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Did implementation of no-fault auto-insurance in British Columbia, Canada, impact return to work following road trauma? Protocol for a before–after survival analysis

Herbert Chan,[1] Shannon Erdelyi,[1] Alex Jiang,[1] Christopher McLeod ,[2] Mieke Koehoorn,[2] Jeffrey R Brubacher [1]

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[1]Department of Emergency Medicine, The University of British Columbia, Vancouver, British Columbia, Canada
[2]School of Population and Public Health, The University of British Columbia, Vancouver, British Columbia, Canada

Correspondence to
Dr Jeffrey R Brubacher; jeff.brubacher@ubc.ca

ABSTRACT

Introduction Road trauma (RT) is a major public health problem that often results in prolonged absenteeism from work. Limited evidence suggests that recovery after RT is associated with automobile insurance compensation schemes. In May 2021, British Columbia, Canada switched from fault-based to no-fault auto-insurance coverage. This manuscript presents the protocol for a planned evaluation of that natural experiment: We will evaluate the impact of changing automobile insurance schemes on return to work following RT.

Methods and analysis The evaluation will use a before–after design to analyse auto-insurance claims (1 April 2019 to 30 April 2024) in order to compare recovery of claimants with non-catastrophic injuries who filed claims under the no-fault insurance scheme to that of those who filed claims under the previous system. Claimants will be followed from date of injury until they return to work or have been followed for 6 months (right-censored). We will perform sensitivity analyses to examine the robustness of our findings. First, we will exclude injuries that occurred during the COVID-19 provincial State of Emergency. Second, we will use propensity score methods rather than conventional covariate adjustment to address potential imbalance between characteristics of claimants pre-change and post-change. Finally, as the implementation effect may have a heterogeneous association with time off work, we will use quantile regression with right-censoring at 6 months to model differences in return to work at the 25th, 50th, 75th and 90th percentiles.

Ethics and dissemination The study uses de-identified data and is approved by the University of British Columbia Clinical Research Ethics Board (H20-03644). This research is funded by the Insurance Corporation of British Columbia (ICBC). Findings will be published in the peer-reviewed literature and summarised in a report prepared for ICBC. We anticipate that our findings will inform policy decisions in other jurisdictions considering switching to no-fault auto-insurance schemes.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This evaluation will analyse a large data set with almost 5 years of population-level data.
⇒ All claimants have access to British Columbia's universal healthcare system.
⇒ Injury details are coded by claims adjustors based on injuries reported by the claimant, as such some injury details may be incorrect.
⇒ Return to work is an imprecise proxy for recovery; claimants who return to work may have ongoing pain or other health problems from the injury.
⇒ An important confounder is the fact that the new insurance scheme was implemented during the second year of the COVID-19 pandemic; COVID-19 had major impacts on employment, access to healthcare and on the number and demographics of auto-insurance claimants.

INTRODUCTION

Recovery after road trauma is associated with injury severity,[1] pre-crash health,[2] socio-demographic status[2 3] and psychosocial well-being of road trauma survivors,[4 5] as well as with automobile insurance compensation schemes,[6 7] crash responsibility,[8] and litigation involvement.[9] Among these factors, insurance compensation scheme is most easily modified and some researchers suggest that switching from fault-based to no-fault schemes may improve recovery of auto insurance claimants.[6 10] Previous research suggests that claimants with fault-based insurance had poorer health and work outcomes following a motor vehicle crash than those with no-fault insurance.[7] Most previous studies on the benefits of no-fault auto-insurance focused on claimants with whiplash injuries[6 11 12] and evidence remains limited and inconclusive.[13 14] A systematic review by Scholten-Peeters *et al* found that poor outcomes following whiplash injuries were associated with older age, female gender, psychological distress and type of collision but not to compensation

scheme.[14] Conversely, other studies suggest that compensation schemes significantly influence recovery for whiplash associated disorders.[6 11 12] In addition, some studies found that being deemed 'not at fault' for the collision was linked to poorer outcomes because of stress arising from the litigation and compensation processes. Those assessed as 'not a fault' had more mental and emotional issues, poorer physical and mental health outcomes and longer time to return to work, than the 'at fault' group.[8 15]

The Insurance Corporation of British Columbia (ICBC) is the sole provider of basic auto insurance for about 3 700 000 drivers in British Columbia (BC), Canada. By January 2018, the annual cost of injury claims approached $Cdn3 billion.[16] The number of 'large loss claims' with an average payout of $C450 000 per claim increased by 80% in 2017 making the BC public insurance system unmanageable financially without drastically increasing insurance premiums.[17] To combat these financial challenges, ICBC introduced the Rate Affordability Action Plan (RAAP) which took effect on 1 April 2019. RAAP aimed to reduce legal and administrative costs in order to improve the affordability of auto-insurance rates for British Columbians and help ICBC return to a stable financial footing.[18] RAAP strategies included insurance product reform, rate design changes, road safety initiatives and cost-effectiveness in compensation. One of these changes included a cap of $C5500 on pain and suffering payout for minor injuries from a crash; although payment was capped, it could be claimed quickly. A medical professional, not ICBC, would determine the nature of injury and whether it was considered minor. In May 2021, building on RAAP, ICBC switched from fault-based coverage to a no-fault, care-based approach that focuses on recovery, known as Enhanced Care Coverage (ECC). Changes with ECC include age loss benefits providing British Columbians access to significantly enhanced medical care, recover and wage loss benefits if they are injured in a crash, regardless of who is at fault.[19] To improve recovery, claimants have access to physical treatment, mental health treatment and medical care in the first 12 weeks following a crash without ICBC's pre-approval. However, ECC also removed compensation for pain and suffering and removed opportunities for litigation for the majority of collision injury claims. The aims of ECC are to improve the health outcomes and functional recovery of road trauma survivors, reduce insurance premium costs for BC drivers and reduce costs for ICBC. The no-fault insurance approach is intended to support injured claimants more efficiently and effectively. This is done by moving away from the adversarial approach of suing the other driver while ensuring that claimants have rapid access to evidence-based medical treatment and function-based supports for their recovery. These changes greatly reduce many transactional processes and associated costs that are found in a tort-based system.[20]

Early access to medical care is essential to a crash survivor's recovery. This is where jurisdictions with no-fault insurance have an advantage over those with a fault-based system.[21] No-fault systems have provided higher reimbursement rates, improved claims processing speeds and expanded access to medical care.[22] Without financial incentive for pain and suffering payment, the incidence of claims for whiplash injury greatly decrease in most jurisdictions with no-fault systems. Cassidy *et al*[6] found that no-fault insurance was associated with decreased incidence of whiplash, improved prognosis following whiplash and a significant reduction in the time till claim closure. It is conceivable that improved recovery occurs because crash survivors receive medical attention earlier and avoid psychological stress from litigation. As such, there is a clear need to determine whether modification to auto-insurance schemes, such as the implementation of ECC in BC, can indeed improve health and recovery outcomes of motor vehicle crash survivors.

This manuscript presents a protocol for evaluating whether ECC is meeting its objectives of improving recovery outcomes. Specifically, we aim to evaluate the impact of ECC implementation on recovery and treatment patterns of auto-insurance claimants who sustained non-catastrophic injuries, such as soft tissue injuries or whiplash associated disorder, in road traffic collisions in BC. The primary objective is to compare time until return-to-work under ECC with that under the older RAAP system. The secondary objective is to examine changes in access to physical and mental health treatment and number of treatments per injured claimant following ECC.

METHODS

This evaluation will use a before–after design to analyse ICBC claims for all claimants injured in automobile collisions between 1 April 2019 and 30 April 2024. We will compare outcomes for claimants who filed their claims under the new ECC system (collisions occurring on or after 1 May 2021) to those under the previous tort-based RAAP system (1 April 2019 to 30 April 2021). Claims filed pre-RAAP will not be analysed because claim data collected by ICBC changed substantially at that time. Data will be extracted in May 2025 (to allow for 1 year of data maturation) and analysis will be completed by December 2025.

Patient and public involvement

Public involvement in this research is not planned.

Specific research questions

This evaluation will focus on *two* research questions:

Primary

Is implementation of ECC associated with a change in functional recovery outcomes among claimants who sustained *non-catastrophic* injuries (extremity fractures, soft tissue injuries, whiplash associated disorder or mild traumatic brain injury)? Specifically, our primary outcome will be time off-work which we consider to be a proxy for functional recovery.

Table 1 Classification of injuries recorded in ICBC injury claims

Injury category	Injury location (body part)
(1) Fracture	
	Hand or wrist
	Arm
	Ankle or foot
	Leg
(2) Soft tissue injury (sprain)*	
	(3) Neck (WAD)
	Torso
	Arm
	Leg
(4) Soft tissue injury (non sprain)*	
	Head, face or neck
	Torso
	Arm
	Leg
(5) Mild traumatic brain injury (concussion)	

(#) Numbers in brackets indicate the five primary injury subgroups that will be examined.
*Excludes claimants with a fracture.
ICBC, Insurance Corporation of British Columbia; WAD, Whiplash Associated Disorder.

Secondary

Is ECC associated with changes in access to treatment and patterns of treatment for claimants with extremity fractures, soft tissue injuries, whiplash associated disorder and mild traumatic brain injury? Specifically, we will examine time to first treatment, and the total number and type of treatments received in the first 3 months and first 6 months post injury (secondary outcome measures).

Data and study population

In BC, there are approximately 260 000 automobile crashes per year,[23] including 71 000 injured victims.[24] As BC's sole provider of basic auto-insurance coverage, ICBC receives reports on all these claims. Data available for this evaluation include: (1) basic collision details (crash date, number of vehicles, road users involved); (2) demographic information of claimants (age, sex, postal code); (3) type of injury (table 1); (4) medical and support services (eg, counselling, physiotherapist), treatment frequency and date of treatment provided; (5) employment status and off-work information (including missing work, payment for wage loss, date off-work, date return-to-work); and (6) types and dates of various payments.

Inclusion and exclusion criteria

All consecutive individual *injury claims* filed between 1 April 2019 and 30 April 2024 by adult motor vehicle occupants (drivers and passengers) will be included. Children under the age of 18 will be excluded as their recovery pattern may differ and they are less likely to be employed. Pedestrians and cyclists will be excluded from this evaluation as they represent <1% of automobile insurance injury claims and likely have different injury and recovery profiles. We will exclude claims filed by non-residents, claims for collisions occurring outside BC, and property damage only claims. Claimants with catastrophic or undefined injuries will be excluded (see below).

Injury coding

Injuries are recorded by claims adjustors based on interviews of injured claimants combined with review of medical records when available. Injury details include 'nature of injury', 'injury description' and 'injury body part detail'. The 'nature of injury' field is completed during the initial call. This field includes a flag for 'catastrophic injuries'. When ECC was implemented, the 'nature of injury' field was transitioned from >40 options to only 2 options (catastrophic or not). In this evaluation, we will only use 'nature of injury' to exclude claimants with catastrophic injuries. The 'injury description' field was revamped in 2017 and has been in use since that time. It includes a pick list with approximately 45 options. Injury description can be completed during the initial call or later in the claims process. Claims adjustors also record the 'injury body part detail' which tells which body part(s) were injured. For claimants who visit hospital, ICBC may obtain International Classification of Diseases (ICD) injury codes from their medical records. The system allows multiple injuries for each claimant.

For this evaluation, we will exclude claimants with catastrophic or undefined injuries. Catastrophic injuries include all injuries flagged as catastrophic in the 'nature of injury' field as well as those considered likely to result in prolonged disability based on injury description (eg, paraplegia, vision loss, traumatic amputation). Undefined injuries include those with 'injury description' entries that are not clearly due to an injury (eg, fibromalygia, chronic pain), of unknown severity (eg, joint injury, pelvic fracture) or with missing or uninformative entries (eg, 'other'). The remaining claimants will be classified as having extremity fractures, sprains (excludes those with fractures), other soft tissue injuries (lacerations, abrasions, contusions; excludes those with fractures), or mild traumatic brain injuries (mTBI). Fractures, sprains and other soft tissue injuries will be subclassified according to the body part involved (see table 1). Claimants may be classified as having more than one injury type (eg, fractures of wrist combined with mTBI). Claimants with both a fracture and a soft tissue injury (sprain, other soft tissue injuries) will be classified according to their fractures but will be excluded from the soft tissue injury groups (fractures are usually associated with soft tissue injuries and outcome is typically more dependent on the fracture than on the soft tissue injury).

Analysis plan—overview

Demographic data (age, sex, postal code and employment status) will be included in the data abstracts. Road user groups are categorised as vehicle driver, vehicle passenger, motorcyclist and motorcycle passenger. Data from ICBC come in multiple claim experience tables including crash table, claim-exposure (filing) table, injury table, medical/treatment encounter table, cost reimbursement, loss income replacement, etc. These tables will be linked and data will first be extensively checked for completeness and consistency before conducting statistical analyses.

Statistical analysis

As described above, we will categorise claimant injuries by five primary injury types: (1) Fracture, (2) all sprains (without fracture), (3) Whiplash Associated Disorder (WAD = neck sprain without fracture), (4) other soft tissue injury (without fracture) and (5) mTBI. Injury type groups are not mutually exclusive, and will be further categorised by body part involved (see table 1). Claimants will also be categorised according to whether their injury occurred under the tort-based RAAP system or under ECC. Post ECC claims will be subcategorised into first year post ECC (1 May 2021 to 30 April 2022), second year post ECC (1 May 2022 to April 2023) and third year post ECC (1 May 2023 to 30 April 2024). Data for the final analysis will be extracted in May 2025, allowing at least 1 year for data maturation following the last claim. We will use descriptive statistics to compare claimant characteristics (age, sex, employment status, rural vs urban residence, etc) between the two insurance schemes (RAAP and ECC). We will also report the annual rate of injury claims per policy holder and per population by type of injury.

Research question 1

Our primary outcome is time from date of injury to first return-to-work date. This analysis will be limited to claimants who were employed at the time of injury and are off work for more than the day of the collision. People who miss work for only the day of collision are excluded for two reasons. First, people may miss work the day of a collision because of factors that have nothing to do with injury or recovery such as the time required to report the collision to police, getting their vehicle towed, difficulty finding alternative transportation to work and possibly seeking medical care for assessment of their injuries. Second, claims adjustors are inconsistent with respect to whether they code a claimant as 'off work' if they only miss work on the day of collision. For each injury type and insurance scheme (RAAP and ECC), we will report the mean/median number of days off work and the number of injured claimants remaining off work at 30 days, 90 days, 180 days and >180 days post-injury.

We will use survival analysis to compare time to return-to-work under the two insurance schemes. Injured claimants will be followed from date of injury (t_0) until they return to work or have been followed for 6 months (right-censored). We limited follow-up to 6 months since the majority of claims are closed within 6 months and this time should be sufficient to assess changes in recovery duration for non-catastrophic injuries. Kaplan-Meier survival curves will be used to visualise time to return to work among injured claimants pre and post ECC. Subgroup analyses will be performed for each primary injury type to assess differences in the impact of ECC implementation on different injuries. We will fit separate Cox proportional-hazard (PH) models for each injury subgroup with a categorical variable for insurance scheme (RAAP (reference period), first year ECC, second year ECC or third year ECC) as the primary exposure. Dividing ECC claims into three distinct periods serves two functions. First, it allows us to assess changes in intervention effects over time. Second, it differentiates post-ECC claimants who are most impacted by the COVID-19 pandemic (first year of ECC) from those less impacted. Models will be adjusted for the following time-invariant factors computed at t_0: age, sex, rural versus urban residential postal code, year, season, monthly employment rate in BC, injury location (body part involved) and presence of psychiatric sequelae (table 2). Since it is possible for claimants to have multiple injuries, we will adjust for the presence of other injury types (fractures, soft tissue injuries and mTBI) in other body parts where applicable. We will also include a time-varying indicator variable for the COVID-19 State of Emergency (18 March 2020 to 30 June 2021). We will use Schoenfeld residuals to test the PH assumption, and if necessary, include time-by-covariate interactions when this assumption is violated. Likelihood ratio tests will be used to obtain p values for the overall ECC implementation effect, and we will report HRs for the ECC implementation effect in each injury subgroup.

Research question 2

Secondary outcomes are time from date of injury to first treatment, and number of treatments received in the first 6 months post-injury. Treatments will be categorised as either (1) counselling, (2) medical care (physician) or (3) physical treatment (physiotherapy, chiropractic, massage therapy, occupational therapy, etc). For each injury type and insurance scheme, we will report the mean/median number of days until first treatment and number of treatments received in the first 3 months and first 6 months by treatment type.

Time to first treatment will be analysed using survival analyses similar to those described above. However, analysis of treatment patterns will include all injured claimants, rather than just those who are employed. We will use Cox PH regression to model time to first treatment adjusting for the factors described above. To assess whether changes in access to care post-ECC differ by type of treatment received, we will model first treatment of *any* type and model first treatment of *each* type (counselling, medical and physical) separately.

Number of treatments received in the first 6 months will be examined using count regression models (Poisson

Table 2 Variable roles in analysis

Variable	Possible values	Planned statistical technique
Outcomes		
Primary		
Time off work in first 6 months	Continuous (days)	Cox PH regression
Secondary		
Time to first treatment within 6 months	Continuous (days)	Cox PH regression
Number of treatments in first 6 months	Count	Poisson/negative binomial regression
Exposure		
Time period (insurance scheme)	RAAP, first year ECC, second year ECC, third year ECC	
Possible confounders		
Demographic		
Age	Continuous (years)	Adjustment
Sex	Male, female	Adjustment
Place of residence	Urban, rural based on postal code	Adjustment
Temporal and seasonal		
Annual trend	Continuous (years)	Adjustment
Season	Fall, winter, spring, summer	Adjustment
BC monthly employment rate	Continuous (%)	Adjustment
COVID-19 State of Emergency*	1 if date between 18 March 2020 and 30 June 2021; 0 otherwise	Adjustment, sensitivity†
Primary injury characteristics		
Primary injury type	(1) Fracture, (2) sprain, (3) WAD, (4) other soft tissue injury, (5) mild traumatic brain injury	Stratification
Primary injury body part (if applicable)	See 'Injury Location' in table 1	Adjustment
Other injuries (if applicable)		
Presence of fractures in other body parts	1 if yes; 0 otherwise	Adjustment
Presence of sprain in other body parts	1 if yes; 0 otherwise	Adjustment
Presence of soft tissue injuries in other body parts	1 if yes; 0 otherwise	Adjustment
Presence of mild traumatic brain injury	1 if yes; 0 otherwise	Adjustment
Presence of psychiatric sequelae	1 if yes; 0 otherwise	Adjustment

*Time-varying covariate in survival analysis.
†Injuries occurring during the COVID-19 State of Emergency in BC will be excluded in a sensitivity analysis.
BC, British Columbia; ECC, Enhanced Care Coverage; PH, proportional-hazard; RAAP, Rate Affordability Action Plan; WAD, Whiplash Associated Disorder.

or negative binomial in the presence of overdispersion). In the event that many claimants receive zero treatments, we will assess the need for zero-inflated models using the Vuong test. Models will be adjusted for the factors described above. Separate models will be fit for the total number of treatments and for the number of treatments of each treatment type. We will report relative risks for the ECC implementation effect in each injury subgroup.

Sensitivity analyses

We will perform several sensitivity analyses to examine the robustness of our findings. First, we will exclude injuries occurring during the COVID-19 State of Emergency. This will limit pre-ECC data to about 11 months (1 April 2019 to 17 March 2020) but will ensure that post-ECC time periods are compared relative to pre-pandemic norms. The COVID-19 pandemic changed the acceptability of remote work for many employers and this change may have impacted return to work times. To further test the robustness of our primary analysis to the potential impact of COVID-19, we will perform a subset analysis restricted to injured claimants working in predominantly physical-labour jobs (which are not amenable to remote work). Second, we will use propensity score (PS) methods rather than conventional covariate adjustment to address potential imbalance between characteristics of pre-ECC and post-ECC claimants. For each primary injury subgroup,

we will match post-ECC to pre-ECC claimants based on PS estimates from a logistic regression model that includes age, sex, rural/urban residence, season, primary injury location, presence of psychiatric sequelae and other injury types and locations. We will explore several matching strategies depending on the size and composition of pre-ECC and post-ECC samples, including 1:1 matching and 1:M matching with both greedy (best match) and optimal matching algorithms. Cox PH models will be stratified by matched sets to obtain ECC implementation effect estimates. Additionally, we will include PSs estimates as a covariate in our adjusted Cox PH models. Third, we will examine the impact of missing (unreported) return to work dates by following off-work claimants until the earliest of their return to work date or claim closure date. We assume claimants with closed claims returned to work on or before the claim closure date. Fourth, we will alter our observation period by right censoring claimants at 3, 9 and 12 months. Finally, as the ECC implementation effect may have a heterogeneous association with time off work, we will use quantile regression with right-censoring at 6 months to model differences in return to work at the 25th, 50th, 75th and 90th percentiles.[25] Quantiles examined may be modified depending on the extent of censoring. Quantile regression will allow effect estimates to be interpreted in terms of differences in time off work rather than HRs.

Multiplicity adjustments

Since our primary research question involves five injury subgroups, we will use a Bonferroni adjusted significance level of 0.01 (0.05/5). Although the Bonferroni method is regarded as conservative, this study is sufficiently powered (see below) and has a relatively small number of primary subgroups. All CIs will be reported at the 99% confidence level. No further multiplicity adjustments will be made regarding the number of secondary outcome measures or subgroups in secondary and ad-hoc exploratory analyses, and we will not draw related inferences from these tests.

Minimum detectable effects

The annual number of injured claimants during the RAAP period (before implementation of ECC) was 719 for fracture with 57% off-work, 45 427 for sprains with 37% off-work, 3190 for non-sprain soft tissue injuries with 38% off-work, 19 737 for WAD with 36% off-work and 1788 for mTBI with 58% off-work. Assuming half of off-work claimants return-to-work within 6 months, this study has 80% power to detect a minimum increase in the hazard of return-to-work after ECC implementation of 25% (HR=1.25) for fractures, 20% (HR=1.20) for sprains, 6% (HR=1.06) for non-sprain soft tissue injuries, 15% (HR=1.15) for WAD and <5% (HR<1.05) for mTBI (table 3). This calculation is based on a two-sided test with a Bonferroni adjusted significance level of 0.01. We examined rates of return-to-work between 30% and 90%. Under all scenarios, the minimum detectable HR was ≤1.33.

Interim analyses

We will conduct an interim analysis using claims filed up to 30 April 2023 (data extract in November 2023 allowing 6 months of data maturation). No multiplicity adjustments will be made with respect to interim analyses, as the

Table 3 Minimum detectable HR for primary outcome (return-to-work) with 80% power and a significance level of 0.05/5

	Fracture	Sprain	WAD	Non-sprain	mTBI
	Number of injured claimants*				
Per year	700	1700	3100	19 700	45 000
RAAP (25 months)	1458	3542	6458	41 042	93 750
ECC† (36 months)	1750	4250	7750	49 250	112 500
Anticipated percentage of claimants off work	57	37	36	38	58
Return-to-work‡	**Minimum detectable HR**				
30%	1.33	1.26	1.19	1.07	<1.05
50%	1.25	1.20	1.15	1.06	<1.05
70%	1.21	1.17	1.12	<1.05	<1.05
90%	1.19	1.15	1.11	<1.05	<1.05

This calculation is based on a two-sided test with a specified number of events (return-to-work) during RAAP. The number of injured claimants and the percentage of claimants off work are based on data observed during the RAAP period only. We have not examined data following implementation of ECC. For example, for an injury subgroup with 1700 claimants per year (sprains), we expect to see 3542 and 4250 injured claimants during RAAP and ECC, respectively. Assuming 37% of all injured claimants are off-work, there will be 1310 claimants during RAAP and 1572 claimants during ECC who are off-work. If the rate of return-to-work within 6 months is 50% during RAAP, then there will be 655 return-to-work events for claimants injured during RAAP, and the study will be powered to detect at least a 20% increase (HR=1.20) in the hazard of return-to-work after ECC implementation. Note that an increase in hazard is favourable because the outcome is a proxy for recovery.
*Number of injured claimants after exclusions described in Methods section.
†Annual number of injured claimants is assumed to be the same across all years, except for first-year ECC where we assume a 50% reduction due to COVID-19.
‡Per cent of off-work claimants during RAAP who return-to-work within 6 months.
ECC, Enhanced Care Coverage; mTBI, mild traumatic brain injuries; RAAP, Rate Affordability Action Plan; WAD, Whiplash Associated Disorder.

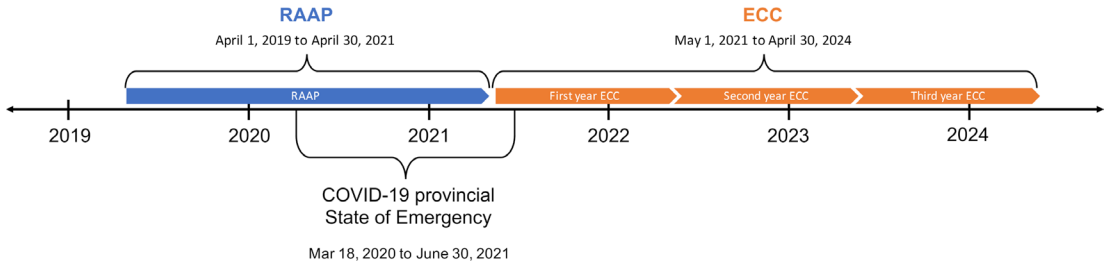

Figure 1 ECC implementation timeline. ECC, Enhanced Care Coverage; RAAP, Rate Affordability Action Plan.

purpose of this analysis is to provide a timely update to the insurance provider rather than to confirm the impact of ECC implementation or to inform decisions around stopping the study.

Strengths

ICBC is the sole provider of compulsory basic auto-insurance for all vehicle owners in BC and all residents of BC have access to the same universal healthcare system. Our study will include about 2 years of historical administrative data under the tort system and 3 years of data under the new enhanced care coverage insurance to explore both the short-term and long-term effects of the new system. Our ability to study non-catastrophic injuries at the population level is a major strength.

Limitations

This study is based on administrative data. There may be further changes in how claim data is collected during the study period. Injury outcomes (recovery) may also change because of improvements in medical treatment and care methods. However, advances in medical care are expected to occur gradually; an abrupt change in time to return-to-work occurring when ECC was implemented would likely be due to the insurance scheme rather than advancements in medical care. Injury details are coded by claims adjustors-based largely on injuries reported by the claimant, as such some injury details may be incorrect. This evaluation also suffers from other limitations of administrative data. In particular, return to work is an imprecise proxy for recovery: even if a claimant has returned to work, we do not know whether they returned in full capacity and in the same role after the injury. We do not know whether they still have pain or other health impacts from the injury. Further, we do not have access to worker compensation data nor to type of employment. The effect of co-payment benefits from the two systems (workers compensation and auto-insurance) is not known. However, the number claimants with co-payment is expected to be small. It is also possible that the characteristics of people who report being off work will change under ECC, for example, if reporting threshold changes as a result of removal of payment for pain and suffering. An important confounder is the fact that ECC was implemented during the second year of the COVID-19 pandemic (figure 1); driving behaviour, access to healthcare and work environments were significantly impacted by the pandemic.[26] There were major impacts on employment (figure 2), access to healthcare and on the number and demographics of auto-insurance claimants (online supplemental figures 1–3). We attempt to account for this in our model by including indicators for the COVID-19 public health measures and for overall employment rate.

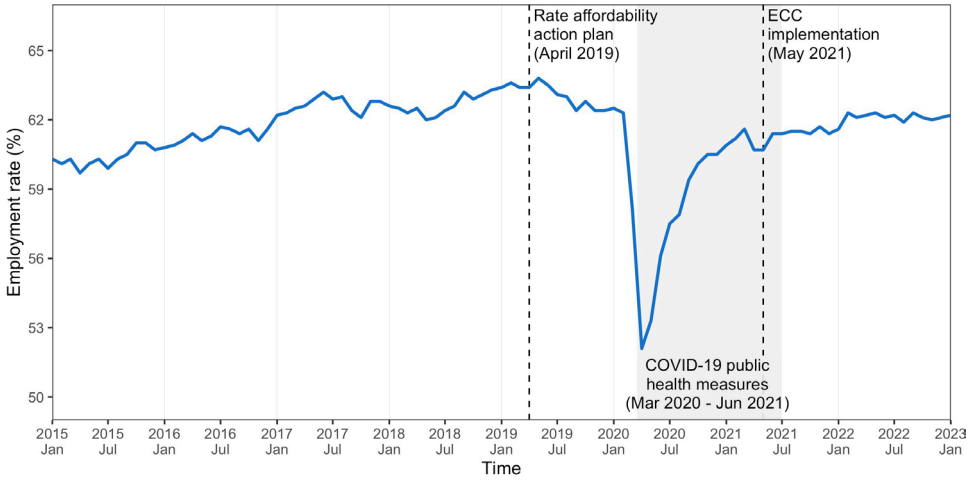

Figure 2 Seasonally adjusted monthly employment rate in British Columbia, January 2015 to January 2023. ECC, Enhanced Care Coverage. Data source: Statistics Canada. (2023). *Table 14-10-0287-01 Labour force characteristics, monthly, seasonally adjusted and trend-cycle*. https://doi.org/10.25318/1410028701-eng.

ETHICS AND DISSEMINATION

This study uses de-identified administrative data. No individual claimants will be identified. The study is approved by the University of British Columbia Clinical Research Ethics Board (H20-03644).

This evaluation will provide needed evidence to inform policymakers in BC and in other jurisdictions that may be considering similar changes in auto-insurance scheme. This study will provide information to assess the effectiveness of intervention via no-fault insurance in improving the recovery outcomes of road traffic injured survivors. Results will be submitted for publication in an open-access peer-reviewed journal. We will provide a report for the funder (ICBC) and post a copy on our website (rsph.med.ubc.ca).

Twitter Christopher McLeod @mcleodcb1

Contributors The study was conceived by HC and JRB. HC wrote the first draft of the manuscript. SE wrote the analysis section. AJ extensively reviewed available data and, together with SE, HC and JRB, had a series of meetings with Insurance Corporation of British Columbia to understand data definitions and limitations. JRB completed the injury classification. MK and CM critically reviewed and contributed to the methods section. All authors reviewed and approved the final manuscript.

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Competing interests This research is funded by a research contract with the Insurance Corporation of British Columbia (ICBC). ICBC may object to a proposed Presentation or Publication on the grounds that it contains Restricted Information or Confidential Information that was disclosed to the Institution (ie, The University of British Columbia) by ICBC. If ICBC makes such objection, the Institution will ensure that the Research Team removes such Restricted Information or Confidential Information, as applicable, immediately from the proposed Presentation or Publication, after which the Institution can publish or present. Importantly, ICBC does NOT have authority to delay or prevent publication or presentation of any findings by the Research Team.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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ORCID iDs

Christopher McLeod http://orcid.org/0000-0001-9268-3694
Jeffrey R Brubacher http://orcid.org/0000-0002-4866-4231

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