IESC
Universidade Federal do Rio de Janeiro
Centro de Ciências da Saúde
Instituto de Estudos em Saúde Coletiva

PROTOCOLO PARA ELABORAÇÃO DE ESTRATÉGIA DE BUSCA

1 Identificação

Aluna	Mônica Miguel Brochini	
E-mail	monicabrochini@yahoo.com.br	
(X) Pós-Graduação	Curso: Doutorado em Saúde Coletiva Linha: Epidemiologia e Políticas de Saúde Ano: 2022/2	
Orientadores: Prof. Antonio José Leal Costa & Profa. Natalia Santana Paiva	Bibliotecário: Roberto Unger	Avenida Horácio Macedo, S/N. Ao lado da Prefeitura Universitária. Ilha do Fundão, UFRJ. CEP: 21941-598

1.1 Questão/problema de pesquisa

Quais as modelagens estatísticas e ou matemáticas são utilizadas para corrigir o atraso das notificações de Síndrome Respiratória Aguda Grave (SRAG) na Pandemia de Covid-19 e produzir o *Nowcasting* para tomada de decisão na vigilância epidemiológica?

P	Patients population	Atrasos das notificações (SRAG ou óbito)
I	Intervention	Correção do atraso e predições
C	Comparison	nowcasting
O	Outcomes	Impacto na saúde pública

1.2 Objetivos da pesquisa (geral e específicos)

Identificar o estado da arte das modelagens estatísticas e matemáticas utilizadas na correção do atraso das notificações e nowcasting na Pandemia de Covid-19.

Identificar se a Lógica Fuzzy já foi aplicada em correções do atraso das notificações e, ou construção de nowcasting na vigilância em saúde.

2 Estratégia de busca

2.1 Assunto(s)

- Nas Ciências da Saúde os assuntos (descritores) e os sinônimos podem ser consultados no DeCS (http://decs.bvs.br) e no MeSH (https://www.ncbi.nlm.nih.gov/mesh).
- Para outras áreas do conhecimento verifique se existem Tesauros/Vocabulários Controlados que possam ser utilizados para consulta de termos.

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	Assunto/palavras-chave sinônimos em **português**	Assunto/palavras-chave e sinônimos em **inglês**
Assunto 1	Correção das notificações	Correcting notification
Assunto 2	Covid-19	Covid-19
Assunto 3	Síndrome respiratória aguda grave (SRAG)	severe acute respiratory illness (SARI)
Assunto 4	Atraso das notificações	Reporting delay
Assunto 5	Predição em tempo real	Nowcasting
Assunto 6	Correção do atraso das notificações	Correcting reporting delay

2.2 Critérios de inclusão

- Indique os critérios para seleção dos resultados de busca.

Tipo de documento (artigos, teses, dissertações etc.)	Artigos científicos (publicados e preprint)
Área geográfica	Sem limitação
Período de tempo	Sem limitação
Idioma	inglês
Outros	Trabalhos que aplicaram correções do atraso das notificações para SRAG

2.3 Bases de Dados

- Indique as bases de dados e demais fontes de informação que deseja utilizar em sua pesquisa.

Bases de dados
PubMed/MEDLINE (Ciências da Saúde; abrangência mundial) Acesso gratuito: https://www.ncbi.nlm.nih.gov/pubmed
Scopus (Elsevier) (Multidisciplinar; abrangência mundial) Acesso via VPN ou Acesso CAFE e busca no Portal de Periódicos da CAPES pelo menu "Acervo" > "Lista de bases"
Web of Science (Clarivate Analytics) (Multidisciplinar; abrangência mundial) Acesso via VPN ou Acesso CAFE e busca no Portal de Periódicos da CAPES pelo menu "Acervo" > "Lista de bases"

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3 Resultados da busca

PubMed/MEDLINE

- Acesso gratuito: https://www.ncbi.nlm.nih.gov/pubmed

((((covid-19 OR SARI OR covid19))) AND (("correcting reporting delay" OR "correcting notification" OR "delay reporting"))) AND (nowcasting)

https://pubmed-ncbi-nlm-nih.ez29.periodicos.capes.gov.br/?term=%28%28covid-19+OR+SARI+OR+covid19%29+AND+%28%28%28%22correcting+reporting+delay%22+OR+%22correcting+notification%22+OR+%22delay+reporting%22%29%29+AND+%28nowcasting%29&sort=

Quoted phrases not found in phrase index: "correcting reporting delay", "correcting notification"

Quantidade de resultados:

1: Greene SK, McGough SF, Culp GM, Graf LE, Lipsitch M, Menzies NA, Kahn R. Nowcasting for Real-Time COVID-19 Tracking in New York City: An Evaluation Using Reportable Disease Data From Early in the Pandemic. JMIR Public Health Surveill. 2021 Jan 15;7(1):e25538. doi: 10.2196/25538. PMID: 33406053; PMCID: PMC7812916.

2: Equiza-Goñi J. Correcciones para las cifras diarias de mortalidad acumulada en España durante la pandemia de COVID-19 [Corrections to daily excess mortality estimates in Spain during the COVID-19 pandemic.]. Rev Esp Salud Publica. 2021 Apr 7;95:e202104048. Spanish. PMID: 33824266.

Chave:
(((Covid-19 OR SARI)) AND ("reporting delay" OR "correcting reporting delay")) AND nowcasting

Resultados:
Delay in death reporting affects timely monitoring and modeling of the COVID-19 pandemic.
Carvalho CA, Carvalho VA, Campos MAG, Oliveira BLCA, Diniz EM, Santos AMD, Souza BF, Silva AAMD.Cad Saude Publica. 2021 Aug 13;37(7):e00292320. doi: 10.1590/0102-311X00292320. eCollection 2021.PMID: 34406216 Free article.

Nowcasting the COVID-19 pandemic in Bavaria.
Günther F, Bender A, Katz K, Küchenhoff H, Höhle M.Biom J. 2021 Mar;63(3):490-502. doi: 10.1002/bimj.202000112. Epub 2020 Dec 1.PMID: 33258177 Free PMC article.

Bayesian back-calculation and nowcasting for line list data during the COVID-19 pandemic.
Li T, White LF.PLoS Comput Biol. 2021 Jul 12;17(7):e1009210. doi: 10.1371/journal.pcbi.1009210. eCollection 2021 Jul.PMID: 34252078 **Free PMC article.**

Nowcasting COVID-19 deaths in England by age and region.

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Seaman SR, Samartsidis P, Kall M, De Angelis D.J R Stat Soc Ser C Appl Stat. 2022 Jun 15:10.1111/rssc.12576. doi: 10.1111/rssc.12576. Online ahead of print.PMID: 35942006 **Free PMC article.**

Evaluation of **Nowcasting** for Real-Time **COVID-19** Tracking - New York City, March-May 2020.
Greene SK, McGough SF, Culp GM, Graf LE, Lipsitch M, Menzies NA, Kahn R.medRxiv. 2020 Oct 20:2020.10.18.20209189. doi: 10.1101/2020.10.18.20209189. Preprint.PMID: 33106814 **Free PMC article. Updated.**

Nowcasting for Real-Time **COVID-19** Tracking in New York City: An Evaluation Using **Reportable** Disease Data From Early in the Pandemic.
Greene SK, McGough SF, Culp GM, Graf LE, Lipsitch M, Menzies NA, Kahn R.JMIR Public Health Surveill. 2021 Jan 15;7(1):e25538. doi: 10.2196/25538.PMID: 33406053 **Free PMC article.**

Forecasting of **COVID-19** onset cases: a data-driven analysis in the early stage of **delay**.
Wang X, Li Y, Jia J.Environ Sci Pollut Res Int. 2021 Apr;28(16):20240-20246. doi: 10.1007/s11356-020-11859-w. Epub 2021 Jan 6.PMID: 33405171 **Free PMC article.**

Near real-time surveillance of the **SARS-CoV-2** epidemic with incomplete data.
De Salazar PM, Lu F, Hay JA, Gómez-Barroso D, Fernández-Navarro P, Martínez E, Astray-Mochales J, Amillategui R, García-Fulgueiras A, Chirlaque MD, Sánchez-Migallón A, Larrauri A, Sierra MJ, Lipsitch M, Simón F, Santillana M, Hernán MA.medRxiv. 2021 Jan 26:2021.01.25.20230094. doi: 10.1101/2021.01.25.20230094. Preprint.

[**Corrections** to daily excess mortality estimates in Spain during the **COVID-19** pandemic.].
Equiza-Goñi J.Rev Esp Salud Publica. 2021 Apr 7;95:e202104048.PMID: 33824266 **Free article.** Spanish.

Near real-time surveillance of the **SARS-CoV-2** epidemic with incomplete data.
De Salazar PM, Lu F, Hay JA, Gómez-Barroso D, Fernández-Navarro P, Martínez EV, Astray-Mochales J, Amillategui R, García-Fulgueiras A, Chirlaque MD, Sánchez-Migallón A, Larrauri A, Sierra MJ, Lipsitch M, Simón F, Santillana M, Hernán MA.PLoS Comput Biol. 2022 Mar 31;18(3):e1009964. doi: 10.1371/journal.pcbi.1009964. eCollection 2022 Mar.PMID: 35358171 **Free PMC article.**

Chave:
(covid-19 OR SARI)) AND (nowcasting) excluída essa chave!

Quantidade de resultados:

1: Garcia LP, Gonçalves AV, Andrade MP, Pedebôs LA, Vidor AC, Zaina R, Hallal ALC, Canto GL, Traebert J, Araújo GM, Amaral FV. Estimating underdiagnosis of COVID-19 with nowcasting and machine learning. Rev Bras Epidemiol. 2021 Oct 29;24:e210047. doi: 10.1590/1980-549720210047. PMID: 34730709.

2: Günther F, Bender A, Katz K, Küchenhoff H, Höhle M. Nowcasting the COVID-19 pandemic in Bavaria. Biom J. 2021 Mar;63(3):490-502. doi: 10.1002/bimj.202000112. Epub 2020 Dec 1. PMID: 33258177; PMCID: PMC7753318.

3: Wu JT, Leung K, Lam TTY, Ni MY, Wong CKH, Peiris JSM, Leung GM. Nowcasting epidemics of novel pathogens: lessons from COVID-19. Nat Med. 2021

Mar;27(3):388-395. doi: 10.1038/s41591-021-01278-w. Epub 2021 Mar 15. PMID: 33723452.

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5: Arslan S, Ozdemir MY, Ucar A. Nowcasting and Forecasting the Spread of COVID-19 and Healthcare Demand in Turkey, a Modeling Study. Front Public Health. 2021 Jan 20;8:575145. doi: 10.3389/fpubh.2020.575145. PMID: 33553085; PMCID: PMC7855976.

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7: Li T, White LF. Bayesian back-calculation and nowcasting for line list data during the COVID-19 pandemic. PLoS Comput Biol. 2021 Jul 12;17(7):e1009210. doi: 10.1371/journal.pcbi.1009210. PMID: 34252078; PMCID: PMC8297945.

8: Su SY, Lee WC. Nowcasting the prevalence of asymptomatic, preclinical, and clinical COVID-19 infections. J Formos Med Assoc. 2021 Sep;120(9):1790-1792. doi: 10.1016/j.jfma.2021.03.026. Epub 2021 Mar 31. PMID: 33840544; PMCID: PMC8011633.

9: Schneble M, De Nicola G, Kauermann G, Berger U. Nowcasting fatal COVID-19 infections on a regional level in Germany. Biom J. 2021 Mar;63(3):471-489. doi: 10.1002/bimj.202000143. Epub 2020 Nov 20. PMID: 33215765.

10: Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. Lancet. 2020 Feb 29;395(10225):689-697. doi: 10.1016/S0140-6736(20)30260-9. Epub 2020 Jan 31. Erratum in: Lancet. 2020 Feb 4;: PMID: 32014114; PMCID: PMC7159271.

11: Seaman SR, Samartsidis P, Kall M, De Angelis D. Nowcasting COVID-19 deaths in England by age and region. J R Stat Soc Ser C Appl Stat. 2022 Jun 15:10.1111/rssc.12576. doi: 10.1111/rssc.12576. Epub ahead of print. PMID: 35942006; PMCID: PMC9349735.

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13: Greene SK, McGough SF, Culp GM, Graf LE, Lipsitch M, Menzies NA, Kahn R. Nowcasting for Real-Time COVID-19 Tracking in New York City: An Evaluation Using

Reportable Disease Data From Early in the Pandemic. JMIR Public Health Surveill. 2021 Jan 15;7(1):e25538. doi: 10.2196/25538. PMID: 33406053; PMCID: PMC7812916.

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33: Larson WD, Sinclair TM. Nowcasting unemployment insurance claims in the time of COVID-19. Int J Forecast. 2022 Apr-Jun;38(2):635-647. doi: 10.1016/j.ijforecast.2021.01.001. Epub 2021 Jan 11. PMID: 35185232; PMCID: PMC8846950.

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Keilegom I, Speybroeck N, Legrand C, De Buyser S, Hulstaert F. Infectious diseases epidemiology, quantitative methodology, and clinical research in the midst of the COVID-19 pandemic: Perspective from a European country. Contemp Clin Trials. 2020 Dec;99:106189. doi: 10.1016/j.cct.2020.106189. Epub 2020 Oct 22. PMID: 33132155; PMCID: PMC7581408.

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68: De Salazar PM, Lu F, Hay JA, Gómez-Barroso D, Fernández-Navarro P, Martínez EV, Astray-Mochales J, Amillategui R, García-Fulgueiras A, Chirlaque MD, Sánchez-Migallón A, Larrauri A, Sierra MJ, Lipsitch M, Simón F, Santillana M, Hernán MA. Near real-time surveillance of the SARS-CoV-2 epidemic with incomplete data. PLoS Comput Biol. 2022 Mar 31;18(3):e1009964. doi: 10.1371/journal.pcbi.1009964. PMID: 35358171; PMCID: PMC9004750.

PMC: chave
(((Covid-19 OR SARI)) AND ("reporting delay" OR "correcting reporting delay")) AND nowcasting

Resultados pré-selecionados manualmente:
1: Bayesian back-calculation and nowcasting for line list data during the COVID-19 pandemic
Tenglong Li, Laura F. White
PLoS Comput Biol. 2021 Jul; 17(7): e1009210. Published online 2021 Jul 12. doi: 10.1371/journal.pcbi.1009210
PMCID: PMC8297945

PROTOCOLO PARA ELABORAÇÃO DE ESTRATÉGIA DE BUSCA

2: Near real-time surveillance of the SARS-CoV-2 epidemic with incomplete data
Pablo M. De Salazar, Fred Lu, James A Hay, Diana Gómez-Barroso, Pablo Fernández-Navarro, Elena V Martínez, Jenaro Astray-Mochales, Rocío Amillategui, Ana García-Fulgueiras, Maria D Chirlaque, Alonso Sánchez-Migallón, Amparo Larrauri, María J Sierra, Marc Lipsitch, Fernando Simón, Mauricio Santillana, Miguel A Hernán
PLoS Comput Biol. 2022 Mar; 18(3): e1009964. Published online 2022 Mar 31. doi: 10.1371/journal.pcbi.1009964
PMCID: PMC9004750

3: Nowcasting for Real-Time COVID-19 Tracking in New York City: An Evaluation Using Reportable Disease Data From Early in the Pandemic
Sharon K Greene, Sarah F McGough, Gretchen M Culp, Laura E Graf, Marc Lipsitch, Nicolas A Menzies, Rebecca Kahn
JMIR Public Health Surveill. 2021 Jan; 7(1): e25538. Published online 2021 Jan 15. doi: 10.2196/25538
PMCID: PMC7812916

4: Nowcasting the COVID-19 pandemic in Bavaria
Felix Günther, Andreas Bender, Katharina Katz, Helmut Küchenhoff, Michael Höhle
Biom J. 2021 Mar; 63(3): 490–502. Published online 2020 Dec 1. doi: 10.1002/bimj.202000112
PMCID: PMC7753318

5: Transmission dynamics and control measures of COVID-19 outbreak in China: a modelling study
Xu-Sheng Zhang, Emilia Vynnycky, Andre Charlett, Daniela De Angelis, Zhengji Chen, Wei Liu
Sci Rep. 2021; 11: 2652. Published online 2021 Jan 29. doi: 10.1038/s41598-021-81985-z
PMCID: PMC7846591

6: Forecasting of COVID-19 onset cases: a data-driven analysis in the early stage of delay
Xueli Wang, Ying Li, Jinzhu Jia
Environ Sci Pollut Res Int. 2021; 28(16): 20240–20246. Published online 2021 Jan 6. doi: 10.1007/s11356-020-11859-w
PMCID: PMC7786867

7: Evaluation of Nowcasting for Real-Time COVID-19 Tracking — New York City, March–May 2020
Sharon K. Greene, Sarah F. McGough, Gretchen M. Culp, Laura E. Graf, Marc Lipsitch, Nicolas A. Menzies, Rebecca Kahn
Version 1. medRxiv. Preprint. 2020 Oct 20. doi: 10.1101/2020.10.18.20209189Published in: JMIR Public Health Surveill. 2021 Jan; 7(1): e25538.
PMCID: PMC7587834

8: Timely epidemic monitoring in the presence of reporting delays: anticipating the COVID-19 surge in New York City, September 2020
Jeffrey E. Harris
BMC Public Health. 2022; 22: 871. Published online 2022 May 2. doi: 10.1186/s12889-022-13286-7
PMCID: PMC9058738

9: Near real-time surveillance of the SARS-CoV-2 epidemic with incomplete data
PM De Salazar, F Lu, JA Hay, D Gómez-Barroso, P Fernández-Navarro, E Martínez, J Astray-Mochales, R Amillategui, A García-Fulgueiras, MD Chirlaque, A Sánchez-Migallón, A Larrauri, MJ Sierra, M Lipsitch, F Simón, M Santillana, MA Hernán
Version 1. medRxiv. Preprint. 2021 Jan 26. doi: 10.1101/2021.01.25.20230094
PMCID: PMC7852239

10: Data-driven prediction of COVID-19 cases in Germany for decision making
Lukas Refisch, Fabian Lorenz, Torsten Riedlinger, Hannes Taubenböck, Martina Fischer, Linus Grabenhenrich, Martin Wolkewitz, Harald Binder, Clemens Kreutz
BMC Med Res Methodol. 2022; 22: 116. Published online 2022 Apr 20. doi: 10.1186/s12874-022-01579-9
PMCID: PMC9019290

11: Addressing delayed case reporting in infectious disease forecast modeling

Lauren J. Beesley, Dave Osthus, Sara Y. Del Valle
PLoS Comput Biol. 2022 Jun; 18(6): e1010115. Published online 2022 Jun 3. doi: 10.1371/journal.pcbi.1010115
PMCID: PMC9200328

12: Bayesian imputation of COVID-19 positive test counts for nowcasting under reporting lag
Radka Jersakova, James Lomax, James Hetherington, Brieuc Lehmann, George Nicholson, Mark Briers, Chris Holmes
J R Stat Soc Ser C Appl Stat. 2022 Apr 23 : 10.1111/rssc.12557. doi: 10.1111/rssc.12557 [Epub ahead of print]
PMCID: PMC9115539

13: Nowcasting COVID-19 deaths in England by age and region
Shaun R. Seaman, Pantelis Samartsidis, Meaghan Kall, Daniela De Angelis
J R Stat Soc Ser C Appl Stat. 2022 Jun 15 : 10.1111/rssc.12576. doi: 10.1111/rssc.12576 [Epub ahead of print]
PMCID: PMC9349735

14: Regional now- and forecasting for data reported with delay: toward surveillance of COVID-19 infections
Giacomo De Nicola, Marc Schneble, Göran Kauermann, Ursula Berger
Adv Stat Anal. 2022; 106(3): 407–426. Published online 2022 Jan 18. doi: 10.1007/s10182-021-00433-5
PMCID: PMC8764329

15: A modelling approach for correcting reporting delays in disease surveillance data
Leonardo S Bastos, Theodoros Economou, Marcelo F C Gomes, Daniel A M Villela, Flavio C Coelho, Oswaldo G Cruz, Oliver Stoner, Trevor Bailey, Claudia T Codeço
Stat Med. 2019 Sep 30; 38(22): 4363–4377. Published online 2019 Jul 10. doi: 10.1002/sim.8303
PMCID: PMC6900153

16: Bayesian sequential data assimilation for COVID-19 forecasting
Maria L. Daza-Torres, Marcos A. Capistrán, Antonio Capella, J. Andrés Christen
Epidemics. 2022 Jun; 39: 100564. Published online 2022 Apr 22. doi: 10.1016/j.epidem.2022.100564
PMCID: PMC9023479

17: Multivariate hierarchical frameworks for modeling delayed reporting in count data
Oliver Stoner, Theo Economou
Biometrics. 2020 Sep; 76(3): 789–798. Published online 2019 Nov 29. doi: 10.1111/biom.13188
PMCID: PMC7540263

Scopus (Elsevier)

- Base de dados de acesso restrito/pago. Acesso via Portal de Periódicos da CAPES (http://periodicos.capes.gov.br/), utilizando a opção "Acervo" > "Lista de bases".
- Utilize o VPN ou Acesso CAFe para acessá-la quando estiver fora da UFSC.

https://www-scopus.ez29.periodicos.capes.gov.br/results/results.uri?sort=plf-f&src=s&sid=12c437dee770113803e2111aa624f71e&sot=a&sdt=a&sl=110&s=%28covid-19+OR+SARI+OR+covid19%29+AND+%28%22correcting+reporting+delay%22+OR+%22correcting+notification%22%29+AND+%28nowcasting%29&origin=searchadvanced&editSaveSearch=&txGid=ab1fe9eaacff23858061dc09b1f97352

(covid-19 OR SARI OR covid19) AND ("correcting reporting delay" OR "correcting notification") AND (nowcasting)

1) Harris, J.E.

Timely epidemic monitoring in the presence of reporting delays: anticipating the COVID-19 surge in New York City,

(2022) *BMC Public Health*, 22 (1), art. no. 871, .

Document Type: Article
Publication Stage: Final
Source: Scopus

2) Sarnaglia, A.J.Q., Zamprogno, B., Fajardo Molinares, F.A., de Godoi, L.G., Jiménez Monroy, N.A.

Correcting notification delay and forecasting of COVID-19 data
(2022) *Journal of Mathematical Analysis and Applications*, 514 (2), art. no. 125202, . Cited 4 times.

Document Type: Article
Publication Stage: Final
Source: Scopus

3) Costa, G.S., Cota, W., Ferreira, S.C.

Data-driven approach in a compartmental epidemic model to assess undocumented infections
(2022) *Chaos, Solitons and Fractals*, 163, art. no. 112520, .

Document Type: Article
Publication Stage: Final
Source: Scopus

4) Zerenner, T., Di Lauro, F., Dashti, M., Berthouze, L., Kiss, I.Z.

Probabilistic predictions of SIS epidemics on networks based on population-level observations
(2022) *Mathematical Biosciences*, 350, art. no. 108854, .

Document Type: Article
Publication Stage: Final
Source: Scopus

5) Beesley, L.J., Osthus, D., Del Valle, S.Y.

Addressing delayed case reporting in infectious disease forecast modeling
(2022) *PLoS Computational Biology*, 18 (6), art. no. e1010115, .

Document Type: Article

Publication Stage: Final
Source: Scopus

6) Miller, S., Preis, T., Mizzi, G., Bastos, L.S., Gomes, M.F.D.C., Coelho, F.C., Codeço, C.T., Moat, H.S.

Faster indicators of chikungunya incidence using Google searches
(2022) *PLoS Neglected Tropical Diseases*, 16 (6), art. no. e0010441, .

Document Type: Article
Publication Stage: Final
Source: Scopus

7) De Salazar, P.M., Lu, F., Hay, J.A., Gómez-Barroso, D., Fernández-Navarro, P., Martínez, E.V., Astray-Mochales, J., Amillategui, R., García-Fulgueiras, A., Chirlaque, M.D., SánchezMigallón, A., Larrauri, A., Sierra, M.J., Lipsitch, M., Simón, F., Santillana, M., Hernán, M.A.

Near real-time surveillance of the SARS-CoV-2 epidemic with incomplete data
(2022) *PLoS Computational Biology*, 18 (3), art. no. e1009964, . Cited 2 times.

Document Type: Article
Publication Stage: Final
Source: Scopus

8) Verbelen, R., Antonio, K., Claeskens, G., Crevecoeur, J.

Modeling the Occurrence of Events Subject to a Reporting Delay via an EM Algorithm
(2022) *Statistical Science*, 37 (3), pp. 394-410. Cited 1 time.

Document Type: Article
Publication Stage: Final
Source: Scopus

9) Seaman, S.R., Samartsidis, P., Kall, M., De Angelis, D.

Nowcasting COVID-19 deaths in England by age and region
(2022) *Journal of the Royal Statistical Society. Series C: Applied Statistics*, .

Document Type: Article
Publication Stage: Article in Press
Source: Scopus

10) Menkir, T.F., Cox, H., Poirier, C., Saul, M., Jones-Weekes, S., Clementson, C., De Salazar, P.M., Santillana, M., Buckee, C.O.

A nowcasting framework for correcting for reporting delays in malaria surveillance
(2021) *PLoS Computational Biology*, 17 (11), art. no. e1009570, .

Document Type: Article
Publication Stage: Final
Source: Scopus

11) Turbé, H., Bjelogrlic, M., Robert, A., Gaudet-Blavignac, C., Goldman, J.-P., Lovis, C.

Adaptive Time-Dependent Priors and Bayesian Inference to Evaluate SARS-CoV-2 Public Health Measures Validated on 31 Countries
(2021) *Frontiers in Public Health*, 8, art. no. 583401, . Cited 3 times.

Document Type: Article
Publication Stage: Final
Source: Scopus

12) Hawryluk, I., Hoeltgebaum, H., Mishra, S., Miscouridou, X., Schnekenberg, R.P., Whittaker, C., Vollmer, M., Flaxman, S., Bhatt, S., Mellan, T.A.

Gaussian Process Nowcasting: Application to COVID-19 Mortality Reporting
(2021) *37th Conference on Uncertainty in Artificial Intelligence, UAI 2021*, pp. 1258-1268. Cited 2 times.

Document Type: Conference Paper
Publication Stage: Final
Source: Scopus

13) Warne, D.J., Ebert, A., Drovandi, C., Hu, W., Mira, A., Mengersen, K.

Hindsight is 2020 vision: a characterisation of the global response to the COVID-19 pandemic
(2020) *BMC Public Health*, 20 (1), art. no. 1868, . Cited 10 times.

Document Type: Article
Publication Stage: Final
Source: Scopus

14) Bastos, L.S., Economou, T., Gomes, M.F.C., Villela, D.A.M., Coelho, F.C., Cruz, O.G., Stoner,

O., Bailey, T., Codeço, C.T.

A modelling approach for correcting reporting delays in disease surveillance data
(2019) *Statistics in Medicine*, 38 (22), pp. 4363-4377. Cited 25 times.

Document Type: Article
Publication Stage: Final
Source: Scopus

Web of Science (Clarivate Analytics)

- Base de dados de acesso restrito/pago. Acesso via Portal de Periódicos da CAPES (http://periodicos.capes.gov.br/), utilizando a opção "Acervo" > "Lista de bases".
- Utilize o VPN ou Acesso CAFe para acessá-la quando estiver fora da UFSC.

https://www.webofscience.com/wos/woscc/summary/c2a99739-1e54-4b07-a2cd-8e56e54f9792-549052fc/relevance/1

Chave: (((Covid-19 OR SARI)) AND ("reporting delay" OR "correcting reporting delay")) AND nowcasting

Quantidade de resultados:

PT J
AU Gunther, F
Bender, A
Katz, K
Kuchenhoff, H
Hohle, M
AF Guenther, Felix
Bender, Andreas
Katz, Katharina
Kuechenhoff, Helmut
Hohle, Michael
TI Nowcasting the COVID-19 pandemic in Bavaria
WR Ver registro completo no Web of Science
SO BIOMETRICAL JOURNAL
AB To assess the current dynamics of an epidemic, it is central to collect information on the daily number of newly diseased cases. This is especially important in real-time surveillance, where the aim is to gain situational awareness, for example, if cases are currently increasing or decreasing. Reporting delays between disease onset and case reporting hamper our ability to understand the dynamics of an epidemic close to now when looking at the number of daily reported cases only. Nowcasting can be used to adjust daily case counts for occurred-but-not-yet-reported events. Here, we present a novel application of nowcasting to data on the current COVID-19 pandemic in Bavaria. It is based on a hierarchical Bayesian model that considers changes in the reporting delay distribution over time and associated with the weekday of reporting. Furthermore, we present a way to estimate the effective time-varying case reproduction number Re(t) based on predictions of the nowcast. The approaches are based on previously published work, that we considerably extended and adapted to the current task of nowcasting COVID-19 cases. We provide methodological details of the developed approach, illustrate results based on data

of the current pandemic, and evaluate the model based on synthetic and retrospective data on COVID-19 in Bavaria. Results of our nowcasting are reported to the Bavarian health authority and published on a webpage on a daily basis (). Code and synthetic data for the analysis are available from and can be used for adaption of our approach to different data.

RI

Bender, Andreas	ABB-9021-2020

OI

Bender, Andreas	0000-0001-5628-8611
Guenther, Felix	0000-0001-6582-1174
Hohle, Michael	0000-0002-0423-6702

SN 0323-3847
EI 1521-4036
PD MAR
PY 2021
VL 63
IS 3
BP 490
EP 502
DI 10.1002/bimj.202000112
DL http://dx.doi.org/10.1002/bimj.202000112
EA DEC 2020
UT WOS:000594347400001
PM 33258177
ER

PT J

AU De Nicola, G
Schneble, M
Kauermann, G
Berger, U

AF De Nicola, Giacomo
Schneble, Marc
Kauermann, Goeran
Berger, Ursula

TI Regional now- and forecasting for data reported with delay: toward surveillance of COVID-19 infections

WR Ver registro completo no Web of Science

SO ASTA-ADVANCES IN STATISTICAL ANALYSIS

AB Governments around the world continue to act to contain and mitigate the spread of COVID-19. The rapidly evolving situation compels officials and executives to continuously adapt policies and social distancing measures depending on the current state of the spread of the disease. In this context, it is crucial for policymakers to have a firm grasp on what the current state of the pandemic is, and to envision how the number of infections is going to evolve over the next days. However, as in many other situations involving compulsory registration of sensitive data, cases are reported with delay to a central register, with this delay deferring an up-to-date view of the state of things. We provide a stable tool for

monitoring current infection levels as well as predicting infection numbers in the immediate future at the regional level. We accomplish this through nowcasting of cases that have not yet been reported as well as through predictions of future infections. We apply our model to German data, for which our focus lies in predicting and explain infectious behavior by district.

OI

De Nicola, Giacomo	0000-0003-0558-6912

SN 1863-8171

EI 1863-818X

PD SEP

PY 2022

VL 106

IS 3

BP 407

EP 426

DI 10.1007/s10182-021-00433-5

DL http://dx.doi.org/10.1007/s10182-021-00433-5

EA JAN 2022

UT WOS:000743864800001

PM 35069920

ER

PT J

AU de Carvalho, CA
de Carvalho, VA
Campos, MAG
de Oliveira, BLCA
Diniz, EM
Dos Santos, AM
de Souza, BF
da Silva, AAM

AF de Carvalho, Carolina Abreu
de Carvalho, Vitoria Abreu
Garcia Campos, Marcos Adriano
Carneiro Alves de Oliveira, Bruno Luciano
Diniz, Eduardo Moraes
Miranda Dos Santos, Alcione
de Souza, Bruno Feres
Moura da Silva, Antonio Augusto

TI Delay in death reporting affects timely monitoring and modeling of the COVID-19 pandemic

WR Ver registro completo no Web of Science

SO CADERNOS DE SAUDE PUBLICA

AB This study describes the COVID-19 death reporting delay in the city of Sao Luis, Maranhao State, Brazil, and shows its impact on timely monitoring and modeling of the COVID-19 pandemic, while seeking to ascertain how nowcasting can improve death reporting delay. We analyzed COVID-19 death data reported daily in the Epidemiological Bulletin of the State Health Secretariat of Maranhao and calculated the reporting delay from March 23 to August 29, 2020. A semi-mechanistic Bayesian hierarchical model was fitted to illustrate the impact of death reporting delay and test the effectiveness of a Bayesian Nowcasting in improving data quality. Only 17.8% of deaths were reported without delay or the day after, while 40.5% were reported more than 30 days late. Following an initial underestimation due to reporting delay, 644 deaths were reported from June 7 to August 29, although only 116 deaths occurred during this period. Using the Bayesian nowcasting technique partially improved the quality of mortality data during the peak of the pandemic, providing estimates that better matched the observed scenario in the city, becoming unusable nearly two months after the peak. As delay in death reporting can directly interfere with assertive and timely decision-making regarding the COVID-19 pandemic, the Brazilian epidemiological surveillance system must be urgently revised and notifying the date of death must be mandatory. Nowcasting has proven somewhat effective in improving the quality of mortality data, but only at the peak of the pandemic.

RI

Silva, Antonio	B-5410-2009

OI

de Oliveira, Bruno Luciano Carneiro Alves	0000-0001-8053-7972
Feres de Souza, Bruno	0000-0003-1997-4983
Diniz, Eduardo	0000-0002-6201-1771
Garcia Campos, Marcos Adriano	0000-0001-8924-1203
Silva, Antonio	0000-0003-4968-5138

SN 0102-311X
EI 1678-4464
PY 2021
VL 37
IS 7
AR e00292320
DI 10.1590/0102-311X00292320
DL http://dx.doi.org/10.1590/0102-311X00292320
UT WOS:000687125000001
PM 34406216
ER

PT J
AU Sahai, SY
Gurukar, S
KhudaBukhsh, WR
Parthasarathy, S
Rempala, GA
AF Sahai, Saumya Yashmohini
Gurukar, Saket
KhudaBukhsh, Wasiur R.
Parthasarathy, Srinivasan
Rempala, Grzegorz A.
TI A machine learning model for nowcasting epidemic incidence
WR Ver registro completo no Web of Science
SO MATHEMATICAL BIOSCIENCES

AB Due to delay in reporting, the daily national and statewide COVID-19 incidence counts are often unreliable and need to be estimated from recent data. This process is known in economics as nowcasting. We describe in this paper a simple random forest statistical model for nowcasting the COVID-19 daily new infection counts based on historic data along with a set of simple covariates, such as the currently reported infection counts, day of the week, and time since first reporting. We apply the model to adjust the daily infection counts in Ohio, and show that the predictions from this simple data-driven method compare favorably both in quality and computational burden to those obtained from the state-of-the-art hierarchical Bayesian model employing a complex statistical algorithm. The interactive notebook for performing nowcasting is available online at https://tinyurl.com/simpleMLnowcasting.

OI

Parthasarathy, Srinivasan	0000-0002-6062-6449
Sahai, Saumya	0000-0002-4254-5223
KhudaBukhsh, Wasiur R.	0000-0003-1803-0470

SN 0025-5564

EI 1879-3134

PD JAN

PY 2022

VL 343

AR 108677

DI 10.1016/j.mbs.2021.108677

DL http://dx.doi.org/10.1016/j.mbs.2021.108677

UT WOS:000783947800006

PM 34848217

ER

PT J

AU Seaman, S
Samartsidis, P
Kall, M
De Angelis, D

AF Seaman, Shaun
Samartsidis, Pantelis
Kall, Meaghan
De Angelis, Daniela

TI Nowcasting COVID-19 deaths in England by age and region

WR Ver registro completo no Web of Science

SO JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES C-APPLIED STATISTICS

AB Understanding the trajectory of the daily number of COVID-19 deaths is essential to decisions on how to respond to the pandemic, but estimating this trajectory is complicated by the delay between deaths occurring and being reported. In England the delay is typically several days, but it can be weeks. This causes considerable uncertainty about how many deaths occurred in recent days. Here we estimate the deaths per day in five age strata within seven English regions, using a Bayesian model that accounts for reporting-day effects and longer-term changes in the delay distribution. We show how the model can be computationally efficiently fitted when the delay distribution is the same in multiple strata, for example, over a wide range of ages.

SN 0035-9254

EI 1467-9876
DI 10.1111/rssc.12576
DL http://dx.doi.org/10.1111/rssc.12576
EA JUN 2022
UT WOS:000811365700001
PM 35942006
ER

PT J
AU Wang, XL
Li, Y
Jia, JZ
AF Wang, Xueli
Li, Ying
Jia, Jinzhu
TI Forecasting of COVID-19 onset cases: a data-driven analysis in the early stage of delay
WR Ver registro completo no Web of Science
SO ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH
AB The outbreak of COVID-19 has become a global public health event. Many researchers have proposed many epidemiological models to predict the outbreak trend of COVID-19, but all use confirmed cases to predict "onset cases." In this article, a total of 5434 cases were collected from National Health Commission and other provincial Health Commission in China, spanning from 1 December 2019 to 23 February 2020. We studied the delayed distribution of patients from onset to be confirmed. The delay is divided into two stages, which takes about 15 days or even longer. Therefore, considering the right truncation of the data, we proposed a "predict-in-advance" method, used the number of "visiting hospital cases" to predict the number of "onset cases." The results not only show that our prediction shortens the delay of the second stage, but also the predicted value of onset cases is quite close to the real value of onset cases, which can effectively predict the epidemic trend of sudden infectious diseases, and provide an important reference for the government to formulate control measures in advance.
OI

Wang, Xueli	0000-0003-1332-8307

SN 0944-1344
EI 1614-7499
PD APR
PY 2021
VL 28
IS 16
BP 20240
EP 20246
DI 10.1007/s11356-020-11859-w
DL http://dx.doi.org/10.1007/s11356-020-11859-w
EA JAN 2021
UT WOS:000605574200014
PM 33405171
ER

PT J

AU Greene, SK
McGough, SF
Culp, GM
Graf, LE
Lipsitch, M
Menzies, NA
Kahn, R

AF Greene, Sharon K.
McGough, Sarah F.
Culp, Gretchen M.
Graf, Laura E.
Lipsitch, Marc
Menzies, Nicolas A.
Kahn, Rebecca

TI Nowcasting for Real-Time COVID-19 Tracking in New York City: An Evaluation Using Reportable Disease Data From Early in the Pandemic

WR Ver registro completo no Web of Science

SO JMIR PUBLIC HEALTH AND SURVEILLANCE

AB Background: Nowcasting approaches enhance the utility of reportable disease data for trend monitoring by correcting for delays, but implementation details affect accuracy.
Objective: To support real-time COVID-19 situational awareness, the New York City Department of Health and Mental Hygiene used nowcasting to account for testing and reporting delays. We conducted an evaluation to determine which implementation details would yield the most accurate estimated case counts.
Methods: A time-correlated Bayesian approach called Nowcasting by Bayesian Smoothing (NobBS) was applied in real time to line lists of reportable disease surveillance data, accounting for the delay from diagnosis to reporting and the shape of the epidemic curve. We retrospectively evaluated nowcasting performance for confirmed case counts among residents diagnosed during the period from March to May 2020, a period when the median reporting delay was 2 days.
Results: Nowcasts with a 2-week moving window and a negative binomial distribution had lower mean absolute error, lower relative root mean square error, and higher 95% prediction interval coverage than nowcasts conducted with a 3-week moving window or with a Poisson distribution. Nowcasts conducted toward the end of the week outperformed nowcasts performed earlier in the week, given fewer patients diagnosed on weekends and lack of day-of-week adjustments. When estimating case counts for weekdays only, metrics were similar across days when the nowcasts were conducted, with Mondays having the lowest mean absolute error of 183 cases in the context of an average daily weekday case count of 2914.
Conclusions: Nowcasting using NobBS can effectively support COVID-19 trend monitoring. Accounting for overdispersion, shortening the moving window, and suppressing diagnoses on weekends-when fewer patients submitted specimens for testing-improved the accuracy of estimated case counts. Nowcasting ensured that recent decreases in observed case counts were not overinterpreted as true declines and supported officials in anticipating the magnitude and timing of hospitalizations and deaths and allocating resources geographically.

OI

Greene, Sharon K.	0000-0002-3509-2377
Graf, Laura	0000-0003-4249-4283
McGough, Sarah	0000-0003-2448-6714

PROTOCOLO PARA ELABORAÇÃO DE ESTRATÉGIA DE BUSCA

Kahn, Rebecca	0000-0001-9511-6142
Lipsitch, Marc	0000-0003-1504-9213
Menzies, Nicolas	0000-0002-2571-016X

SN 2369-2960
PD JAN
PY 2021
VL 7
IS 1
BP 180
EP 188
AR e25538
DI 10.2196/25538
DL http://dx.doi.org/10.2196/25538
UT WOS:000615122400017
PM 33406053
ER

PT J
AU Jahja, M
Chin, A
Tibshirani, RJ
AF Jahja, Maria
Chin, Andrew
Tibshirani, Ryan J.
TI Real-Time Estimation of COVID-19 Infections: Deconvolution and Sensor Fusion
WR Ver registro completo no Web of Science
SO STATISTICAL SCIENCE
AB We propose, implement, and evaluate a method to estimate the daily number of new symptomatic COVID-19 infections, at the level of individual U.S. counties, by deconvolving daily reported COVID-19 case counts using an estimated symptom-onset-to-case-report delay distribution. Importantly, we focus on estimating infections in real-time (rather than retrospectively), which poses numerous challenges. To address these, we develop new methodology for both the distribution estimation and deconvolution steps, and we employ a sensor fusion layer (which fuses together predictions from models that are trained to track infections based on auxiliary surveillance streams) in order to improve accuracy and stability.
SN 0883-4237
EI 2168-8745
PD MAY
PY 2022
VL 37
IS 2
BP 207
EP 228

PROTOCOLO PARA ELABORAÇÃO DE ESTRATÉGIA DE BUSCA

DI 10.1214/22-STS856
DL http://dx.doi.org/10.1214/22-STS856
UT WOS:000798149000005
ER

PT J
AU Richards, SJ
AF Richards, Stephen J.
TI Real-time measurement of portfolio mortality levels in the presence of shocks and reporting delays
WR Ver registro completo no Web of Science
SO ANNALS OF ACTUARIAL SCIENCE
AB The COVID-19 pandemic requires that actuaries track short-term mortality fluctuations in the portfolios they manage. This demands methods that not only operate over much shorter time periods than a year but that also deal with reporting delays. In this paper, we consider a semi-parametric approach for tracking portfolio mortality levels in continuous time. We identify both seasonal patterns and mortality shocks, thus providing a comparison benchmark for the impact of COVID-19 in terms of a portfolio's own past experience. A parametric model is presented to allow for the average impact of seasonal variation and also reporting delays. We find that an estimate of mortality reporting delays can be made from a single extract of experience data. This can be used to forecast unreported deaths and improve estimates of recent mortality levels. Results are given for annuity portfolios in France, the UK and the USA.
OI

Richards, Stephen	0000-0001-6859-6347

SN 1748-4995
EI 1748-5002
DI 10.1017/S1748499522000021
DL http://dx.doi.org/10.1017/S1748499522000021
EA FEB 2022
UT WOS:000758495500001
ER

PT J
AU Kline, D
Hyder, A
Liu, EH
Rayo, M
Malloy, S
Root, E
AF Kline, David
Hyder, Ayaz
Liu, Enhao
Rayo, Michael
Malloy, Samuel
Root, Elisabeth
TI A Bayesian Spatiotemporal Nowcasting Model for Public Health Decision-Making and Surveillance
WR Ver registro completo no Web of Science

PROTOCOLO PARA ELABORAÇÃO DE ESTRATÉGIA DE BUSCA

SO AMERICAN JOURNAL OF EPIDEMIOLOGY

AB As coronavirus disease 2019 (COVID-19) spread through the United States in 2020, states began to set up alert systems to inform policy decisions and serve as risk communication tools for the general public. Many of these systems included indicators based on an assessment of trends in numbers of reported cases. However, when cases are indexed by date of disease onset, reporting delays complicate the interpretation of trends. Despite a foundation of statistical literature with which to address this problem, these methods have not been widely applied in practice. In this paper, we develop a Bayesian spatiotemporal nowcasting model for assessing trends in county-level COVID-19 cases in Ohio. We compare the performance of our model with the approach used in Ohio and the approach included in decision support materials from the Centers for Disease Control and Prevention. We demonstrate gains in performance while still retaining interpretability using our model. In addition, we are able to fully account for uncertainty in both the time series of cases and the reporting process. While we cannot eliminate all of the uncertainty in public health surveillance and subsequent decision-making, we must use approaches that embrace these challenges and deliver more accurate and honest assessments to policy-makers.

RI

Kline, David	K-8372-2019

OI

Kline, David	0000-0001-6183-3303
Liu, Enhao	0000-0002-9281-900X

SN 0002-9262

EI 1476-6256

PD MAY 20

PY 2022

VL 191

IS 6

BP 1107

EP 1115

DI 10.1093/aje/kwac034

DL http://dx.doi.org/10.1093/aje/kwac034

EA FEB 2022

UT WOS:000791038800001

PM 35225333

ER

PT J

AU Li, TL
White, LF

AF Li, Tenglong
White, Laura F.

TI Bayesian back-calculation and nowcasting for line list data during the COVID-19 pandemic

WR Ver registro completo no Web of Science

SO PLOS COMPUTATIONAL BIOLOGY

AB Author summary Interventions meant to control infectious diseases are often determined and judged using surveillance data on the number of new cases of disease. In many diseases, there are substantial delays between the time when an individual is infected or shows symptoms and when the case is

actually reported to a public health authority, such as the CDC. This reported data often collects information on symptom onset dates for some individuals. In this paper, we describe a method that imputes missing onset dates for all individuals and recreates the history of the disease progression in a population according to symptom onset dates, which are the best observable proxy available for infection dates. Our method also estimates the instantaneous reproduction number and is robust to many deviations from the assumptions of the model. We show, using a COVID-19 dataset from Massachusetts that our method accurately follows the implementation of control measures in the state.
Surveillance is critical to mounting an appropriate and effective response to pandemics. However, aggregated case report data suffers from reporting delays and can lead to misleading inferences. Different from aggregated case report data, line list data is a table contains individual features such as dates of symptom onset and reporting for each reported case and a good source for modeling delays. Current methods for modeling reporting delays are not particularly appropriate for line list data, which typically has missing symptom onset dates that are non-ignorable for modeling reporting delays. In this paper, we develop a Bayesian approach that dynamically integrates imputation and estimation for line list data. Specifically, this Bayesian approach can accurately estimate the epidemic curve and instantaneous reproduction numbers, even with most symptom onset dates missing. The Bayesian approach is also robust to deviations from model assumptions, such as changes in the reporting delay distribution or incorrect specification of the maximum reporting delay. We apply the Bayesian approach to COVID-19 line list data in Massachusetts and find the reproduction number estimates correspond more closely to the control measures than the estimates based on the reported curve.

OI

White, Laura F	0000-0002-0588-8235
Li, Tenglong	0000-0002-5243-1254

SN 1553-734X
EI 1553-7358
PD JUL
PY 2021
VL 17
IS 7
AR e1009210
DI 10.1371/journal.pcbi.1009210
DL http://dx.doi.org/10.1371/journal.pcbi.1009210
UT WOS:000674291100001
PM 34252078
ER