	12	300	10	8	20	26	34	30
ESR	7	8	15	2	6	300	5	5	0	14	19	35
Total	79	95	20	75	166	221	51	40	22	205	301	46

Source: The autor.

7. FINAL CONSIDERATIONS

7.1. DEVELOPING THE DESIGN EVIDENCE INFORMED POLICY METHOD

The design thinking and innovation processes have points that can interact with the classic public health concepts of complexity, health, and health problems. In phase 1 of this study, we observed an interface between the divergent and convergent thinking of Czeresnia [19] on complex health problems and the divergent and convergent thinking from design thinking. In particular, an interface related to the double diamond method that considers convergent and divergent thinking in the analysis and formulation of solutions. We also observed an interface of design thinking with the factors that influence health brought by Santos 2001, when the DT seeks to understand and validate the problem and the solution by analyzing the context and the user's point of view.

It was also possible to observe an interface between two policy formulation processes and the DT problem-solving process. We established a parallel between the support methodology, the policy lab, and design thinking. We observed that these three problem-solving processes have a lot in common. If associated, they can produce faster and more assertive solutions. We combined these methodologies to devise an innovative methodology, the Design Evidence Informed Policy (DEIP) by combining the innovative-agile Design thinking approach from policy lab with the Evidence-informed policy-making principles and methods from SUPPORT

7.2. TESTING THE DESIGN EVIDENCE INFORMED POLICY METHOD BY DEVELOPING COVID-ENDOH.

In the second phase we tested the Design Evidence Informed Policy methodology by developing a solution to inform decision-making concerning dentistry and COVID-19. The DEIP methodology originated the COVID-ENDOH inventory that proved to be a user-centered evidence-informed solution that reflects the needs and

problems of dentists around the world. It considered the end-user's context and point of view from the problem understanding to the solution delivery phase. And so, COVID-ENDOH, also proved to be a useful and specific solution when compared to general inventories for being capable to contain and dispose of Oral health evidence and problems. We attribute these characteristics to the DEIP methodology used, which allowed the authors to co-create the solution with the expert panel and the end-users, receiving feedback from them during the process to refine the inventory. The inventory also allowed the knowledge translation of the scientific evidence opening it to society with an easy understanding way in three languages.

Finally, it is possible to observe that policies informed by evidence have the challenge of including innovation and agility in EIP processes, and DEIP could be a solution for this issue. It is necessary to establish a capable ecosystem in order to develop more methodological studies and build spaces for co-creation that allow the encounter between solution and problem, between who suffers the pain, who uses and who produces evidence. Besides, this work comprises a complete design thinking process, passing through all the moments of design: first, we identified our problem - to make EIP user-centered and agile in all its phases -, then we ideated a solution - by creating the DEIP method -, and after implementing it - by developing the COVID-ENDOH solution while testing the DEIP method-, and finally, we are sharing the story seeking to inspire others towards action [37].

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¹ De acordo com Estilo Vancouver.

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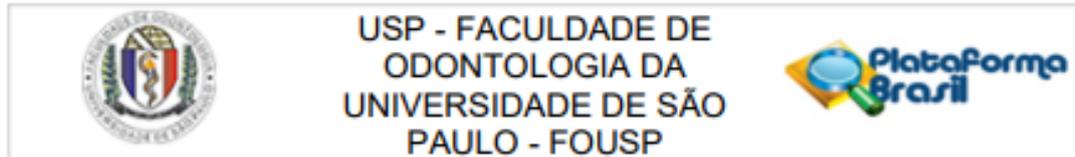
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ANNEX



PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Processo de desenvolvimento e validação de Taxonomia COVID 19 e Saúde Bucal

Pesquisador: Fernanda Campos de Almeida Carrer

Área Temática:

Versão: 3

CAAE: 41820921.9.0000.0075

Instituição Proponente: Faculdade de Odontologia da Universidade de São Paulo

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 4.690.744

Apresentação do Projeto:

As informações elencadas neste campo foram retiradas do arquivo >> Informações Básicas da Pesquisa >> (PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1677074, de 05/04/2021). Resumo:

Nosso objetivo é desenvolver um método, abrangente, gratuito e fácil de pesquisar evidências de pesquisa sobre COVID19 e Saúde Bucal capaz de fornecer informações relevantes para tomada de decisões sobre os muitos tipos de perguntas feitas por formuladores de políticas, stakeholders e pesquisadores sobre sistemas de saúde, COVID19 e saúde bucal. Para atingir este objetivo, procedemos em quatro etapas: i. Desenvolver uma pré-taxonomia Saúde Bucal e COVID19 e classificar a pré- taxonomia nas categorias: medidas de saúde pública; gerenciamento clínico; arranjos do sistema de saúde; e respostas econômicas e sociais;

ii. Validação da taxonomia com diversos atores (formuladores de políticas, pesquisadores, trabalhadores dos Sistemas de Saúde e usuários);

iii. Análise qualitativa de discurso; e iv. Finalização da taxonomia.

Hipótese:

O desenvolvimento de uma taxonomia específica entre COVID19 e saúde bucal possibilitam maior eficácia na organização nas evidências disponíveis e permite fornecer informações relevantes para tomada de decisões sobre os muitos tipos de perguntas feitas por formuladores de políticas, stakeholders e pesquisadores sobre sistemas de saúde, COVID19 e saúde bucal.

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Metodologia proposta:

Este é um estudo unicêntrico, pois todo o estudo será realizado pelo Núcleo de Evidências da FOUSP, que contará com apoio e colaboração de pesquisadores de diversos centros de pesquisa, na validação da proposta, entretanto não haverá coleta ou análise de dados nesses centros. De acordo com a resolução no 346 de 2005, será considerado Projeto multicêntrico – “projeto de pesquisa a ser conduzida de acordo com protocolo único em vários centros de pesquisa e, portanto, a ser realizada por pesquisador responsável em cada centro, que seguirá os mesmos procedimentos”.

Fase 1*. Desenvolvimento Pré-taxonomia saúde Bucal e COVID19. - Um grupo de especialistas composto de pesquisadores desenvolverá, com base em textos científicos e experiência profissional de cada integrante deste estudo, uma lista de tópicos, palavras e frases para compor domínios e classes de taxonomia relacionadas à COVID19 e Saúde Bucal. Essas domínios e classes serão então reclassificados nas categorias do projeto COVID END (<https://www.mcmasterforum.org/networks/covid-end>): 1. medidas de saúde pública;

2. gerenciamento clínico da; 3. arranjos do sistema de saúde; 4. respostas econômicas e sociais. Reuniões semanais, via Google Meet® serão realizadas por 2 meses para finalizar esta etapa. * Fase não incluída no cronograma enviado ao sistema CEP-CONEP, pois esta etapa está sendo realizada pelo grupo de especialistas (pesquisadores) com base em textos científicos e experiência profissional de cada integrante deste estudo.

Fase 2. Avaliação, Ajustes, Validação da Pré-taxonomia. - Após finalização da fase 1, de pré-taxonomia, os pesquisadores aplicarão a metodologia “bola de neve” (BIERNACKI, P. & WALDORF para identificar os participantes de pesquisa desse processo de validação. O grupo de especialistas (pesquisadores) vai convidar formuladores de políticas, stakeholders e representantes das universidades, para avaliar, fazer ajustes e validar o modelo de taxonomia proposto. Após identificação dos informantes (que serão os participantes da pesquisa), enviaremos um convite e o TCLE e após assinarem o TCLE (ANEXO 1), serão desenvolvidas as entrevistas individuais e/ou grupos de discussão (dependendo da disponibilidade de cada informante chave), Via Google Meet®. Quando possível e autorizados pelos participantes da pesquisa, os encontros serão gravados e transcritos.

Fase 3. Análise qualitativa- Análise de Conteúdo. - Para a análise das entrevistas será usado o software Maxqda®, onde serão categorizados os discursos e posteriormente será efetuada uma análise de conteúdo (AC) (ELO; KYNGÅS, 2008), a análise categorial cria as categorias conforme os temas que emergem do texto, agrupando-as através da identificação de uma temática em comum.

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Continuação do Parecer: 4.690.744

A técnica de análise de conteúdo, se compõe de três grandes etapas: 1) a pré-análise; 2) a exploração do material; 3) o tratamento dos resultados e interpretação. Desta forma poderemos ter uma abordagem ampla da temática através da análise de contextos, textos e consequências, considerando a importância das falas de cada informante, levando em conta contexto econômico e político, contexto social e cultural. Para entrevista será utilizado o roteiro (ANEXO 2).

Fase 4. Finalização da taxonomia. - Após adaptações sugeridas pelos informantes-chave, o grupo de especialistas (equipe de pesquisa) finalizará o processo de desenvolvimento da taxonomia e este produto será disponibilizado via site do Núcleo de Evidências da FOUSP para facilitar o processo de busca e classificação das evidências relacionadas à COVID 19 e Saúde Bucal.

Objetivo da Pesquisa:

Objetivo Primário: Será desenvolver um método, abrangente, gratuito e fácil de pesquisar evidências de pesquisa sobre COVID19 e Saúde Bucal através de uma taxonomia específica de COVID19 e Saúde Bucal. O objetivo secundário será avaliar, com base em análise qualitativa dos discursos dos participantes da pesquisa, a percepção dos diversos pontos de vista dos diferentes atores sobre a COVID19, a saúde bucal, e o processo de tomada de decisão.

Avaliação dos Riscos e Benefícios:

Riscos:

Esta pesquisa possui riscos mínimos, de ordem de sigilo. Para minimizar esses riscos, o nome do participante da pesquisa será substituído por um número e apenas a coordenação do estudo terá acesso a este dado. À todos os dados da pesquisa serão assegurados confidencialidade e anonimização, seus dados só serão encaminhados a terceiros/publicações após total anonimização.

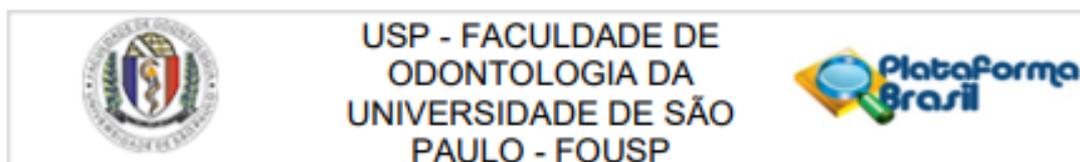
Benefícios:

Esta pesquisa não tem benefícios diretos ao participante da pesquisa, entretanto ela tem potencial de contribuir sobremaneira com o processo de tomada de decisão em relação à COVID 19 e saúde bucal.

Comentários e Considerações sobre a Pesquisa:

Este é um estudo nacional, unicêntrico, prospectivo, não randomizado. Serão convidados 20 participantes para a pesquisa que terá início em junho de 2021 e término em dezembro 2022.

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Continuação do Parecer: 4.690.744

0_Previsão de início e encerramento do estudo.

Considerações sobre os Termos de apresentação obrigatória:

Seguindo a resolução do CNS 466/12 foram apresentados: Projeto detalhado; Informações básicas do projeto; Folha de rosto; TCLE; Cronograma atualizado; Carta resposta ao parecer anterior com as correções e adequações sugeridas.

Conclusões ou Pendências e Lista de Inadequações:

Não há pendências.

Considerações Finais a critério do CEP:

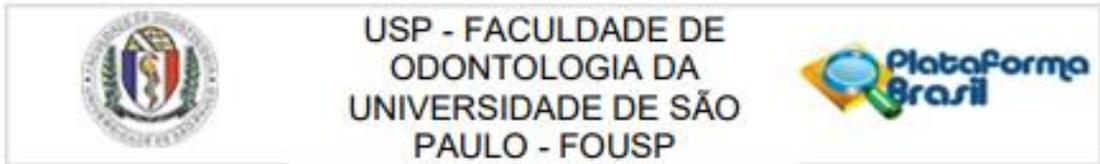
Ressalta-se que cabe ao pesquisador responsável encaminhar os relatórios parciais e final da pesquisa, por meio da Plataforma Brasil, via notificação do tipo "relatório" para que sejam devidamente apreciados no CEP, conforme Norma Operacional CNS nº 001/13, item XI.2.d..

Qualquer alteração no projeto original deve ser apresentada "EMENDA", por meio da Plataforma Brasil, de forma objetiva e com justificativas para nova apreciação (Norma Operacional 001/2013 – letra H).

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1677074.pdf	05/04/2021 16:15:54		Aceito
Projeto Detalhado / Brochura Investigador	Projeto_Taxonomia_junho_posparecer.pdf	05/04/2021 16:15:35	Fernanda Campos de Almeida Carrer	Aceito
Cronograma	Cronograma_atualizado_junho.pdf	05/04/2021 16:15:22	Fernanda Campos de Almeida Carrer	Aceito
Outros	carta_parecer.docx	05/04/2021 14:08:41	Fernanda Campos de Almeida Carrer	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_port.pdf	05/04/2021 14:08:34	Fernanda Campos de Almeida Carrer	Aceito
Folha de Rosto	Folha_rosto_atualizada.pdf	05/04/2021 13:45:37	Fernanda Campos de Almeida Carrer	Aceito

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Continuação do Parecer: 4.690.744

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

SAO PAULO, 04 de Maio de 2021

Assinado por:
Alyne Simões Gonçalves
(Coordenador(a))

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