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政策科学総合研究事業（政策科学推進研究事業）

診療現場の実態に即した医療ビッグデータ（NDB等）を
利活用できる人材育成促進に資するための研究

総合研究報告書

令和3年度～4年度 総合研究報告書

研究代表者 康永秀生

令和5（2023）年 5月

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令和3・4年度厚生労働行政推進調査事業費補助金
政策科学総合研究事業（政策科学推進研究事業）
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診療現場の実態に即した医療ビッグデータ（NDB等）を利活用できる人材育成促進に資するための研究

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研究分担者	中山健夫	京都大学医学研究科健康情報学分野	教授
研究分担者	田宮菜奈子	筑波大学医学医療系ヘルスサービスリサーチ	教授
研究分担者	笹渕裕介	自治医科大学データサイエンスセンター	講師

NDB・DPC等の医療ビッグデータ解析に精通した研究者を育成することは急務である。研究代表者・康永秀生の分担研究「ビッグデータ研究実践能力およびデータハンドリング技術養成プログラムの実践」では、令和3年度において、(1) NDBのeラーニング型コンテンツおよびオンデマンド型教育ビデオコンテンツの新規開発、(2) オンサイトセンターの利活用の検討、(3) 大規模データ(NDB,DPC,JMDCデータ等)を用いた研究の実践を行った。令和4年度においては、令和3年度に開発したコンテンツ（NDBのeラーニング型教育コンテンツやオンデマンド型教育用ビデオコンテンツから構成される20コンテンツ）を用いた人材育成プログラムを実践した。また、大規模データ(NDB,DPC,JMDCデータ等)を用いた研究を継続的に実践した。

研究分担者・中山健夫らの分担研究「NDBデータ研究の実践と人材育成プログラム開発・検証」では、令和3・4年度において、アカデミアにおける研究者養成とは異なる形式での保健医療介護ビッグデータ研究人材育成の可能性について検討した。

研究分担者・田宮菜奈子らの分担研究「医療・介護データ活用による研究・人材育成」では、令和3・4年度において、医療・介護保険レセプトデータやDiagnosis Procedure Combination (DPC)データなどの医療ビッグデータを用いた研究を推し進め、特に博士課程・研修医・若手教員を対象にした人材育成に一層力を入れた。

研究分担者・笹渕裕介らの分担研究「診療現場の実態に即した医療ビッグデータ（NDB等）を利活用できる人材育成促進に資するための研究」では、令和3年度に研究計画立案、統計解析用ソフトウェアRについて双方向型オンラインプログラムの開発に着手し、令和4年度にその開発を行い、研究者へ提供した。

今回我々が実践した研究は、NDBばかりでなくあらゆる保健・医療・介護ビッグデータに対応できる人材育成に関連するものである。開発されたプログラムやそれに基づく研究を継続的に実践することにより、ビッグデータのデータハンドリング、データベースマネジメントに関する総合的な技術を持つ研究者を多数輩出できる。また、日常臨床のクリニカル・クエスチョンを既存のビッグデータを用いて解明する研究実践能力を持つ研究者を多数輩出できる。さらに、データハンドリング技術と臨床研究実践能力の両方に長けた人材を多数育成でき、それによりわが国の医療ビッグデータ研究の進歩を加速できる。

A. 研究目的

近年、NDB・DPCなどの保健医療ビッグデータや介護ビッグデータを用いた大規模データベース研究が拡大している。これらの研究をさらに発展させるためには、臨床医

学・疫学・統計学の知識に加えて、データベースに関連する知識や技能に精通した人材の育成が必須である。

研究代表者の康永秀生、研究分担者の中山健夫、田宮菜奈子、笹渕裕介は、長年にわ

たるビッグデータ研究の実績があり、各機関においてビッグデータ研究の人材育成も担ってきた。康永は東京大学の、中山は京都大学の NDB オンサイトセンターの運営にもあたっている。NDB データを研究用のデータセットに転換する際に存在する数多くの落とし穴の洗い出しや NDB データの処理方法などは、オンサイトセンターの研究プロジェクトで既に明らかにしてきた。本研究では、康永・笹渕は NDB・DPC 等、中山は NDB データ等、田宮は介護データ等の人材育成プログラム開発・実践、およびビッグデータ研究の実施・指導を担当した。

先行の研究班のもとに、ビッグデータ研究利活用のための若手研究者コンソーシアムを立ち上げた。疫学・統計学・医療情報学等の社会医学系研究者に加えて、臨床医学、健康科学・看護学などの若手研究者も多数参画した。研究班メンバーが若手研究者を直接指導し、そこで日夜培われ開発される個別技術（データハンドリング技術、観察研究における統計解析技術など）を体系化・一般化し、既存の知識と合わせた、種々のビッグデータに応用可能な教育プログラムを開発してきており、これをさらに継続した。

研究代表者・康永秀生の分担研究「ビッグデータ研究実践能力およびデータハンドリング技術養成プログラムの実践」では、令和 3 年度に（1）NDB の e ラーニング型コンテンツおよびオンデマンド型教育ビデオコンテンツの新規開発、（2）オンサイトセンターの利活用の検討、（3）大規模データ（NDB,DPC,JMDC データ等）を用いた研究の実践を行った。令和 4 年度には、令和 3 年度に開発したコンテンツ（NDB の e ラーニング型教育コンテンツやオンデマンド型教育ビデオコンテンツから構成される 20 コンテンツ）を用いた人材育成プログラムを実践した。また、大規模データ（NDB,DPC,JMDC データ等）を用いた研究を継続的に実践した。

研究分担者・中山健夫らの分担研究「NDB データ研究の実践と人材育成プログラム開発・検証」では、アカデミアにおける研究

者養成とは異なる形式での保健医療介護ビッグデータ研究人材育成について検討した。

研究分担者・田宮菜奈子らの分担研究「医療・介護データ活用による研究・人材育成」では、本研究分担班では、医療・介護保険レセプトデータや Diagnosis Procedure Combination (DPC) データなどの医療ビッグデータを用いた研究を推し進め、特に修士・博士課程学生や若手医師を対象にした人材育成に一層力を入れた。

研究分担者・笹渕裕介らの分担研究「診療現場の実態に即した医療ビッグデータ（NDB 等）を利活用できる人材育成促進に資するための研究」では、令和 3 年度研究結果を元に、令和 4 年度は研究計画立案、統計解析用ソフトウェア R について双方向型オンラインプログラムの開発を行い、研究者へ提供した。

B. 研究方法

1. ビッグデータ研究実践能力およびデータハンドリング技術養成プログラムの実践

研究代表者・康永秀生らの分担研究では、令和 3 年度に以下を実施した。

（1）NDB 用教育プログラムの新規開発
NDB 教育プログラムとして、新たに e ラーニング型コンテンツおよびオンデマンド型教育ビデオのコンテンツの開発を行った。

(i) NDB ガイドラインの理解のための e ラーニング型コンテンツ

(ii) NDB の概要の理解のための e ラーニング型コンテンツ

(iii) オンサイトセンター利用に関するオンデマンド型教育コンテンツの開発

(iv) Docker の導入に関するオンデマンド型教育コンテンツの開発

令和 3 年度に実施した上記（1）に基づき、令和 4 年度には下記を実践した。

（2）令和 3 年度に開発したプログラムを用いた人材育成の実践

先行研究において、ビッグデータ研究実践能力養成プログラムおよびビッグデータハンドリング技術養成プログラムを開発した。前者は、日常臨床からクリニカル・クエスチョンを紡ぎ出し、検証可能なリサーチ・クエスチョンに構造化し、既存のビッグデータを用いてリサーチ・クエスチョンを解き明かす臨床研究・疫学研究・ヘルスサービスリサーチの実践能力を養成するプログラムである。後者は、テラバイト級のデータベースから個別の研究目的に沿うデータセットを抽出するデータハンドリング技術、膨大なテキストデータを含む大規模かつ複雑な構造のデータを研究用の扱いやすいデータベースに再構築するなどのデータベースマネジメント技術を養成するプログラムである。上記について、現下のコロナ禍の状況においても教育実践が可能となるように、令和3年度にオンラインによるプログラムに改良し、令和4年度にプログラムを実践した。

具体的には、「NDB・DPC データベース研究人材育成 Webinar」を2023年1月10日(火)～1月20日(金)に開催した。Webによる動画配信(講義とeLearning)の形式とした。申請者に事前に登録してもらったアドレスに動画のURLを送信し、オンデマンドで視聴してもらった。配信期間中は全ての講義をいつでも視聴することを可能とした。

20 講義のタイトルは下記のとおりである。

1. NDB・DPC 等の公的データベースの動向
2. NDB ガイドラインの理解度テスト
3. SQL 入門
4. SQL を用いたレセプトデータのハンドリング
5. NDB を用いた研究
6. DPC データを用いた研究 1
7. DPC データを用いた研究 2
8. DeSC データを用いた研究
9. JMDC データを用いた研究
10. 傾向スコア
11. 高次元傾向スコア
12. 操作変数法
13. 不連続回帰デザイン・差の差分析
14. 時間依存性交絡と周辺構造モデル

15. 生存時間分析における競合リスクモデル
16. 欠測データの取り扱いと多重代入法
17. マルチレベル分析
18. 自己対照ケースシリーズ
19. 機械学習
20. データベースにおけるバリデーション研究

(3) 大規模データベースを用いた研究の実践

これまでの人材育成プログラムの内容に沿って、日常臨床からクリニカル・クエスチョンを紡ぎ出し、検証可能なリサーチ・クエスチョンに構造化し、NDB,DPC,JMDC データ等を用いた臨床研究・疫学研究・ヘルスサービスリサーチを、令和3・4年度に継続的に実践した。

◆倫理面への配慮について

NDB、DPC、介護データなどあらゆるデータは、すべての個人情報削除されている。NDB データは東大オンサイトセンターでの利用に限られた。

その他のデータは東京大学のサーバー室内で厳重に管理される。データベースから研究プロジェクトごとに切り出されたデータセットは内部での利用に限られ、データセットのコピーの持ち出しは禁止とされている。本研究は東京大学の倫理委員会に倫理申請を行い承認を得た。

2. NDBデータ研究の実践と人材育成プログラム開発・検証

研究分担者・中山健夫らの分担研究では、令和3・4年度を通して以下を実施した。

京都大学は2019年度より文部科学省の助成を受け、関西広域の計13大学とコンソーシアムを構築して「関西広域・医療データ人材育成拠点形成事業 (Kansai Union / Kyoto University Education Program for Digital Health Innovation: KUEP-DHI. 責任者: 黒田知宏・京都大学医学部附属病院医療情報企画部教授)」に取り組んでいる。本事業は医療現場から大規模に収集される多様なデータの利活

用を推進し、質の高い医療を実現するため、医療データの活用基盤を構築・運営する人材、医療データを利活用できる人材を育成することを旨とするものである。KUEP-DHIの根幹は、大学院生（主に修士学生）を対象とした「医療データ取扱専門家育成コース」であり、京都大学大学院医学研究科と同大大学院情報学研究科に追加履修コースとして設置されている。次世代医療基盤法や保健医療データプラットフォームに蓄積されるデータを活用し、医療データサイエンスの国際的牽引役を担えるよう本邦の医療データサイエンスを発展させるために、医療データが生まれてから活用されるまでの情報流の始点から終点までを確実に支え、正しく統制できる人材を育成することを旨としている。

本研究は同事業の一環として実施されている2つの社会人向けインテンシブコースの運営経験に基づく事例検討である。

3. 医療・介護データ活用による研究・人材育成

研究分担者・田宮菜奈子らの分担研究では、令和3・4年度を通して、若手研究者による医療・介護ビッグデータ活用による論文を2本、および学会発表を1回行った。解析及び論文執筆は、研究分担者（田宮）および研究協力者（岩上）の指導のもと、筑波大学医学医療系ヘルスサービスリサーチ分野に所属する博士課程学生および研修医が行った。

4. 診療現場の実態に即した医療ビッグデータ（NDB等）を利活用できる人材育成促進に資するための研究

研究分担者・笹渕裕介らの分担研究では、令和3・4年度を通して以下を実施した。

①これまで自治医科大学データサイエンスセンターにおいて医療ビッグデータを利用した研究を行っている研究者、大学院生に対して必要なプログラムについて意見交換を行った。

②研究者・大学院生の意見を元にこれまでに作成した医療ビッグデータハンドリング教育プログラムから双方向型オンラインプログラムを開発するコンテンツの選別を行った。

③選別したコンテンツに関する双方向型のオンラインプログラムを開発した。

④実際にプログラムを提供し医療ビッグデータ研究実施へとつなげた。

C. 研究結果

1. ビッグデータ研究実践能力およびデータハンドリング技術養成プログラムの実践

(1) NDB用教育プログラムの新規開発

(i) NDBガイドラインの理解のためのeラーニング型コンテンツ

匿名レセプト情報・匿名特定健診等情報の提供に関するガイドラインに沿って、ガイドラインの理解を確認する設問を作成した。

(ii) NDBの概要の理解のためのeラーニングコンテンツ

NDBの構造、ID、レセプトの構造化などの学習に引き続き、実際のSQLクエリを書く演習も組み合わせたコンテンツを作成した。

(iii) オンサイトセンター利用に関するオンデマンド教育コンテンツの開発

NDB 東京大学オンサイトセンターの運用方法を整備した。外部利用者向けの利用手続き、利用上の注意などを整理した。さらにこれらについてのチュートリアルとなるオンデマンド教育コンテンツを作成した。

(iv) Dockerの導入に関するオンデマンド教育コンテンツの開発

Dockerを用いたNDB解析環境の構築の可能性について検討した。

(2) 令和3年度に開発したプログラムを用いた人材育成の実践

期間中、参加登録者は1,158名であった。内訳は、医療従事者717人（医師411人、薬剤師87人、看護師60人、歯科医師10人、その他コメディカル149人）、製薬会社187人、医療機器メーカー10人、保険会社6人、コンサルティング会社13人、医療IT企業26人、生物統計家6人、データサイエンティスト48人、診療情報管理士3人、審査支

払機関 5 人、CRO18 人、学生 54 人、教員 18 人、研究員 21 人、その他 26 人であった。アンケート回答はのべ 7411 人から得た。受講した一人当たり平均のアンケート回答回数は 6.4 回であった。

Q1.本講義の難易度について、「とてもわかりやすい」と「わかりやすい」を合計した割合は、講義番号 3,5,6,7,8,9,10,16,17,18,20 は 90%を超え、課題番号 1,4,11,12,13,14,15,19 は 80%を超えていたのに対し、講義番号 2 は 49%と低かった。

Q2.本講義の進行速度について、いずれの課題番号も「ちょうどよい」が 80%を超えていた。

Q3.本講義の満足度について、「とても満足」と「満足」を合計した割合は、講義番号 1,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,20 は 90%を超え、講義番号 15,19 は 80%を超えていたのに対し、講義番号 2 は 59%と低かった。

なお、参加者の属性に関わらず、これらの傾向は一定であった。

(3) 大規模データベースを用いた研究の実践

大規模データベース(NDB,DPC,JMDC データ等)を用いた研究を行い、2021 年中に 106 編、2022 年中に 116 編の英文原著研究論文を出版した。その成果は「G. 研究発表」の一覧に示す。

2. NDBデータ研究の実践と人材育成プログラム開発・検証

KUEP-DHI では大学院生という立場に依らず、企業の勤務者等、社会人を想定して次の 2 種類のインテンシブコースを提供している。

(1)DHIEP Program(ディープ プログラム. 責任者: 奥野恭史・京都大学大学院医学研究科ビッグデータ医科学教授) Data-driven Healthcare Innovation Evangelist Promotion Program 分析だけを請け負う従来型データサイエンティストではなく、ライフサイエンス・ヘルスケア領域に深い造詣を有し、社会変革を実現しうる人材育成を目指すプログラム。対象は医療データの利活用を

志す個人であり、個人参加、登録等も個人で行う。出願資格は大卒資格を有する者で、ライフサイエンス・IT 関連企業に所属する者及び今後当該領域に参入を検討している者、医療従事者、地方自治体職員、規制当局関係者、大学院生など定員は 20 名。カリキュラムの修業期間は半年間であり、大きく経営・社会変革、医学・生命科学、情報・データサイエンスの 3 領域で基礎知識を e-learning で学び、必修科目 45 時間(プレゼンテーション・コミュニケーション、環境・市場理解、ビジネスモデリング、デザインシンキング、チェンジマネジメント、医療情報倫理学、バイオインフォマティクス、可視化、AI・機械学習など)、選択科目 21 時間(ゲノム医療、IT 創薬、ライフサイエンスデータベース、時系列分析、テキストマイニング、ベイジアンネットワーク等)、実習(必修) 20 時間(医療データから患者を層別化し、診断アプローチを提案、既存データベースを活用して分子標的探索を行い現状プロセスの改善点を提案、電子カルテの副作用情報を用いたドラッグリポジショニングの探索、ライフログと医療データを用いた生活の中からの医療シーズの発見等)で構成されている。修了要件は、合計 60 時間以上の履修と各科目評価での合格(修了要件を満たせば、履修証明書が授与される)。受講料は社会人が 50 万円(税抜)、大学官公庁等の職員と大学院生は無料である。

(2)医療データ人材育成拠点形成事業ビジネス特化型インテンシブコース Kansai Union / Kyoto University Education Program for Digital Health Innovation directly on themes of business (KUEP-DHI dot.b. 運営委員長:中山健夫・京都大学大学院医学研究科社会健康医学系専攻健康情報学教授):民間(企業)のニーズを踏まえつつ、医療データの活用に造詣のある人材を育成していくことを目的とするプログラム。対象は医療データ利活用に造詣のあるスタッフを確保したい企業であり、個人参加ではあるが、契約は企業-大学間で締結する。

育成する人材像は参加者が所定のプログラムを終えられた後には、各企業に戻り、医療データを企業内で有効かつ安全に利用する方針を立案したり、使用できるデータを適切に活用したりすることで有用な商品やビジネス等の開発に繋げ、社会に貢献できる人材を想定。到達目標は

次の通りである。

- ・医療データを活用するための知識を系統立てて理解し、応用できる。
- ・医療データの活用に必要な現場感覚をもとに、医療データを分析して結果を解釈できる。

プログラムの内容は、dot.b 独自の講義、大学院の既存科目については科目等履修制度の活用、文献抄読、分析実習、臨床講義・実習、グループ演習で構成されている。分析実習では NDB オープンデータ等を用いた R、SQL 等の利用、グループ演習では、NDB 申出の練習や実際の NDB サンプルデータセットを用いた分析を実施している。また臨床講義・実習では、電子カルテ入力体験により、電子カルテの自習環境の操作、電子カルテのインターフェイスの理解、予め提示された模擬患者に対し、医師になったつもりでのカルテ記入等を通して、入力されるデータの背景とリアリティを実感できる機会を提供している。グループ演習では、EBM の PECO (patient, exposure, comparison, outcome) 形式を学び、構造化された研究計画を立ててデータを抽出し分析するという、データベース研究の一連のプロセスを提供している。dot.b プログラムは、参加者個人と契約を行うのではなく、まず本プログラムの趣旨に賛同する企業を募り、大学と有償の共同研究契約を締結する。そして各企業内で参加の該当者を選定し、プログラムに派遣する。参加者は京都大学と各企業の共同研究のプロジェクト研究員として、プログラム参加期間中は、京都大学での立場を持つことができ、京都大学の各種リソースを一定の条件で利用できる。

コースは 2020 年度から開始され、2020 年度には 6 社・9 名、2021 年度は 3 社・4 名、2022 年度は 7 社・8 名が参加した。また、各年度の参加者が一同に会して NDB を分析する演習を行い、コース修了者との関係を維持し、参加者間の繋がりを深化させる機会を提供している。

3. 医療・介護データ活用による研究・人材育成

令和 3 年度には以下の 3 論文を出版した。

論文 1 : Factors Associated with Outpatient Cardiac Rehabilitation Participation in Older Patients: A Population-Based Study

Using Claims Data from Two Cities I Japan (Annals of Clinical Epidemiology 2022;4(1):11-19)

論文 2 : Comparison of patient characteristics and in-hospital mortality between patients with COVID-19 in 2020 and those with influenza in 2017-2020: a multicenter, retrospective cohort study in Japan (Lancet Reg Health West Pac. 2022 Mar;20:100365.)

論文 3 : Association between pre-admission anticoagulation and in-hospital death, venous thromboembolism, and major bleeding among hospitalized COVID-19 patients in Japan (Pharmacoepidemiol Drug Saf. 2022 Mar 24.)

令和 4 年度には以下の 2 論文を出版し、1 つの学会発表を行った。

1. Evaluation of enhanced home care support clinics regarding emergency home visits, hospitalization, and end-of-life care: a retrospective cohort study in a city of Japan (BMC Health Serv Res. 2023 Feb 3;23(1):115.)
2. Pulse Methylprednisolone versus Dexamethasone in COVID-19: A Multicenter Cohort Study. (Crit Care Explor. 2023;5(4):e0886.)
3. 高齢 COVID-19 入院患者における入院早期リハビリテーションと在院死亡との関連 (2022 年度第 5 回日本臨床疫学会)

以上のように、医療・介護ビッグデータを有効に活用し新たな医学的知見を得ることができた。また、研究計画立案から、データクリーニング、統計解析、論文執筆、論文投稿、レビューワーとのやり取り、までの一連の流れについて、次世代を担う若手に経験してもらおうと共に、明確な成果物として世に発信することができた。今回の論文執筆をきっかけに、今後の活躍が期待できる。

4. 診療現場の実態に即した医療ビッグデータ (NDB 等) を利活用できる人材育成促進に資するための研究

①②特に統計解析のプログラムは双方向型であることが習得の近道であるとの意見が

多かった。また、ほぼすべての研究者、大学院生から研究計画立案について知識が足りないことについて教育を受ける機会が不十分であるとの意見があった。そこで研究者にとって必要性の高い研究計画および統計ソフトウェア R についての双方向型オンラインプログラムの開発を行うこととした。

双方向型教育プログラムのコンテンツ

(1) 研究計画立案

研究計画の立案について教育を受ける機会が少ない、書籍等での学習と自身での計画立案にはギャップがあり、自力でそのギャップを埋めることが難しい等の意見を得た。そこで、研究計画立案に際して必須の以下の項目について双方向型オンラインプログラムの開発を行った。具体的には講義に加えて、実践的な作業を行うことができるような研究計画立案に関する課題を設定し、それを解くことで能動的に講義の内容を理解できるようなコンテンツとした。テーマは以下のとおりである。

- ・クリニカルクエスチョン (CQ) からリサーチクエスチョン (RQ) への作り変え
- ・FINER による RQ の評価
- ・文献検索
- ・研究デザイン
- ・抽出変数の定義

(2) R による統計解析

R に関して令和 2 年度までに開発した e-learning プログラムを改良し、以下の項目について双方向型オンライン教育プログラムの開発を行った。具体的には講義中に実際に自分でスクリプトを書くことで R の基本的な使用方法を理解することに加えて、講義の内容を反映した課題を設定し、それを解くことで能動的にスクリプトを書くことができるようなコンテンツとした。テーマは以下のとおりである。

- ・データの整形
- ・各変数の集計及び可視化
- ・検定
- ・回帰分析

③研究計画立案、R による統計解析に関して動画撮影が終了し、オンラインプログラムとして使用可能なプログラムの開発が完了した。

④プログラムを自治医科大学データサイエンスセンターにおいて大学院生、客員研究員、共同研究者に提供した。提供を受けた複数の研究者により研究計画の立案から論文発表まで行われた。

D. 考察

本研究は、わが国のビッグデータ研究において不足している「人材育成」を最重視し、ビッグデータ研究のための種々の技術を一般化し体系的なプログラムを構築した上で、それらを多数の研究者等に利活用してもらえようように社会実装を試みる点が、既存研究にない独創的な点である。

1. ビッグデータ研究実践能力およびデータハンドリング技術養成プログラムの実践

本プログラムの内容の多くは実質的に既に研究代表者を中心とする研究チームで実践されてきたものを踏襲しており、それらを用いて多くの論文投稿・出版の実績を挙げてきた。その実績を以て、すでにその効果は実証済みである。本研究は、それを体系化・一般化する試みである。

多数の大規模データ研究・論文執筆を通して用いられてきた個別技術(データハンドリング技術、観察研究における統計解析技術、など)を体系化・一般化し、既存の知識と合わせて、種々のビッグデータに応用可能な人材育成プログラム version 1 を 2017 年度に最初に開発した。これを 2018 年度に実施し、その効果を検証した。2019 年度研究においては、2018 年度の実践結果を踏まえて、プログラムを改良し、人材育成プログラム ver.2 を作成し、同年度に実施した対面型セミナーの評価結果は概ね良好であった。さらにプログラムの利用者拡大のため、2020 年度にはオンライン教育プログラムの作成を行った。評価結果は極めて良好であった。

さらに 2021 年度は上記の開発を行い、2022 年度にリリースした。

上記のすべては、厚生労働省が進める NDB 高度利活用 に直接反映される研究である。NDB ばかりでなく、あらゆる保健・医療・介護ビッグデータに対応できる人材育成を図ることにより、大規模データのデータハンドリング、データベースマネジメント

等に関する総合的な技術を持つ人材を多数育成できる。

データハンドリング技術と臨床研究実践能力の両方に長けた人材を多数育成することにより、わが国の大規模医療データベース研究の進歩を加速でき、それによってわが国発のエビデンスを量産できることが期待される。

2. NDBデータ研究の実践と人材育成プログラム開発・検証

研究分担者・中山健夫らの分担研究では、

「関西広域・医療データ人材育成拠点形成事業」における2種類の社会人向けインテンシブコースの経験から、データサイエンスの人材育成に関するいくつかの知見を得た。下記に抜粋して記述する。

- ・医療者でない参加者の場合、医療データ以前の「医療そのもの」への距離感が大きいいため、プログラム提供に当たっては、そのギャップを十分意識することが必要。

- ・NDB等の実際のデータに触れることは学習者のモチベーションを大きく高め得る。

- ・「公益性のある研究」としてNDB申出書を書くことの意義を体感することは大いに重要。

- ・医師の診断プロセスや、電子カルテ入力体験を通じた、「データが絶対とは限らない」「バリデーションが重要」という感覚の共有はきわめて重要。

- ・レセプトでの傷病名同定における投薬や処置の情報を理解することの重要性。

- ・医療の場で入力されている情報が必ずしも正確かつ網羅的とは言えないことの実感。

- ・模擬的なデータ分析体験を通じた、臨床研究への意識の高まり。

- ・「企業が求める人材育成」と「大学教育が想定する人材育成」の違いの認識。

- ・受講者ニーズと提供するコンテンツとのマッチングの重要性。

本プログラムは引き続き、より良いデータサイエンス人材育成の在り方、方向性を探っていきたい。

3. 医療・介護データ活用による研究・人材育成

医療・介護ビッグデータを有効に活用し新たな医学的知見を得ることができた。また、研究計画立案から、データクリーニング、統計解析、論文執筆、論文投稿、レビューワーとのやり取り、までの一連の流れについて、次世代を担う若手に経験してもらおうと共に、明確な成果物として世に発信することができた。今回の論文執筆をきっかけに、今後の活躍が期待できる。

4. 診療現場の実態に即した医療ビッグデータ（NDB等）を利活用できる人材育成促進に資するための研究

医療ビッグデータを用いた研究のための双方向型教育プログラムの作成にあたり、研究者・大学院生と意見交換を行い、研究者はデータハンドリングや統計解析に加えて研究デザインの教育も必要であることが明らかとなった。

当センターで行う研究についての研究計画の立案は分担者が個別に各研究者や大学院生に対して直接指導を行っている。令和2年度までにこれらの指導内容を体系化し、直接指導を行わなくとも保健医療ビッグデータ研究を行うためのデータハンドリングから解析までを習得可能な教育プログラムを開発し、研究者や大学院生に提供してきた。これらの教育プログラムによってビッグデータを用いた研究の実践を通して、学会発表・論文執筆につながった。しかしながらこれらの教育プログラムは一方向性であり、一部十分な習得に至らなかった部分に関して改良の余地が残されていた。本研究ではこれらの習得が不十分な点について、プログラム受講者から意見を集めることで特に研究者にとってデータハンドリングや統計解析に加えて研究計画の立案についても教育プログラムが必要であることが明らかとなった。

ずさんな研究計画のまま研究を開始すると、研究途中で様々な問題が生じ、研究自体が頓挫してしまうこともしばしば起こる。そのため、綿密な研究計画を立案する

必要がある。本研究で開発した研究計画立案のための双方向型オンライン教育プログラムはこれまで分担者が行ってきた指導をオンライン用に構築したものである。また、令和2年度までに開発したR習得e-learningプログラムを、動画視聴の合間に複数の課題を設定することにより能動的にRを習得することのできる双方向型のオンライン教育プログラムとして改良した。プログラム受講者からの評価は良好であったが、更に発展的な内容のプログラムを望む声も寄せられており、今後の課題とした。

本研究事業により開発した教育プログラムは医療ビッグデータを利活用できる人材育成につながったと考えられる。実際にプログラム受講者が研究デザインやデータハンドリングを行うことができるようになっており、研究成果として論文発表につながっている（G. 研究発表参照）ことから有用なプログラムであったことが示された。今後このプログラムをより多くの研究者へ提供していく予定である。

4つの研究を総括すると、下記のような貢献が期待できる。

近年、保健・医療・介護データのインフラ整備が進められているが、そのインフラを活用できる人材の育成に貢献し、今後待たれる医療・介護統合データベースの稼働の際には全省的な政策課題に関する研究・知見を提供することにも貢献できる。さらに、日常臨床のクリニカル・クエスチョンを既存のビッグデータを用いて解明する研究実践能力を持つ研究者を多数育成できる。さらに、データハンドリング技術と臨床研究実践能力の両方に長けた人材を多数育成することにより、わが国の医療ビッグデータ研究の進歩を加速できる。わが国の医療ビッグデータ研究の技術水準を世界トップレベルに向上させ、それによってわが国発のエビデンスを量産できることが期待される。

E. 結論

今回我々が実践した研究は、NDBばかりでなくあらゆる保健・医療・介護ビッグデータに対応できる人材育成に関連するものである。開発されたプログラムやそれに基づく研究を継続的に実践することにより、ビッグデータのデータハンドリング、データベースマネージメントに関する総合的な技術を持つ研究者を多数輩出できる。また、日常臨床のクリニカル・クエスチョンを既存のビッグデータを用いて解明する研究実践能力を持つ研究者を多数輩出できる。さらに、データハンドリング技術と臨床研究実践能力の両方に長けた人材を多数育成でき、それによりわが国の医療ビッグデータ研究の進歩を加速できる。

わが国の医療ビッグデータ研究の技術水準を世界トップレベルに向上させ、それによってわが国発のエビデンスを量産できることが期待される。様々なビッグデータ解析の結果は厚生労働行政に資する基礎資料として間接的に活用されることが期待される。さらに、英文論文化されたエビデンスは全世界の臨床家・公衆衛生実務家・民間企業のプラクティスに間接的に活用されるだろう。

また本研究を通じて、医療・介護ビッグデータ研究の後進の育成実績およびそのノウハウが順調に蓄積されている。これは、今後の医療人材のあるべき方向にも沿ったものであり、かつ学生や若手自身が自ら意欲的に取り組める内容でもあり、適切な指導により高い成果につながれることが示唆された。今後、以上の経験を生かし、それぞれの分野やレベルの違いに応じた医療・介護ビッグデータ人材教育の最適な方法論についてまとめていくことが必要であると考えられる。

F. 健康危険情報
なし

G. 研究発表

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<康永秀生>

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H. 知的財産権の出願・登録状況（予定を含む。）

1. 特許取得
なし
2. 実用新案登録
なし
3. その他
なし

研究成果の刊行に関する一覧表

書籍
なし

雑誌

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Kaneko H, Itoh H, Yotsumoto H, Kiriyaama H, Kamon T, Fujii K, Morita K, Michihata N, Jo T, Takeda N, Morita H, Yasunaga H, Komuro I	Impact of hospital volume on clinical outcomes of hospitalized heart failure patients: Analysis of a nationwide database including 447,818 patients with heart failure	BMC Cardiovascular Disorders	21	49	2021
Kaneko H, Itoh H, Kiriyaama H, Kamon T, Fujii K, Morita K, Michihata N, Jo T, Takeda N, Morita H, Yasunaga H, Komuro I	Possible association between eating behaviors and cardiovascular disease in the general population: Analysis of a nationwide epidemiological database	Atherosclerosis	320	79-85	2021
Kaneko H, Itoh H, Morita K, Sugimoto T, Konishi M, Kamiya K, Kiriyaama H, Kamon T, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yasunaga H, Komuro I	Early Initiation of Feeding and In-hospital Outcomes in Patients Hospitalized for Acute Heart Failure	American Journal of Cardiology	145	85-90	2021
Kaneko H, Itoh H, Kiriyaama H, Kamon T, Fujii K, Morita K, Michihata N, Jo T, Takeda N, Morita H, Yasunaga H, Komuro I	Lipid Profile and Subsequent Cardiovascular Disease among Adults Aged < 50 Years	American Journal of Cardiology	142	59-65	2021
Kaneko H, Itoh H, Kiriyaama H, Kamon T, Fujii K, Morita K, Michihata N, Jo T, Takeda N, Morita H, Yasunaga H, Komuro I	Fasting plasma glucose and subsequent cardiovascular disease among young adults: Analysis of a nationwide epidemiological database	Atherosclerosis	319	35-41	2021
Kaneko H, Itoh H, Yotsumoto H, Kiriyaama H, Kamon T, Fujii K, Morita K, Kashiwabara K, Michihata N, Jo T, Morita H, Yasunaga H, Komuro I	Cardiovascular Health Metrics of 87,160 Couples: Analysis of a Nationwide Epidemiological Database	Journal of Atherosclerosis and Thrombosis	28(5)	535-543	2021
Katsuki R, Jo T, Yasunaga H, Ishimaru M, Sakamoto T	Outcomes of Self-expandable Metal Stent as Bridge to Surgery versus Emergency Surgery for Left-sided Obstructing Colon Cancer: A Retrospective Cohort Study	Am J Surg	221(1)	168-173	2021
Katsuki Y, Jo T, Yasunaga H, Kumazawa R, Uda K	Outcomes of Laparoscopic versus Open Pancreatoduodenectomy: A Nationwide Retrospective Cohort Study	Surgery	169(6)	1427-1433	2021
Kawata M, Taketomi S, Inui H, Matsui H, Fushimi K, Yamagami H, Yasunaga H, Tanaka S	Type of bone graft and primary diagnosis were associated with nosocomial surgical site infection after high tibial osteotomy: analysis of a national database	Knee Surgery, Sports Traumatology, Arthroscopy	29(2)	429-436	2021
Kim HS, Cheng HS, Yamana H, Lee S, Yoon NH, Lin YC, Fushimi K, Yasunaga H	Variations in Hip Fracture Inpatient Care in Japan, Korea, and Taiwan: An Analysis of Health Administrative Data	BMC Health Services Research	21(1)	694	2021

Kiriyama H, Kaneko H, Itoh H, Kamon T, Morita K, Jo T, Fujii K, Daimon M, Takeda N, Morita H, Yasunaga H, Komuro I	Surgical Treatment for Infective Endocarditis in the Aging Society: a Nationwide Retrospective Study in Japan	Open Heart	8(1)	e001627	2021
Kitamura T, Nakajima M, Kawamura I, Kaszynski RH, Ohbe H, Sasabuchi Y, Matsui H, Fushimi K, Fukamizu S, Yasunaga H	Safety and effectiveness of intracardiac echocardiography in ventricular tachycardia ablation: A nationwide observational study	Heart and Vessels	36(7)	1009-1015	2021
Koizumi M, Ishimaru M, Matsui H, Fushimi K, Yamasoba T, Yasunaga H	Factors associated with the occurrence of stomal stenosis after tracheostomy in adults	Auris Nasus Larynx	48(5)	973-977	2021
Kondo Y, Ohbe H, Aso S, Matsui H, Fushimi K, Tanaka H, Yasunaga H	Efficacy of prophylactic antibiotics during extracorporeal membrane oxygenation: A nationwide cohort study	Annals of the American Thoracic Society	18(11)	1861-1867	2021
Konishi T, Fujiogi M, Michihata N, Kumazawa R, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Outcomes of nonoperative treatment for gastroduodenal ulcer perforation: a nationwide study of 14,918 inpatients in Japan	Journal of Gastrointestinal Surgery	25(11)	2770-2777	2021
Konishi T, Fujiogi M, Michihata M, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Association between body mass index and localization of breast cancer: results from a nationwide inpatient database in Japan	Breast Cancer Research and Treatment	185(1)	175-182	2021
Konishi T, Fujiogi M, Michihata N, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Comparison of short-term surgical outcomes between men and women with breast cancer: a retrospective study using nationwide inpatient data in Japan	Breast Cancer Research and Treatment	186(3)	731-739	2021
Konishi T, Fujiogi M, Michihata N, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Comparing outcomes of nonoperative treatment for adhesive small bowel obstruction with and without antibiotics	Journal of Infection and Chemotherapy	27(5)	690-695	2021
Konishi T, Fujiogi M, Michihata N, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Comparisons of postoperative outcomes after breast cancer surgery in patients with and without renal replacement therapy: a matched-pair cohort study using a Japanese nationwide inpatient database	Breast Cancer	28(5)	1112-1119	2021
Konishi T, Fujiogi M, Michihata N, Niwa T, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Impact of body mass index on short-term outcomes after differentiated thyroid cancer surgery: a nationwide inpatient database study in Japan	European Thyroid Journal	11(1)	e210081	2021
Konishi T, Fujiogi M, Michihata N, Tanaka-Mizutani H, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Breast cancer surgery in patients with schizophrenia: short-term outcomes from a nationwide cohort	British Journal of Surgery	108	168-173	2021
Kurakawa K, Okada A, Manaka K, Konishi T, Jo T, Ono S, Uda K, Michihata N, Matsui H, Fushimi K, Yamaguchi S, Yamauchi T, Nangaku M, Yasunaga H, Kadowaki T	Clinical characteristics and incidences of benign and malignant insulinoma using a national inpatient database in Japan	Journal of Clinical Endocrinology & Metabolism	106(12)	3477-3486	2021

Makito K, Matsui H, Fushimi K, Yasunaga H	Spinal epidural hematoma and abscess after neuraxial anesthesia: a historical cohort study using the Japanese Diagnosis Procedure Combination database	Canadian Journal of Anesthesia	68(1)	42-52	2021
Matsuda K, Jo T, Toyama K, Nakazaki K, Matsui H, Fushimi K, Yasunaga H	Efficacy of recombinant human soluble thrombomodulin in induction therapy for acute promyelocytic leukemia	Thrombosis Research	202	173-175	2021
Matsuda K, Ise M, Shimura A, Honda A, Masamoto Y, Jo T, Yasunaga H, Kurokawa M	Use of wide-spectrum antimicrobials with blood culture tests during chemotherapy as an accurate marker of febrile neutropenia in the DPC database: A validation study	Journal of Infection and Chemotherapy	27(10)	1541-1542	2021
Matsuda K, Jo T, Toyama K, Nakazaki K, Matsui H, Fushimi K, Yasunaga H, Kurokawa M	Risk factors for early in-hospital death in patients who developed coagulopathy during induction therapy for acute promyelocytic leukemia: a nation-wide analysis in Japan	Annals of Hematology	100(10)	2613-2619	2021
Matsuda K, Jo T, Miyauchi M, Toyama K, Nakazaki K, Matsui H, Fushimi K, Yasunaga H, Kurokawa M	Difference of preventing effects of G-CSF according to age in patients with malignant lymphoma: a nation-wide analysis in Japan	Journal of Infection and Chemotherapy	27(8)	1151-1155	2021
Matsuzaki S, Kaneko H, Yano Y, Itoh H, Fukui A, Morita M, Kiriya H, Kamon T, Fujiu K, Seki H, Michihata N, Jo T, Takeda N, Morita H, Nakamura S, Yokoo T, Nishiyama A, Node K, Yasunaga H, Komuro I	Association Between Blood Pressure Classification Using the 2017 ACC/AHA Blood Pressure Guideline and Retinal Atherosclerosis	American Journal of Hypertension	34(10)	1049-1056	2021
Miyamoto Y, Ohbe H, Ishimaru M, Matsui H, Fushimi K, Yasunaga H	Effect of tranexamic acid in patients with colonic diverticular bleeding: a nationwide inpatient database study	Journal of Gastroenterology and Hepatology	36(4)	999-1005	2021
Miyamoto Y, Ohbe H, Goto T, Yasunaga H	Association between intensive care unit admission of a patient and mental disorders in the spouse: a retrospective matched-pair cohort study	Journal of Intensive Care	9(1)	69	2021
Miyano S, Michihata N, Sada K, Uda K, Matsui H, Fushimi K, Nangaku M, Yasunaga H	Comparison of fracture risk between proton pump inhibitors and histamine-2 receptor antagonists in AAV patients: A nested case-control study	Rheumatology	60(4)	1717-1723	2021
Morita K, Fukahori H, Ogawara H, Iwagami M, Matsui H, Okura T, Itoh S, Fushimi K, Yasunaga H	Outcomes of a financial incentive scheme for dementia care by dementia specialist teams in acute-care hospitals: a difference-in-differences analysis of a nationwide retrospective cohort study in Japan	International Journal of Geriatric Psychiatry	36(9)	1386-1397	2021
Nakamura K, Ohbe H, Ikeda K, Uda K, Furuya H, Furuta S, Nakajima M, Sasabuchi Y, Matsui H, Fushimi K, Yasunaga H, Nakajima H	Intravenous cyclophosphamide in acute exacerbation of rheumatoid arthritis-related interstitial lung disease: a propensity-matched analysis using a nationwide inpatient database	Seminars in Arthritis and Rheumatism	51(5)	977-982	2021
Naruse K, Shigemi D, Hashiguchi M, Imamura M, Yasunaga H, Arai T	Placental abruption in each phenotype of hypertensive disorders of pregnancy: a retrospective cohort study using a national inpatient database in Japan	Hypertension Research	44(2)	232-238	2021

Oda K, Aso S, Hattori Y, Yamaguchi F, Matsui H, Fushimi K, Yasunaga H, Morita A	Snowfall reduces the risk of chronic subdural hematoma onset: Analysis of an administrative database in Japan	Surgical Neurology International	12	69	2021
Ohbe H, Nakamura K, Uda K, Matsui H, Yasunaga H	Effect of early rehabilitation on physical function in patients undergoing coronary artery bypass grafting: a nationwide inpatient database study	Journal of Clinical Medicine	10(4)	618	2021
Ohbe H, Matsui H, Fushimi K, Yasunaga H	Small-bore feeding tube versus large-bore sump tube for early enteral nutrition in mechanically ventilated patients: a nationwide inpatient database study	Clinical Nutrition	40(6)	4113-4119	2021
Ohbe H, Matsui H, Fushimi K, Yasunaga H	Epidemiology of Chronic Critical Illness in Japan: A Nationwide Inpatient Database Study	Crit Care Med	49(1)	70-78	2021
Ohbe H, Jo T, Matsui H, Fushimi K, Yasunaga H	Clinical trajectories of suicide attempts and self-harm in patients admitted to acute-care hospitals in Japan: a nationwide inpatient database study	Journal of Epidemiology	31(3)	231-236	2021
Ohbe H, Sasabuchi Y, Yamana H, Matsui H, Yasunaga H	Intensive care unit versus high-dependency care unit for mechanically ventilated patients with pneumonia: a nationwide comparative effectiveness study	The Lancet Regional Health - Western Pacific	13	100185	2021
Ohbe H, Yasunaga H	Spouse's cardiovascular disease as a risk factor for cardiovascular disease in middle-aged adults: a matched-pair cohort study	Circulation: Cardiovascular Quality and Outcomes	14(8)	e007649	2021
Ohbe H, Iwagami M, Sasabuchi Y, Yasunaga H	Increased risk of infective endocarditis after traumatic skin wound	Heart	107(23)	1868-1874	2021
Ohbe H, Jo T, Matsui H, Fushimi K, Yasunaga H	Effect of Daikenchuto for mechanically ventilated patients with enteral feeding intolerance: a propensity score-matched analysis using a nationwide administrative inpatient database	Journal of Parenteral and Enteral Nutrition	45(8)	1703-1713	2021
Ohbe H, Matsui H, Yasunaga H	Intensive care unit versus high-dependency care unit for patients with acute heart failure: a nationwide propensity score-matched cohort study	J Intensive Care	9(1)	78	2021
Ohbe H, Yamana H, Matsui H, Yasunaga H	Development and validation of a procedure-based organ failure assessment model for patients in the intensive care unit: an administrative database study	Acute Medicine & Surgery	8(1)	e719	2021
Okada A, Ono S, Yamaguchi S, Yamana H, Kurakawa K, Michihata N, Matsui H, Nangaku M, Yamauchi T, Yasunaga H, Kadowaki T	Association between nutritional guidance or ophthalmological examination and discontinuation of physician visits in patients with newly diagnosed diabetes: a retrospective cohort study using a nationwide database	Journal of Diabetes Investigation	12(9)	1619-1631	2021

Okada A, Yamana H, Morita K, Sato Y, Yamaguchi S, Kurakawa K, Michihata N, Matsui H, Fushimi K, Nangaku M, Yamauchi T, Yasunaga H, Kadowaki T	Potassium concentration in initial fluid therapy and in-hospital mortality of patients with diabetic ketoacidosis	Journal of Clinical Endocrinology & Metabolism	106(5)	e2162-e2175	2021
Okubo Y, Horimukai K, Michihata N, Morita K, Matsui H, Fushimi K, Yasunaga H	Association between early antibiotic treatment and clinical outcomes in children hospitalized for an asthma exacerbation	Journal of Allergy and Clinical Immunology	147(1)	114-122.e14	2021
Okubo Y, Michihata N, Morisaki N, Yoshida K, Matsui H, Fushimi K, Yasunaga H	Effects of glucocorticoids on hospitalized children with anaphylaxis	Pediatric Emergency Care	37(5)	255-259	2021
Ono S, Ishimaru M, Ida Y, Yamana H, Ono Y, Hoshi K, Yasunaga H	Validity of diagnoses and procedures in Japanese dental claims data	BMC Health Services Research	21(1)	1116	2021
Otaka S, Aso S, Matsui H, Fushimi K, Yasunaga H	Association between parenteral nutrition in the early phase and outcomes in patients with abdominal trauma undergoing emergency laparotomy: A retrospective nationwide study	Clinical Nutrition ESPEN	41	371-376	2021
Otaka S, Aso S, Matsui H, Fushimi K, Yasunaga H	Associations between early parenteral nutrition and in-hospital outcomes in underweight patients with gastrointestinal surgery	Clinical Nutrition ESPEN	43	464-470	2021
Sakamoto T, Fujiogi M, Matsui H, Fushimi K, Yasunaga H	Comparing perioperative mortality and morbidity of minimally invasive esophagectomy versus open esophagectomy for esophageal cancer: a nationwide retrospective analysis	Annals of Surgery	274(2)	324-330	2021
Sakamoto Y, Yamauchi Y, Jo T, Michihata N, Hasegawa W, Takeshima H, Matsui H, Fushimi K, Yasunaga H, Nagase T	In-hospital mortality associated with community-acquired pneumonia due to methicillin-resistant Staphylococcus aureus: a matched-pair cohort study	BMC Pulmonary Medicine	21(1)	345	2021
Sako A, Yasunaga H, Matsui H, Fushimi K, Yanai H, Gu Y, Ohmagari N	Hospitalization for Urinary Tract Infections in Japan, 2010–2015: A Retrospective Study Using a National Inpatient Database	BMC Infectious Diseases	21(1)	1048	2021
Sato D, Goto T, Uda K, Kumazawa R, Matsui H, Yasunaga H	Impact of national guidelines for antimicrobial stewardship to reduce antibiotic use in upper respiratory tract infection and gastroenteritis	Infection Control & Hospital Epidemiology	42	280–286	2021
Sato Y, Morita K, Okada A, Matsui H, Fushimi K, Yasunaga H	Factors affecting in-hospital mortality of diabetic ketoacidosis patients: A retrospective cohort study	Diabetes Research and Clinical Practice	171	108588	2021
Sawada R, Yamana H, Shinoda Y, Tsuda Y, Matsui H, Fushimi K, Kobayashi H, Matsubayashi Y, Yasunaga H, Tanaka S, Haga N	Predictive factors of 30-day mortality after surgery for spinal metastasis: Analysis of a nationwide database	Journal of Orthopaedic Science	26(4)	666-671	2021

Seki M, Kaneko H, Morita H, Itoh H, Morita K, Matsuoka S, Kiriyama H, Kamon T, Fujiu K, Michihata N, Jo T, Takeda N, Yano Y, Nakamura S, Node K, Yasunaga H, Komuro I	Relation of Serum Uric Acid and Cardiovascular Events in Young Adults Aged 20-49 Years	American Journal of Cardiology	152	150-157	2021
Shigemi D, Isogai S, Uda K, Aso S, Matsui H, Fushimi K, Yasunaga H	Association between rehabilitation during hospitalization and perinatal outcomes among pregnant women with threatened preterm birth	The Journal of Maternal-Fetal & Neonatal Medicine	34(7)	1028-1033	2021
Shigemi D, Hashimoto Y, Michihata N, Yasunaga H	Effect of Japanese herbal Kampo medicines on live birth rate in women with recurrent pregnancy loss	International Journal of Gynecology and Obstetrics	153(3)	489-495	2021
Shigemi D, Hashimoto Y, Michihata N, Yasunaga H	Impact of maternal depression and anxiety-related disorders on live birth rate in women with recurrent pregnancy loss	Human Fertility	20	1-8	2021
Shigemi D, Morishima T, Yamana H, Yasunaga H, Miyashiro I	Validity of initial cancer diagnoses in the Diagnosis Procedure Combination data in Japan	Cancer Epidemiology	74	102016	2021
Shinozaki N, Morita K, Matsui H, Jo T, Yasunaga H	Semisolid versus liquid nutrients and 30-day readmission in gastrostomy tube-fed patients: a propensity-matched analysis	Journal of Parenteral and Enteral Nutrition	45(4)	720-728	2021
Shiozawa M, Kaneko H, Itoh H, Morita K, Okada A, Matsuoka S, Kiriyama H, Kamon T, Fujiu K, Michihata N, Jo T, Takeda N, Morita H, Nakamura S, Node K, Yasunaga H, Komuro I	Association of Body Mass Index with Ischemic and Hemorrhagic Stroke	Nutrients	13(7)	2343	2021
Shirane S, Michihata N, Yoshiuchi K, Ariyoshi K, Iwase S, Morita K, Matsui H, Fushimi K, Yasunaga H	Evaluation of quality indicators near death in older adult cancer decedents in Japan: A nationwide retrospective cohort study	Japanese Journal of Clinical Oncology	51(11)	1643-1648	2021
Suzuki T, Michihata N, Aso S, Yoshikawa T, Saito K, Matsui H, Fushimi K, Yasunaga H	Sodium-containing versus sodium-trace preparations of IVIG for children with Kawasaki disease in the acute phase	European Journal of Pediatrics	180(11)	3279-3286	2021
Takano A, Yamana H, Ono S, Matsui H, Yasunaga H	Outpatient treatment following alcohol screening at health checkups and change in drinking patterns among excessive drinkers with lifestyle-related diseases	Preventive Medicine Reports	24	101549	2021
Takiguchi T, Ohbe H, Nakajima M, Sasabuchi Y, Tagami T, Matsui H, Fushimi K, Yokobori S, Yasunaga H	Intermittent versus continuous neuromuscular blockade during target temperature management after cardiac arrest: a nationwide observational study	Journal of Critical Care	62	276-282	2021
Takeuchi Y, Kumamaru H, Hagiwara Y, Matsui H, Yasunaga H, Miyata H, Matsuyama Y	Sodium-glucose cotransporter-2 inhibitors and the risk of urinary tract infection among diabetic patients in Japan: Target trial emulation using a nationwide administrative claims database	Diabetes, Obesity and Metabolism	23(6)	1379-1388	2021

Tanaka G, Jo T, Tamiya H, Sakamoto Y, Hasegawa W, Matsui H, Fushimi K, Yasunaga H, Nagase T	Factors affecting in-hospital mortality of non-tuberculous mycobacterial pulmonary disease	BMC Infectious Diseases	21(1)	1048	2021
Taniguchi K, Ohbe H, Yamakawa K, Matsui H, Fushimi K, Yasunaga H	Recombinant thrombomodulin in disseminated intravascular coagulation associated with stage IV solid tumors: a nationwide observational study in Japan	Thrombosis and Haemostasis	121(1)	36-45	2021
Tsuchiya A, Tsutsumi Y, Yasunaga H, Yasuda S, Yuzawa K, Kushimoto S	Long-term Functional Outcomes, Quality of Life, and Patient Trajectory in 1 Trauma Survivors: A Study Protocol	Annals of Clinical Epidemiology	3(2)	59-66	2021
Ugata Y, Michihata N, Matsui H, Fushimi K, Yasunaga H	Impact of proton pump inhibitors on mortality and severe esophageal injury after catheter ablation for atrial fibrillation: a nationwide retrospective study using propensity score matching	Heart and Vessels	36(11)	1730-1738	2021
Urushiyama H, Jo T, Hasegawa W, Ando T, Sakamoto Y, Uda K, Matsui H, Fushimi K, Yasunaga H, Nagase T	Preoperative use of pirfenidone and reduced risk of postoperative severe respiratory complications in patients with idiopathic pulmonary fibrosis: propensity score-matched analysis using a nationwide database in Japan	Respirology	26(6)	590-596	2021
Yagi M, Morita K, Matsui H, Michihata N, Fushimi K, Koyama T, Fujitani J, Yasunaga H	Outcomes after Intensive Rehabilitation for Mechanically-ventilated Patients: A Nationwide Retrospective Cohort Study	Archives of Physical Medicine and Rehabilitation	102(2)	280-289	2021
Yamamoto N, Ohbe H, Tomita Y, Yorifuji T, Nakajima M, Sasabuchi Y, Miyamoto Y, Matsui H, Noda T, Yasunaga H	Associations between early surgery and postoperative outcomes in elderly patients with distal femur fracture: a retrospective cohort study	Journal of Clinical Medicine	10(24)	5800	2021
Yamana H, Iba A, Tomio J, Ono S, Jo T, Yasunaga H	Treatment of latent tuberculosis infection in patients receiving biologic agents	Journal of Infection and Chemotherapy	27(2)	243-249	2021
Yamana H, Ono S, Michihata N, Jo T, Yasunaga H	Association between maoto use and hospitalization for seasonal influenza in a nonelderly cohort in Japan	Internal Medicine	60(21)	3401-3408	2021
Yamazaki R, Ohbe H, Matsuda Y, Kito S, Morita K, Matsui H, Fushimi K, Yasunaga H	Early electroconvulsive therapy in patients with major depressive disorder: a propensity score-matched analysis using a nationwide inpatient database in Japan	The Journal of ECT	37(3)	176-181	2021
Yasui H, Michihata N, Matsui H, Fushimi K, Iwase S, Yoshiuchi K, Sakata Y, Yasunaga H	Association between ambulance use and hospitalization costs among heart failure patients	Heart and Vessels	36(5)	654-658	2021
Yokoyama A, Sakamoto Y, Jo T, Urushiyama H, Tamiya H, Tanaka G, Matsui H, Fushimi K, Yasunaga H, Nagase T	Pulmonary disease as a risk factor for transfusion-related acute lung injury	ERJ Open Research	7(3)	00039-2021	2021
Yoshihara S, Yamana H, Akahane M, Kishimoto M, Nishioka Y, Noda T, Matsui H, Fushimi K, Yasunaga H, Kasahara K, Imamura T	Association between Prophylactic Antibiotic Use for Transarterial Chemoembolization and Occurrence of Liver Abscess: A Retrospective Cohort Study	Clinical Microbiology and Infection	27(10)	1514.e5-1514.e10	2021

Yoshii E, Yamana H, Ono S, Matsui H, Yasunaga H	Association between allergic or autoimmune diseases and incidence of endometriosis: A nested case-control study using a health insurance claims database	Am J Reprod Immunol	86(5)	e13486	2021
Abe H, Sumitani M, Matsui H, Inoue R, Fushimi K, Uchida K, Yasunaga H	Use of naldemedine is associated with reduced incidence of hyperactive delirium in cancer patients with opioid-induced constipation: a nationwide retrospective cohort study in Japan	Pharmacotherapy	42(3)	241-249	2022
Abe H, Sumitani M, Matsui H, Inoue R, Konishi M, Fushimi K, Uchida K, Yasunaga H	Gabapentinoid use is associated with reduced occurrence of hyperactive delirium in older cancer patients undergoing chemotherapy: a nationwide retrospective cohort study in Japan	Anesthesia & Analgesia	135(2)	362-369	2022
Aso S, Matsui H, Fushimi K, Yasunaga H	Effect of Dobutamine on Patients with Septic Shock: A Retrospective Nationwide Study	Annals of Clinical Epidemiology	4(2)	41-48	2022
Awano N, Jo T, Izumo T, Inomata M, Morita K, Matsui H, Fushimi K, Urushiyama H, Nagase T, Yasunaga H	Recombinant human soluble thrombomodulin for acute exacerbation of idiopathic pulmonary fibrosis: A nationwide observational study	Journal of Intensive Care	10(1)	14	2022
Chinen T, Sasabuchi Y, Matsui H, Yamaguchi H, Yasunaga H	Oxaliplatin- versus cisplatin-based regimens for elderly individuals with advanced gastric cancer: A retrospective cohort study	BMC Cancer	22(1)	460	2022
Fujita A, Hashimoto Y, Matsui H, Yasunaga H, Aihara M	Recent trends in glaucoma surgery: a nationwide database study in Japan, 2011–2019	Japanese Journal of Ophthalmology	66(2)	183-192	2022
Fujita A, Hashimoto Y, Okada A, Obata R, Aihara M, Matsui H, Yasunaga H	Association Between Proteinuria and Retinal Vein Occlusion in Individuals with Preserved Renal Function: A Retrospective Cohort Study	Acta Ophthalmologica	100(7)	e1510-e1517	2022
Fukui R, Kaneko H, Okada A, Yano Y, Itoh H, Matsuoka S, Morita K, Kiriya H, Kamon T, Fujiu K, Michihata N, Jo T, Takeda N, Morita H, Nakamura S, Nishiyama A, Node K, Yokoo T, Nangaku M, Yasunaga H, Komuro I	Semiquantitative assessed proteinuria and risk of heart failure: Analysis of a nationwide epidemiological database	Nephrology Dialysis Transplantation	37(9)	1691-1699	2022
Furuya H, Nakajima M, Ikeda K, Nakamura K, Ohbe H, Aso S, Kumazawa R, Iwamoto T, Iwata A, Furuta S, Matsui H, Fushimi K, Yasunaga H, Nakajima H	Prognosis and treatment of myositis-associated severe interstitial lung disease	Arthritis Care & Research	74(3)	478-483	2022
Fuseda Y, Michihata N, Kumazawa R, Fushimi K, Yasunaga H	Annual Trend in Lumbar Puncture for Infants Younger Than 3 Months Hospitalized with Suspected Serious Bacterial Infection: A Nationwide Inpatient Database Study	Pediatric Infectious Disease Journal	41(8)	631-635	2022
Hamada S, Nakajima M, Kaszynski RH, Otaka S, Goto H, Matui H, Fushimi K, Yamaguchi Y, Yasunaga H	Association between adjunct clindamycin and in-hospital mortality in patients with necrotizing soft tissue infection due to group A Streptococcus: A nationwide cohort study	European Journal of Clinical Microbiology & Infectious Diseases	41(2)	263-270	2022
Hashimoto Y, Kaneko H, Okada A, Matsui H, Yasunaga H, Aihara M, Obata R	Association between retinal vein occlusion and Life's Simple 7 cardiovascular health metrics: A large claims database study	Ophthalmology Retina	6(8)	684-692	2022
Hashimoto Y, Matsui H, Michihata N, Ishimaru M, Yasunaga H, Aihara M, Kaburaki T	Incidence of sympathetic ophthalmia after inciting events: a national database study in Japan	Ophthalmology	129(3)	344-352	2022
Hashimoto Y, Michihata N, Yamana H, Shigemi D,	Safety of topical ophthalmic antibiotics in pregnant women with hordeola,	EYE	36(5)	1066-1073	2022

Morita K, Matsui H, Yasunaga H, Aihara M	chalazia, blepharitis, or bacterial conjunctivitis: propensity score analyses				
Hashimoto Y, Yamana H, Michihata N, Shigemi D, Ishimaru M, Matsui H, Yasunaga H, Aihara M	Eye drops for dry eye disease during pregnancy and adverse neonatal outcomes: high-dimensional propensity score analyses	Ophthalmic Epidemiology	29(4)	384-393	2022
Hirano T, Nakajima M, Ohbe H, Kaszynski RH, Iwasaki Y, Arakawa Y, Sasabuchi Y, Fushimi K, Matsui H, Yasunaga H	Corticosteroid use with extracorporeal cardiopulmonary resuscitation for out-of-hospital cardiac arrest: A nationwide observational study	Resuscitation Plus	12	100308	2022
Hirano Y, Kaneko H, Konishi T, Itoh H, Matsuda S, Kawakubo H, Uda K, Matsui H, Fushimi K, Daiko H, Itano O, Yasunaga H, Kitagawa Y	Short-Term Outcomes of Epidural Analgesia in Minimally Invasive Esophagectomy for Esophageal Cancer: Nationwide Inpatient Data Study in Japan	Annals of Surgical Oncology	29(13)	8225-8234	2022
Hirose N, Morita K, Matsui H, Fushimi K, Yasunaga H	Association between nurse aide staffing and patient mortality after major cancer surgeries in acute care settings: A retrospective cohort study using a national inpatient database	Nursing and Health Sciences	24(1)	283-292	2022
Hirose N, Morita K, Matsui H, Fushimi K, Yasunaga H	Dose-response association between nurse staffing and patient outcomes following major cancer surgeries using a nationwide inpatient database in Japan	Journal of Clinical Nursing	31(17-18)	2562-2573	2022
Honda A, Michihata N, Iizuka Y, Uda K, Morita K, Mieda T, Takasawa E, Ishiwata S, Tajika T, Matsui H, Fushimi K, Yasunaga H, Chikuda H	Risk factors for severe lower extremity ischemia following venoarterial extracorporeal membrane oxygenation: An analysis using a nationwide inpatient database	Trauma Surgery & Acute Care Open	7	e000776	2022
Hosoi T, Yamana H, Tamiya H, Matsui H, Fushimi K, Akishita M, Yasunaga H, Ogawa S	Association between comprehensive geriatric assessment and polypharmacy at discharge in patients with ischaemic stroke: a nationwide retrospective cohort study	eClinicalMedicine	50	101528	2022
Inooka Y, Yamana H, Shinoda Y, Inokuchi H, Matsui H, Fushimi K, Yasunaga H, Haga N	Predictive factors for oral intake recovery after acute stroke: analysis of a Japanese nationwide inpatient database	Dysphagia	37(6)	1623-1632	2022
Ishimaru M, Ono S, Morita K, Matsui H, Hagiwara Y, Yasunaga H	Prevalence, incidence rate and risk factors of medication-related osteonecrosis of the jaw (MRONJ) in patients with osteoporosis and cancer: a nationwide population-based study in Japan	Journal of Oral and Maxillofacial Surgery	80(4)	714-727	2022
Ishimaru T, Fujiogi M, Michihata N, Konishi T, Morita K, Matsui H, Uda K, Fushimi K, Kawashima H, Fujishiro J, Yasunaga H	Perioperative Outcomes of Laparoscopically Assisted Anorectoplasty versus Conventional Procedures for Anorectal Malformation: A Retrospective Nationwide Database Study	Pediatric Surgery International	38(12)	1785-1791	2022
Itoh H, Kaneko H, Okada A, Suzuki Y, Fujiu K, Matsuoka S, Michihata N, Jo T, Nakanishi K, Takeda N, Morita H, Node K, Di Tullio MR, Homma S, Yasunaga H, Komuro I	Age-Specific Relation of Cardiovascular Health Metrics With Incident Cardiovascular Disease	American Journal of Cardiology	177	34-39	2022
Iwasaki Y, Ohbe H, Shigemi D, Fushimi K, Yasunaga H	Effect of antithrombin III among patients with disseminated intravascular coagulation in obstetrics: a nationwide observational study in Japan	BJOG: An International Journal of Obstetrics and Gynaecology	129(5)	805-811	2022
Kamijo K, Nakajima M, Shigemi D, Kaszynski RH, Ohbe H, Goto T, Sasabuchi Y, Fushimi K, Matsui H, Yasunaga H	Resuscitative endovascular balloon occlusion of the aorta for life-threatening postpartum hemorrhage: A nationwide observational study in Japan	The Journal of Trauma and Acute Care Surgery	93(3)	418-423	2022
Kamon T, Kaneko H, Itoh H, Okada A, Matsuoka S, Kiriyaama H, Fujiu K, Morita	Sex difference in the association between lipid profile and incident	Journal of Atherosclerosis and Thrombosis	29(10)	1475-1486	2022

K, Michihata N, Jo T, Takeda N, Morita H, Nakamura S, Node K, Yasunaga H, Komuro I	cardiovascular disease among young adults				
Kaneko H, Suzuki Y, Ueno K, Okada A, Fujii K, Matsuoka S, Michihata N, Jo T, Takeda N, Morita H, Kamiya K, Node K, Yasunaga H, Komuro I	Association of Life's Simple 7 with incident cardiovascular disease in 53,974 patients with cancer	European Journal of Preventive Cardiology	29(18)	2324-2332	2022
Kaneko H, Yano Y, Lee HH, Lee H, Okada A, Itoh H, Morita K, Fukui A, Fujii K, Suzuki Y, Matsuoka S, Nakamura S, Michihata N, Jo T, Takeda N, Morita H, Yokoo T, Nishiyama A, Node K, Viera AJ, Muntner P, Oparil S, Kim HC, Yasunaga H, Komuro I	Medication-Naïve Blood Pressure and Incident Cancers: Analysis of Two Nationwide Population-Based Databases	American Journal of Hypertension	35(8)	731-739	2022
Kaneko H, Yano Y, Suzuki Y, Okada A, Itoh H, Matsuoka S, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Node K, Viera AJ, Lima JAC, Oparil S, Lam CSP, Carey RM, Yasunaga H, Komuro I	Reduction in blood pressure for elevated blood pressure/ stage 1 hypertension according to the ACC/AHA guideline and cardiovascular outcomes	European Journal of Preventive Cardiology	29(14)	1921-1929	2022
Karakawa R, Konishi T, Yoshimatsu H, Fuse Y, Hashimoto Y, Matsui H, Fushimi K, Yano T, Yasunaga H	Comparison of short-term outcomes between pedicled- and free-flap autologous breast reconstruction	Breast Cancer	29(6)	1067-1075	2022
Kodama S, Jo T, Yasunaga H, Michihata N, Matsui H, Kumazawa R, Shirota Y, Fushimi K, Toda T, Hamada M	Outcomes of gastrointestinal cancer surgeries in Parkinson's disease patients: a nationwide study	Parkinsonism and Related Disorders	96	45-49	2022
Konishi T, Fujiogi M, Michihata N, Kumazawa R, Ohbe H, Matsui H, Fushimi K, Ogita M, Tanabe M, Seto Y, Yasunaga H	Interstitial lung disorders following postoperative radiotherapy with concurrent or sequential hormonal therapy for breast cancer: a nationwide database study in Japan	Breast Cancer	29(4)	688-697	2022
Konishi T, Fujiogi M, Michihata N, Matsui H, Tanabe M, Seto Y, Yasunaga H	Association between body mass index and incidence of breast cancer in premenopausal women: A Japanese nationwide database study	Breast Cancer Research and Treatment	194(2)	315-325	2022
Konishi T, Fujiogi M, Michihata N, Morita K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Association of operative day of the week with length of stay and total hospitalization costs in patients with partial mastectomy: a nationwide database study in Japan	JMA Journal	5(3)	319-327	2022
Konishi T, Fujiogi M, Michihata N, Ohbe H, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Cost-effectiveness analysis of trastuzumab monotherapy versus adjuvant chemotherapy plus trastuzumab in elderly patients with HER2-positive early breast cancer	Japanese Journal of Clinical Oncology	52(10)	1115-1123	2022
Konishi T, Fujiogi M, Sato A, Michihata N, Kumazawa R, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Short-term outcomes following breast cancer surgery with and without neoadjuvant chemotherapy: a nationwide administrative database study in Japan	Annals of Surgical Oncology	29(5)	3000-3010	2022
Konishi T, Fujiogi M, Shigemi D, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Risk factors for postoperative bleeding following breast cancer surgery: a nationwide database study of 477,108 cases in Japan	World Journal of Surgery	46(12)	3062-3071	2022
Konishi T, Fujiogi M, Shigemi D, Nishioka K, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Surgical and obstetric outcomes of breast cancer surgery during pregnancy: A nationwide database study in Japan	Breast Cancer Research and Treatment	195(3)	289-299	2022
Konishi T, Goto T, Fujiogi M, Michihata N, Kumazawa R,	New machine learning scoring system for predicting postoperative mortality in	Surgery	171(4)	1036-1042	2022

Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	gastroduodenal ulcer perforation: A study using a Japanese nationwide inpatient database				
Konishi T, Sakata A, Inokuchi H, Kumazawa R, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Treatments and outcomes of adult parapharyngeal and retropharyngeal abscess: 1,882 cases from a Japanese nationwide database	American Journal of Otolaryngology	44(2)	103770	2022
Konishi T, Takamoto T, Fujiogi M, Hashimoto Y, Matsui H, Fushimi K, Tanabe M, Seto Y, Yasunaga H	Laparoscopic versus open distal pancreatectomy with or without splenectomy: A propensity score analysis in Japan	International Journal of Surgery	104	106765	2022
Konishi T, Yoshimoto T, Fujiogi M, Yamana H, Tanabe M, Seto Y, Yasunaga H	Validity of operative information in Japanese administrative data: a chart review-based analysis of 1221 cases at a single institution	Surgery Today	52(10)	1484-1490	2022
Kumazawa R, Jo T, Matsui H, Fushimi K, Yasunaga H	Direct oral anticoagulants versus warfarin for secondary prevention of cerebral infarction and bleeding in older adults with atrial fibrillation	Journal of the American Geriatrics Society	70(7)	2029-2039	2022
Kurakawa KI, Okada A, Bessho K, Jo T, Ono S, Michihata N, Kumazawa R, Matsui H, Fushimi K, Yamaguchi S, Yamauchi T, Nangaku M, Kadowaki T, Yasunaga H	Major complications after percutaneous biopsy of native or transplanted liver in pediatric patients: A nationwide inpatient database study in Japan	BMC Gastroenterology	22(1)	395	2022
Kutsuna S, Ohbe H, Matsui H, Yasunaga H	Effectiveness of fluoroquinolone antimicrobials in addition to tetracyclines for Japanese Spotted Fever: A retrospective analysis using a national inpatient database	International Journal of Infectious Diseases	123	70-75	2022
Kutsuna S, Ohbe H, Matsui H, Yasunaga H	Delayed Tetracycline Initiation Increases Mortality Risk in Patients With Japanese Spotted Fever: Retrospective Analysis Using a National Inpatient Database	Open Forum Infectious Diseases	9(11)	ofac573	2022
Matsuda K, Jo T, Matsui H, Fushimi K, Yasunaga H, Sugimoto K	Institutional factors associated with early mortality of newly diagnosed acute promyelocytic leukemia	Blood Cancer Journal	12(12)	167	2022
Matsuda K, Jo T, Shimura A, Honda A, Taoka K, Masamoto Y, Matsui H, Fushimi K, Yasunaga H, Kurokawa M	Risk of febrile neutropenia in very elderly patients aged ≥ 80 years receiving their first cycle of R-CHOP regimen: a nationwide real-world study in Japan	British Journal of Haematology	197(3)	e37-e41	2022
Matsui H, Yamana H, Fushimi K, Yasunaga H	Development of deep learning models for predicting in-hospital mortality using an administrative claims database	JMIR Medical Informatics	10(2)	e27936	2022
Matsuoka S, Kaneko H, Kamon T, Suzuki Y, Yano Y, Okada A, Itoh H, Morita K, Fukui A, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Nakamura S, Yokoo T, Nishiyama A, Node K, Yasunaga H, Komuro I	Incorporation of Retinal Arteriosclerosis into Risk Stratification of Blood Pressure Category According to the 2017 ACC/AHA Blood Pressure Guideline	Journal of Atherosclerosis and Thrombosis	29(10)	1487-1498	2022
Matsuoka S, Kaneko H, Okada A, Fukui A, Yano Y, Itoh H, Morita K, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yamaguchi S, Nakamura S, Nishiyama A, Yokoo T, Node K, Yamauchi T, Nangaku M, Yasunaga H, Komuro I	Association between Proteinuria and Incident Colorectal Cancer: Analysis of a Nationwide Population-Based Database	BMJ Open	12(4)	e056250	2022
Matsuoka S, Kaneko H, Okada A, Itoh H, Suzuki Y, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Nakamura S, Node K, Yasunaga H, Komuro I	Association of retinal atherosclerosis assessed using Keith-Wagener-Barker system with incident heart failure and other atherosclerotic cardiovascular disease: Analysis of 319,501 individuals from the general population	Atherosclerosis	348	68-74	2022

Matsuoka S, Kaneko H, Okada A, Morita K, Itoh H, Michihata N, Jo T, Takeda N, Morita H, Fujii K, Nakamura S, Node K, Yasunaga H, Komuro I	Age Modified Relationship between Modifiable Risk Factors and the Risk of Atrial Fibrillation	Circulation: Arrhythmia and Electrophysiology	15(1)	e010409	2022
Michihata N, Shigemi D, Yamana H, Matsui H, Jo T, Yasunaga H	Safety of Japanese Herbal Kampo Medicines for the Treatment of Depression During Pregnancy	International Journal of Gynecology and Obstetrics	159(3)	865-869	2022
Michihata N, Suzuki T, Honda A, Oka I, Yoshikawa T, Saito K, Matsui H, Fushimi K, Yasunaga H	Clinical features of Kawasaki disease with atlantoaxial rotatory fixation	Pediatric Infectious Disease Journal	41(8)	626-630	2022
Michihata N, Suzuki T, Yoshikawa T, Saito K, Matsui H, Fushimi K, Yasunaga H	Association between intravenous immunoglobulin dose and outcomes in patients with acute Kawasaki disease	European Journal of Pediatrics	181(10)	3607-3615	2022
Miyachi H, Konishi T, Kumazawa R, Matsui H, Shimizu S, Fushimi K, Matsui H, Yasunaga H	Treatments and outcomes of generalized pustular psoriasis: a cohort of 1516 patients in a nationwide inpatient database in Japan	Journal of the American Academy of Dermatology	86(6)	1266-1274	2022
Miyachi H, Konishi T, Shigemi D, Matsui H, Shimizu S, Fushimi K, Matsue H, Yasunaga H	Association between psoriasis and short-term outcomes of acute myocardial infarction: a matched-pair cohort study using a nationwide inpatient database in Japan	JAAD International	8	21-30	2022
Miyakawa T, Michihata N, Morita K, Matsui H, Honda M, Yasunaga H	Ambient temperature and hospital admissions for acute cholecystitis: A nationwide inpatient database study in Japan	HPB	24(3)	398-403	2022
Miyamoto Y, Iwagami M, Aso S, Uda K, Fushimi K, Hamasaki Y, Nangaku M, Yasunaga H, Doi K	Postoperative outcomes of cancer surgery in patients with and without kidney failure with dialysis therapy: A matched-pair cohort study	Clinical Kidney Journal	15(6)	1137-1143	2022
Miyamoto Y, Matsuyama T, Goto T, Ohbe H, Kitamura T, Yasunaga H, Ohta B	Association between age and neurological outcomes in out-of-hospital cardiac arrest patients resuscitated with extracorporeal cardiopulmonary resuscitation: a nationwide multicentre observational study	European Heart Journal: Acute Cardiovascular Care	11(1)	35-42	2022
Mizuno S, Ono S, Takano A, Yasunaga H, Iwase H	Dental characteristics associated with methamphetamine use: Analysis using forensic autopsy data	BMC Oral Health	22(1)	141	2022
Nagata S, Ohbe H, Jo T, Matsui H, Fushimi K, Yasunaga H	Glucocorticoids and rates of biphasic reactions in patients with adrenaline-treated anaphylaxis: A propensity score matching analysis	International Archives of Allergy and Immunology	183(9)	939-945	2022
Nishimoto Y, Ohbe H, Matsui H, Nakajima M, Sasabuchi Y, Goto T, Morita K, Fushimi K, Sato Y, Yasunaga H	Predictive ability of the sequential organ failure assessment score for in-hospital mortality in patients with cardiac critical illness: a nationwide observational study	EHJ Acute Cardiovascular Care	11(4)	312-321	2022
Ogasawara H, Obe H, Yasunaga H	Oral food challenge management in Japan: A retrospective analysis of health insurance claims data	Clinical & Experimental Allergy	52(7)	898-900	2022
Ogawa Y, Yamana H, Noda T, Kishimoto M, Yoshihara S, Kanaoka K, Matsui H, Fushimi K, Yasunaga H, Kawaguchi M, Imamura T	Severe complications after general anesthesia versus sedation during pediatric diagnostic cardiac catheterization for ventricular septal defect	Journal of Clinical Medicine	11(17)	5165	2022
Ohbe H, Goto T, Matsui H, Fushimi K, Yasunaga H	Associations of government-issued ICU admission criteria with clinical practices, outcomes, and ICU bed occupancy	Annals of the American Thoracic Society	19(6)	1013-1021	2022
Ohbe H, Goto T, Nakamura K, Matsui H, Yasunaga H	Development and validation of early prediction models for new-onset functional impairment at hospital discharge of ICU admission	Intensive Care Medicine	48(6)	679-689	2022
Ohbe H, Matsui H, Kumazawa R, Yasunaga H	Intensive care unit versus high dependency care unit admission after emergency surgery: a nationwide inpatient registry study	British Journal of Anaesthesia	129(4)	527-535	2022

Ohbe H, Matsui H, Kumazawa R, Yasunaga H	Postoperative intensive care unit admission following major elective surgery: a nationwide inpatient database study	European Journal of Anaesthesiology	39(5)	436-444	2022
Ohbe H, Matsui H, Yasunaga H	ICU versus high-dependency care unit for patients with acute myocardial infarction: a nationwide propensity score-matched cohort study	Critical Care Medicine	50(6)	977-985	2022
Ohbe H, Sasabuchi Y, Kumazawa R, Matsui H, Yasunaga H	Intensive care unit occupancy in Japan, 2015–2018: a nationwide inpatient database study	Journal of Epidemiology	32(12)	535-542	2022
Ohbe H, Sasabuchi Y, Matsui H, Yasunaga H	Impact of the COVID-19 pandemic on critical care utilization in Japan: a nationwide inpatient database study	Journal of Intensive Care	10(1)	51	2022
Ohbe H, Tagami T, Ogura T, Matsui H, Yasunaga H	Low-flow duration and outcomes of extracorporeal cardiopulmonary resuscitation in adults with in-hospital cardiac arrest: a nationwide inpatient database study	Critical Care Medicine	50(12)	1768-1777	2022
Ohbe H, Tagami T, Uda K, Matsui H, Yasunaga H	Incidence and outcomes of in-hospital cardiac arrest in Japan 2011–2017: a nationwide inpatient database study	Journal of Intensive Care	10(1)	10	2022
Ohisa K, Yamana H, Morita K, Matsui H, Fushimi K, Yasunaga H	Association between subcutaneous steroid injection for extravasation of vesicant anticancer drugs and skin ulcers requiring surgery	European Journal of Oncology Nursing	58	102119	2022
Okada A, Hashimoto Y, Goto T, Yamaguchi S, Ono S, Ikeda Kurakawa K, Nangaku M, Yamauchi T, Yasunaga H, Kadowaki T	A machine learning-based predictive model to identify patients who failed to attend a follow-up visit for diabetes care after recommendations from a national screening program	Diabetes Care	45(6)	1346-1354	2022
Okada A, Yamana H, Yamaguchi S, Kurakawa K, Michihata N, Matsui H, Fushimi K, Nangaku M, Yamauchi T, Yasunaga H, Kadowaki T	Effect of branched-chain amino acid infusion on in-hospital mortality of patients with hepatic encephalopathy and endstage kidney disease: a retrospective cohort study using a national inpatient database	Journal of Renal Nutrition	32(4)	432-440	2022
Okada A, Yasunaga H	Prevalence of non-communicable diseases in Japan using a newly developed administrative claims database covering young, middle-aged, and elderly people	JMA Journal	5(2)	190-198	2022
Okubo Y, Nishi A, Uda K, Miyairi I, Michihata N, Kumazawa R, Matsui H, Fushimi K, Yasunaga H	Financial Incentives for Infection Prevention and Antimicrobial Stewardship to Reduce Antibiotic Use: A Japan's Nationwide Observational Study	Journal of Hospital Infection	131	89-98	2022
Ono S, Ishimaru M, Yokota I, Konishi T, Okada A, Ono Y, Matsui H, Itai S, Yonenaga K, Tonosaki K, Watanabe R, Hoshi K, Yasunaga H	Risk of post-extraction bleeding with direct oral anticoagulant compared with warfarin: Retrospective cohort study using large scale claims data in Japan	Thrombosis Research	222	24-30	2022
Sakamoto T, Fujiogi M, Ishimaru M, Matsui H, Fushimi K, Yasunaga H	Comparison of postoperative infection after emergency inguinal hernia surgery with enterectomy between mesh repair and non-mesh repair: a national database analysis	Hernia	26(1)	217-223	2022
Sato M, Yamana H, Ono S, Ishimaru M, Matsui H, Yasunaga H	Trends in prophylactic antibiotic use for tooth extraction from 2015 to 2018 in Japan: an analysis using a health insurance claims database	Journal of Infection and Chemotherapy	28(4)	504-509	2022
Shibahashi K, Konishi T, Ohbe H, Yasunaga H	Cost-effectiveness analysis of termination-of-resuscitation rules for patients with out-of-hospital cardiac arrest	Resuscitation	180	45-51	2022
Shibahashi K, Ohbe H, Yasunaga H	Association between intensive care unit admission practices and outcomes in patients with isolated traumatic subarachnoid hemorrhage: A nationwide inpatient database analysis in Japan	Neurocritical Care	37(2)	497-505	2022
Shibahashi K, Ohbe H, Yasunaga H	Urban-rural inequalities in care and outcomes of severe traumatic brain injury:	World Neurosurgery	163	e628-e634	2022

	A nationwide inpatient database analysis in Japan				
Shibahashi K, Ohbe H, Yasunaga H	Adjuvant oral tranexamic acid and reoperation after burr-hole surgery in patients with chronic subdural hematoma: Propensity score-matched analysis using a nationwide inpatient database	Journal of Neurosurgery	138(2)	430-436	2022
Shigemi D, Tabuchi T, Okawa S, Yasunaga H	Association between health literacy and COVID-19 prevention behaviors among pregnant and postpartum women	The Journal of Maternal-Fetal & Neonatal Medicine	35(25)	9971-9977	2022
Sugawara C, Yamana H, Sasagawa E, Yonezawa K, Hikita N, Morita K, Matsui H, Yasunaga H, Haruna M	Factors associated with surgical treatment in postpartum women with mastitis or breast abscess: A retrospective cohort study	Breastfeeding Medicine	17(3)	233-238	2022
Sugihara T, Kamei J, Yasunaga H, Sasabuchi Y, Fujimura T	Prescription of Choreito, a Japanese Kampo medicine, with antimicrobials for treatment of acute cystitis: a retrospective cohort study	Antibiotics	1.736111		2022
Suzuki J, Sasabuchi Y, Hatakeyama S, Matsui H, Sasahara T, Morisawa Y, Yamada T, Fushimi K, Yasunaga H	Additional effect of azithromycin over β -lactam alone for severe community-acquired pneumonia-associated acute respiratory distress syndrome: a retrospective cohort study	Pneumonia	14(1)	1	2022
Suzuki T, Michihata N, Yoshikawa T, Saito K, Matsui H, Fushimi K, Yasunaga H	Low- versus high-concentration intravenous immunoglobulin for children with Kawasaki disease in the acute phase	International Journal of Rheumatic Diseases	25(5)	576-583	2022
Suzuki Y, Kaneko H, Okada A, Itoh H, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yamaguchi S, Kamiya K, Matsunaga A, Ako J, Node K, Yamauchi T, Nangaku M, Yasunaga H, Komuro I	Impact of Glucose Tolerance on Incident Proteinuria in Prediabetes: Analysis of a Nationwide Population-Based Dataset	American Journal of Nephrology	53(4)	307-315	2022
Suzuki Y, Kaneko H, Okada A, Itoh H, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yamaguchi S, Yano Y, Kamiya K, Matsunaga A, Ako J, Fukui A, Yokoo T, Nishiyama A, Node K, Yamauchi T, Nangaku M, Yasunaga H, Komuro I	Risk for Proteinuria in Newly Defined Hypertensive People Based on the 2017 American College of Cardiology/American Heart Association Blood Pressure Guideline	American Journal of Cardiology	168	83-89	2022
Suzuki Y, Kaneko H, Okada A, Itoh H, Matsuoka S, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Kamiya K, Matsunaga A, Ako J, Node K, Yasunaga H, Komuro I	Comparison of cardiovascular outcomes between SGLT2 inhibitors in diabetes mellitus	Cardiovascular Diabetology	21(1)	67	2022
Suzuki Y, Kaneko H, Okada A, Itoh H, Morita K, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yamaguchi S, Kamiya K, Matsunaga A, Ako J, Fukui A, Nishiyama A, Yokoo T, Node K, Yamauchi T, Nangaku M, Yasunaga H, Komuro I	Change in Cardiovascular Health Metrics and Risk for Proteinuria Development: Analysis of a Nationwide Population-Based Database	American Journal of Nephrology	53(2-3)	240-248	2022
Suzuki Y, Kaneko H, Okada A, Matsuoka S, Itoh H, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yamaguchi S, Node K, Yamauchi T, Yasunaga H, Komuro I	Prediabetes in Young Adults and Its Association with Cardiovascular Health Metrics in the Progression to Diabetes	Journal of Clinical Endocrinology & Metabolism	107(7)	1843-1853	2022
Suzuki Y, Kaneko H, Okada A, Nangaku M, Yasunaga H, Komuro I	Kidney outcomes in patients with diabetes mellitus did not differ between individual sodium-glucose cotransporter-2 inhibitors	Kidney International	102(5)	1147-1153	2022

Suzuki Y, Kaneko H, Yano Y, Okada A, Itoh H, Matsuoka S, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Kamiya K, Matsunaga A, Ako J, Node K, Yasunaga H, Komuro I	Glycemic status and the association of change in blood pressure with incident cardiovascular disease	American Heart Journal	254	48-56	2022
Suzuki Y, Kaneko H, Yano Y, Okada A, Itoh H, Matsuoka S, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Matsunaga A, Node K, McEvoy JW, Lam CSP, Oparil S, Yasunaga H, Komuro I	Association of Cardiovascular Health Metrics with Risk of Transition to Hypertension in Non-Hypertensive Young Adults	American Journal of Hypertension	35(10)	858-866	2022
Suzuki Y, Kaneko H, Yano Y, Okada A, Itoh H, Matsuoka S, Fujii K, Yamaguchi S, Michihata N, Jo T, Takeda N, Morita H, Node K, Kim HC, Viera AJ, Oparil S, Yasunaga H, Komuro I	Age-Dependent Relationship of Hypertension Subtypes with Incident Heart Failure	JAHA	11(9)	e025406	2022
Suzuki Y, Kaneko H, Yano Y, Okada A, Itoh H, Ueno K, Matsuoka S, Fujii K, Michihata N, Jo T, Takeda N, Morita H, Yokota I, Node K, Yasunaga H, Komuro I	Dose-dependent relationship of blood pressure and glycemic status with risk of aortic dissection and aneurysm	European Journal of Preventive Cardiology	29(18)	2338-2346	2022
Tagami T, Yamakawa K, Endo A, Hayakawa M, Ogura T, Hirayama A, Yasunaga H	Japanese Multicenter Research of COVID-19 by Assembling Real-world Data: A Study Protocol	Annals of Clinical Epidemiology	4(3)	92-100	2022
Taguchi R, Shigemi D, Yasunaga H	Trends in antihypertensive prescription for pregnant women with hypertension and their peripartum outcomes before and after label and guideline revisions in Japan	Hypertension Research	45(11)	1823-1831	2022
Tahara S, Hattori Y, Aso S, Uda K, Kumazawa R, Matsui H, Fushimi K, Yasunaga H, Morita A	Trends in Surgical Procedures for Spontaneous Intracerebral Hemorrhage in Japan	Journal of Stroke and Cerebrovascular Diseases	31(9)	106664	2022
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