Preventing acute kidney injury: assessing awareness to temporarily discontinue ‘at-risk’ medicines during acute illness in a New Zealand cohort

Dianne Vicary, Colin Hutchison, Trudi Aspden

ABSTRACT

AIM: The objective of this research is to determine community dwelling patients’ awareness of temporarily discontinuing medicines during acute illness, and the actions they would undertake when acutely unwell.

METHOD: Adults taking long-term oral medicines for chronic health conditions completed a four-question self-completion paper-based questionnaire collecting data requiring quantitative analysis. Recruitment occurred in six participating Hawke’s Bay community pharmacies during 2017 and 2018.

RESULTS: One hundred and thirty people completed the survey. Seventeen (13%) recalled receiving guidance from a health professional on which medicines to stop during excessive vomiting or diarrhoea. Only three people, however, would stop their medicines. Eighteen percent (17/95) of participants aged 65 years and older were prescribed both a NSAID and either an angiotensin-converting-enzyme inhibitor (ACEi) or angiotensin-II receptor blocker (ARB); five reported receiving advice to withhold medicines. Three participants were prescribed a Triple Whammy combination; none reported being advised to withhold medicines.

CONCLUSION: A small proportion of the participants recalled receiving guidance to temporarily withhold medicines during acute illness; many indicated the advice would not be followed. The results indicate a degree of acute kidney injury prior (AKI) at-risk prescribing. There are opportunities to empower people to self-manage at-risk medicines during periods of acute illness.

Acute kidney injury (AKI) is an increasingly common clinical problem affecting kidney structure and function, and is defined as an abrupt onset of renal dysfunction ranging from minor loss of function to organ failure.1 Globally, it is estimated to affect approximately 13.3 million people and contribute to 1.7 million deaths each year, despite many AKI cases being deemed to occur due to potentially preventable causes.1,2 AKI is associated with increased healthcare costs, and is a predictor of adverse outcomes, including mortality, particularly in hospitalised patients where it has also been shown to increase length of stay.1,3,4

There is an increasing awareness of particular medicines, patient groups or patient characteristics, and illnesses, that place individuals at greater AKI risk.1,5 Patient groups at risk of AKI in primary care include those with diabetes mellitus, chronic kidney disease, dementia, heart failure, and older people, particularly when combined with conditions leading to dehydration, and when prescribed potentially at-risk medicines such as non-steroidal anti-inflammatories (NSAIDs), angiotensin-converting-enzyme inhibitors (ACEI), angiotensin-II receptor blockers (ARB), diuretics or aminoglycosides.6,7 The term Triple Whammy describes the concurrent use of an ACEi or an ARB, with a diuretic and a NSAID, including cyclo-oxygenase-2 (COX-2) inhibitors; while a combination of any two is termed a Double Whammy.
Internationally, multi-level management strategies have been suggested to address AKI-preventable causes including clinicians communicating the risk of AKI and self-management advice for individuals to temporarily stop specific medicines when acutely unwell. In June 2015 NHS Scotland and the Scottish Patient Safety Programme made the NHS Highland Medicine Sick Day Rules card available nationally, after local development and a two-part service evaluation. In July 2015 NHS England, in partnership with the UK Renal Registry, established the ‘Think Kidneys’ national programme. The Think Kidneys Board published an interim position statement supporting the recommendation that health professionals communicate the risk of AKI to patients and carers, including discussing the possible causes and the importance of maintaining fluid balance during episodes of acute illness. Diabetes Canada promote a ‘sick day medication list’; recommending that adults with diabetes and chronic kidney disease (CKD) be given a personalised ‘sick day’ medicines list that outlines which of their medicines they should withhold during times of acute illness. The acronym SAD MANS has been developed as an aide memoire for the medicines included in the ‘sick day list’ representing: sulphonylureas, ACEis, diuretics, direct renin inhibitors, metformin, ARBs, NSAIDs and sodium glucose co-transporter 2 inhibitors.

While these strategies have been incorporated into guidelines and implemented in some countries, the evidence that these approaches reduce net harm is considered by some to be low quality or lacking, particularly in primary care settings. New Zealand Medicines and Medical Devices Safety Authority guidance to clinicians is to withhold certain medicines when AKI has been established, while being aware of at-risk patient groups and medicines. Best Practice Advocacy Centre New Zealand (bpac) provides New Zealand primary care prescribers access to their individualised prescribing data for practice reflection and identification of opportunities to improve patient care. Guidance in the publication ‘Avoiding the “triple whammy” in primary care’ includes recommendations to advise patients taking this combination to maintain good hydration and avoid inadvertently taking additional NSAIDs, as well as discussing a ‘sick day’ plan with them. At present it is unclear how well New Zealand clinicians have incorporated this guidance into their practice.

Analysis of the Hawke’s Bay District Health Board (DHB) in-patient hospital records identified 774 incidences of AKI between July 2013 and June 2014; 60 cases (8%) started in primary care. The 774 patients were found to have hospital admissions three times longer than the average medical admission and within three and a half years 50% were deceased.

The aim of this investigation was to explore whether a sample of Hawke’s Bay adults prescribed long-term medicines, recalled receiving advice to temporarily discontinue at-risk medicines during acute illness, and if so, would they follow the advice. At-risk medicines (study medicines) were identified as being ACEis, ARBs, NSAIDs, diuretics and metformin.

Method

This is the second phase of a three-phase study (manuscripts from phase one and three currently under review) to explore the value of community pharmacists educating the Hawke’s Bay population to temporarily discontinue at-risk medicines during acute illness, and if so, would they follow the advice. At-risk medicines (study medicines) were identified as being ACEis, ARBs, NSAIDs, diuretics and metformin.

Patients and data collection

This is a cross-sectional exploratory study using a four-question plus demographics self-completion paper-based questionnaire (see Appendix) to collect data requiring quantitative analysis. Participants are a convenience sample of adults (aged over 17) taking long-term medicines. The study received Central Health and Disability Ethics Committee approval (Reference 17/CEN/64).
and locality approval was granted by Hawke's Bay District Health Board Research Office in March 2017.

Pharmacy recruitment
In May 2017 all 39 community pharmacies in the Hawke's Bay DHB area were emailed an invitation to participate. Pharmacists at three pharmacies responded and received the research protocol, training and resources. Low participant recruitment numbers resulted in re-circulating the expression of interest to Hawke's Bay pharmacies in November 2017 and three additional pharmacies volunteered in January 2018.

Patient recruitment
This occurred between July 2017 and February 2018. Eligible people were invited to join the study when they visited a participating pharmacy to have a prescription dispensed for any long-term medicine(s). They were provided with an information sheet and a consent form to read and sign. Agreement to participate in the study was not required on the spot; consenting and participation could occur during a return visit to the pharmacy. All participants were eligible to enter a prize draw to win a $100 voucher.

Data analyses
All participant responses were entered into an electronic spreadsheet. Descriptive statistics were generated from the data collected.

Results
A total of 130 participants, recruited from six pharmacies completed the questionnaire. Over half of the respondents, 70 (54%), were recruited in one pharmacy, with the remaining five pharmacies recruiting between 2 and 16 participants. Four of the six pharmacies were located in Havelock North and Hastings (76% of the participants).

Participant characteristics
Table 1 shows the demographic characteristics of the participants. Sixty-seven (52%) participants were women, 117 (90%) were of European/Pākehā ethnicity and 58 (45%) lived in Hastings. The mean age was 71 years, with 88 (68%) being retired and for almost half, (62, 48%) high school-level education was their highest educational achievement.

Advising patients to temporarily discontinue medicines during acute illness
Of the 130 participants, a study medicine (ACEi, ARB, diuretic, NSAID and/or metformin) was taken by 108 participants (83%). Seventeen (13%) participants indicated that they had been advised by a doctor, specialist, nurse or pharmacist to stop taking medicines when they have excessive vomiting and/or diarrhoea. Of these participants, 16 (16/17) reported that they took at least one of the study medicines regularly. Six participants indicated it was a study medicine they had been advised to stop; four reported it was all the study medicines they currently took regularly. Two participants indicated they took either an ARB, metformin, or a NSAID, but did not list these as medicines they had been advised to stop. The remaining 11 did not name the medicines they had been advised to stop, could not remember or indicated a non-study medicine, eg, aspirin, a statin or warfarin. Two participants were taking both an ACEi and an ARB; one recalled advice to stop the ACEi. Table 2 presents data describing the prescribed medicines taken by the study participants. Of the 22 participants who did not take a study medicine, one recalled receiving advice to stop medicines when unwell.

Patient willingness to follow advice received
Eight (47%) of the 17 participants who recalled receiving advice to discontinue their medicines during illness listed the medicines that they would stop when unwell, of the others two (12%) stated either ‘all’ or ‘ones I have been told to’, six (35%) did not complete this section of the question and one (6%) could not remember which medicine/s to stop. However, when asked the question “If you have excessive vomiting (‘the spews’) and/or diarrhoea (‘the runs’), what do you do about taking your regular medicines?” only three indicated they would stop their medicines (Table 3). These three participants all took a study medicine regularly and were aged 65 years or older.
Table 1: Demographic information of participants.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total participants N/XX (%)</th>
<th>Participants recalling being advised to stop medicines N/XX (%)</th>
<th>Participants NOT recalling being advised to stop medicines N/XX (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62/130 (48)</td>
<td>9/17α (53)</td>
<td>53/113 (47)</td>
</tr>
<tr>
<td>Female</td>
<td>67 (52)</td>
<td>8 (47)</td>
<td>59 (53)</td>
</tr>
<tr>
<td>Age¥ (years) mean &amp; range</td>
<td>71 (26–92)</td>
<td>71.4 (42–90)</td>
<td>71.4 (26–92)</td>
</tr>
<tr>
<td>Primary ethnicity£</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European / Pakeha</td>
<td>114 (88)</td>
<td>17 (100)</td>
<td>97 (86)</td>
</tr>
<tr>
<td>Māori</td>
<td>12 (9)</td>
<td>0</td>
<td>12 (11)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (3)</td>
<td>0</td>
<td>4 (4)</td>
</tr>
<tr>
<td>Domicile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Napier</td>
<td>30 (23)</td>
<td>1 (6)</td>
<td>29 (26)</td>
</tr>
<tr>
<td>Hastings</td>
<td>58 (45)</td>
<td>7 (41)</td>
<td>51 (45)</td>
</tr>
<tr>
<td>Havelock North</td>
<td>33 (25)</td>
<td>7 (41)</td>
<td>26 (23)</td>
</tr>
<tr>
<td>Other∞</td>
<td>2 (2)</td>
<td>1 (6)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Unknown or not provided</td>
<td>7 (5)</td>
<td>1 (6)</td>
<td>6 (5)</td>
</tr>
<tr>
<td>Employment status*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>1 (1)</td>
<td>0</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Waged</td>
<td>22 (17)</td>
<td>3 (18)</td>
<td>19 (17)</td>
</tr>
<tr>
<td>Self-employed</td>
<td>11 (9)</td>
<td>1 (6)</td>
<td>10 (9)</td>
</tr>
<tr>
<td>Unemployed or unable to work</td>
<td>5 (4)</td>
<td>0</td>
<td>5 (4)</td>
</tr>
<tr>
<td>Home maker</td>
<td>2 (2)</td>
<td>0</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Retired</td>
<td>88 (68)</td>
<td>13 (76)</td>
<td>75 (67)</td>
</tr>
<tr>
<td>Education*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>4 (3)</td>
<td>0</td>
<td>4 (4)</td>
</tr>
<tr>
<td>High school</td>
<td>62 (48)</td>
<td>11 (65)</td>
<td>51 (46)</td>
</tr>
<tr>
<td>Trade/vocational</td>
<td>41 (32)</td>
<td>5 (29)</td>
<td>36 (32)</td>
</tr>
<tr>
<td>Degree &amp; post-graduate</td>
<td>22 (17)</td>
<td>1 (6)</td>
<td>21 (19)</td>
</tr>
</tbody>
</table>

*One did not provide information.*Seven did not provide information.
£Other (Chinese or no information provided). European/Pākehā also includes those who indicated they are Australian, Scottish and UK.
∞Other domiciles were Tauranga and Waipapa.
αOne participant was not taking a study medicine, but indicated receiving advice to withhold medicines when unwell.
Fourteen of the 95 participants, prescribed either an ACEi and/or an ARB recalled receiving advice to stop taking medicines when experiencing excessive vomiting and/or diarrhoea; five listed an ACEi or ARB as a medicine they would stop. The remaining nine did not list the medicines they would stop, or indicated a non-study medicine. When asked “If you have excessive vomiting (‘the spews”) and/or diarrhoea (‘the runs’), what do you do about taking your regular medicines?” only two of the 14 indicated stopping medicines; one would withhold the ACEi and the other, aspirin; of the remaining 12, three indicated they would do nothing, four would ring the doctor and five the pharmacist.

None of the six participants prescribed a NSAID, or the four participants prescribed a diuretic, who remembered receiving advice, planned to temporarily withhold medicines during acute illness. Of the five participants prescribed metformin who recalled receiving advice, four would temporarily withhold medicines; one indicated they would specifically stop metformin.

Participants’ actions during an episode of severe vomiting and/or diarrhoea
Fifty-four (42%) of the 130 participants indicated they would continue taking their medicines during an episode of severe vomiting or diarrhoea. However, 47 (36%) would contact their doctor or practice nurse, and 34 (26%) would contact their pharmacist. Of those recalling guidance to temporarily discontinue medicines during acute illness and whom were prescribed a study medicine, four (25%) identified they would discontinue all study medicines if acutely unwell, while others indicated intention to discontinue some but not all.

**Acute kidney injury risk factor: medicine combinations**

One hundred and eight participants (83%) indicated they took one or more study medicines. Thirty-three participants (31%) were prescribed a *Double Whammy* combination and three (3%) participants were taking a *Triple Whammy* combination.

Of the 113 participants who could not recall being advised to stop taking certain medicines during an episode of excessive vomiting and/or diarrhoea, 28 participants (25%) were taking at-risk combinations; the most common being an ACEi and a diuretic.

**Acute kidney injury risk factor: age**

Ninety-five participants were aged between 65 and 92 years of age, and 79 (83%) took a study medicine. Seventy-two of these participants took an ACEi and/or ARB and 11 (15%) reported being advised to withhold medicines during excessive vomiting/diarrhoea; however only one would follow this advice. Of the 21 participants taking a *Double Whammy* combination, six (29%) recalled advice by a clinician to withhold medicines during

<table>
<thead>
<tr>
<th>Medicines and combinations</th>
<th>All participants n/130 (%)</th>
<th>Participants ≥65 years n/95 (%)</th>
<th>All participants recalling being advised to stop medicines n/17 (%)</th>
<th>All participants not recalling being educated to stop medicines n/113 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor (ACEi)</td>
<td>60 (46)</td>
<td>46 (48)</td>
<td>8 (47)</td>
<td>52 (46)</td>
</tr>
<tr>
<td>Angiotensin-II receptor blocker (ARB)</td>
<td>37 (28)</td>
<td>28 (29)</td>
<td>7 (41)</td>
<td>30 (27)</td>
</tr>
<tr>
<td>Diuretic</td>
<td>25 (19)</td>
<td>16 (17)</td>
<td>4 (24)</td>
<td>21 (19)</td>
</tr>
<tr>
<td>Metformin</td>
<td>28 (22)</td>
<td>22 (23)</td>
<td>5 (29)</td>
<td>23 (20)</td>
</tr>
<tr>
<td>NSAID</td>
<td>24 (18)</td>
<td>14 (15)</td>
<td>6 (35)</td>
<td>18 (16)</td>
</tr>
<tr>
<td><em>Double Whammy</em></td>
<td>33 (25)</td>
<td>21 (22)</td>
<td>9 (53)</td>
<td>24 (21)</td>
</tr>
<tr>
<td><em>Triple Whammy</em></td>
<td>3 (2)</td>
<td>2 (2)</td>
<td>0</td>
<td>3 (3)</td>
</tr>
<tr>
<td>ACEi and ARB</td>
<td>2 (2)</td>
<td>1 (1)</td>
<td>1 (6)</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>
### Table 3: Recollection of receiving advice and planned actions during an episode of severe vomiting or diarrhoea n=130.

<table>
<thead>
<tr>
<th>Planned actions</th>
<th>Participants advised to stop medicines n/17 (%)</th>
<th>Participants not recalling receiving or not receiving advice n/113 (%)</th>
<th>Study medicines being taken</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Continue to take medicines</td>
<td>3 (18)</td>
<td>ACEI or ARB n/95 (%)</td>
</tr>
<tr>
<td></td>
<td>Stop medicines**</td>
<td>3 (18)</td>
<td>NSAID n/24 (%)</td>
</tr>
<tr>
<td></td>
<td>Contact doctor</td>
<td>5 (29)</td>
<td>Diuretic n/25(%)</td>
</tr>
<tr>
<td></td>
<td>Contact pharmacist</td>
<td>7 (41)</td>
<td>Metformin n/28(%)</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**One participant was not taking a study medicine.

With no national approach recommending the use of ‘sick day rules’ as part of an AKI prevention strategy, it is unsurprising that our study found only a small proportion of participants recalled receiving advice to withhold medicines during acute illness. However, an awareness of the risks of certain medicines is suggested from the results as those taking a study medicine were more likely to recall receiving ‘sick day advice’ than those not taking a study medicine. Our results also suggest that primary care clinical guidance to discuss a ‘sick day’ plan for those on a Triple Whammy combination, may not be occurring. Exploring general practitioners and community pharmacist provision of sick day guidance and the acceptability by general practitioners of community pharmacists providing this has been explored in phase one of this research.

Research into the implementation of sick day guidance in the UK has highlighted the challenges of primary care practice change, include patient identification and patient interpretation of the information provided. Our study found in those participants who recalled receiving advice to withhold medicines during acute illness, few would follow it, but many would seek additional guidance from a clinician, often their community pharmacist. This need for support when temporarily discontinuing medicine was noted by Morris et al.

New Zealand pharmacists are encouraged to

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excessive vomiting/diarrhoea; five indicated they would follow this advice after discussion with either their doctor or pharmacist, and one would continue taking regular medicines while unwell. Two participants took a Triple Whammy combination; both did not recall receiving advice on temporary withholding medicines during excessive vomiting/diarrhoea; however, one indicated they would stop medicines during acute illness.

### Discussion

Our study shows that only 16 of the 108 participants taking a study medicine recalled receiving clinician advice to stop taking medicines during excessive vomiting and/or diarrhoea; three indicated they would follow this advice. The ability to remember information declines with age and our sample had a mean age of 71. This could have contributed to the low number recalling advice, or it could be that the advice was never provided. Our study was unable to determine which.

Of note is that of the 16, none identified as Māori. This is of concern as Māori are at higher risk of Triple Whammy-induced AKI and of being prescribed NSAIDs. In light of research indicating Māori report poorer communication acceptability within the medical environment compared to non-Māori, this warrants further investigation.
assess and discuss the risks of using a NSAID in patients already taking an ACEi/ARB with or without diuretics,\textsuperscript{18} while internationally pharmacists are trained to provide sick day guidance.\textsuperscript{27,28} Patient comprehension of sick day guidance has been reported to be of concern to community pharmacists.\textsuperscript{24,26} Indeed a study by Doerfler RM et al showed individuals with CKD could accurately identify a scenario that qualified for Sick-Day Protocol implementation; however, most (95%) made a medicine selection error.\textsuperscript{29}

All NSAIDs have been associated with the development of AKI.\textsuperscript{12} Huerta et al found the current use of NSAIDs was associated with a three-times greater risk for AKI, compared to non-NSAID use, and when combined with diuretics this increased to 11 times greater risk.\textsuperscript{30} The \textit{Triple Whammy} combination is associated with an increased risk of AKI.\textsuperscript{18} Lapi et al noted current use of \textit{Triple Whammy} was associated 31% increased rate of acute kidney injury compared to \textit{Double Whammy}.\textsuperscript{8} Health Quality & Safety Commission analysis of people receiving the \textit{Triple Whammy} for all age groups, sexes and ethnic groups in 2016 found the Health Hawke’s Bay Primary Health Organisation (PHO) population has a higher rate of \textit{Triple Whammy} prescribing (3.1%) than the national rate (2.7%); the second highest ranking PHO.\textsuperscript{31} Analysis by Okamura-Kho et al suggests a lower rate for those in secondary care (0.2%).\textsuperscript{32} bpac\textsuperscript{\textregistered} recommends primary care clinicians discuss a ‘sick day’ plan with patients on this combination.\textsuperscript{18} However, no study participant on this at-risk combination recalled advice to temporarily withhold certain medicines during times of acute illness. This study is unable to determine if this is due to a lack of advice being given, or patients not remembering receiving this advice.

Our study reveals a degree of potentially at-risk prescribing (NSAIDs prescribed to those aged 65 years and older, concurrent ACEi and ARB, \textit{Double} and \textit{Triple Whammy} combinations). Older people value community pharmacists providing medicine information, including expanding, reinforcing and explaining guidance provided by the doctor.\textsuperscript{30} Wider exploration of the acceptability and practicalities of New Zealand community pharmacists in supporting key medicine safety messages to the elderly is recommended.

Our research recruited a small number of participants from a small number of pharmacies within a defined region of New Zealand, therefore does not claim to represent wider New Zealand health consumers’ views, nor the practices of all Hawke’s Bay clinicians. It is also possible that participant self-selection bias occurred. A large percentage of participants were recruited from Havelock North and Hastings pharmacies. This willingness to participate may have been influenced by an increased awareness of the effects of acute illness due to the campylobacter outbreak that occurred in the Havelock North public water supply in 2016.\textsuperscript{34}

A strength of our study is the approach of comparing patient recall of receiving medicine discontinuation advice and their planned actions. This provides useful insights into patient awareness and understanding of the risks associated with acute illness when also taking at-risk medicines.

**Conclusion**

Our findings reveal that only a small number of people taking at least one of the study medicines recalled receiving advice from health professionals to temporarily withhold them during acute illness. Of those who recalled receiving this advice, many would not act on it before receiving additional instructions from a health professional.

The results also indicate a degree of AKI at-risk prescribing, with few of these participants recalling receiving any guidance to temporarily withhold medicines during acute illness.

There is an opportunity to develop a brief educational community pharmacy intervention with associated resources to empower people to self-manage at-risk medicines during periods of acute illness. It would also appear beneficial to increase clinician awareness of at-risk medicine combinations, and encourage identification of these patients and informing them about acute illness management strategies; particularly those who are older.
Appendix

Medicine Use Survey

Kia Ora and greetings to you and your family. Thank you for taking part in our research and for answering the following questions. You do not have to answer any questions that you feel uncomfortable about.

1. If you have excessive vomiting (‘the spews’) and/or diarrhoea (‘the runs’), what do you do about taking your regular medicines? Please tick one of the boxes below to answer.
   - Do nothing different, keep taking my medicines as usual
   - Stop the medicines I have been told to stop while I am sick
   - Ring my doctor or practice nurse for help
   - Talk to my pharmacist about what I should do

2. Have you been told by a doctor, specialist, nurse, or pharmacist about what medicines you should stop taking when you have excessive vomiting (‘the spews’) and/or diarrhoea (‘the runs’)? Please tick one of the boxes below to answer.
   - Yes
   - No

3. If yes, my medicines I would stop are: ______________________________________

4. Please tick the medicines that you regularly take from the list below. If you are unsure, a member of the dispensary team is available to help you.
   - Non-steroidal anti-inflammatories (NSAIDs)
     for example: ibuprofen, naproxen, diclofenac
   - ACE Inhibitor
     for example: cilazparil, quinapril, lisinopril, enalapril, captopril
   - Angiotensin Receptor Antagonist
     for example: candesartan, losartan
   - Diuretic
     for example: furosemide, bendroflumethiazide (bendrofluzide), amiloride, spironolactone, indapamide, chlortalidone (chlorthalidone)
   - Metformin

If you have any questions about taking your medicines when you have excessive vomiting (‘the spews’) and/or diarrhoea (‘the runs’) please talk to your doctor. Thank you for taking part in our survey.

Di Vicary
Clinical Pharmacist
Portfolio Manager – Integration
Di.Vicary@hbdhb.govt.nz
06 878 8109 ext 4617

and/or

Dr Colin Hutchison
Nephrology Senior Medical Officer
Medical Director of Acute and Medical Directorate
Hawke’s Bay District Health Board
colin.hutchison@hawkesbaydhb.govt.nz
06 878 8109
Information about me
You do not have to answer any questions that you feel uncomfortable about.

1. **Gender:** Are you...? Please tick the box that applies to you.
   - Male □
   - Female □

2. **Age:** What year were you born? __________________________

3. **What is the highest level of education you have completed?** Please tick the box that applies to you.
   - Primary school (Year 1 to 8) □
   - High school (Year 9 to 13) □
   - Trade/technical/vocational training □
   - University Degree □
   - Postgraduate □

4. **What is your ethnicity?** Please tick the box or boxes that apply to you.
   - New Zealand European □
   - Māori □
   - Samoan □
   - Cook Islands Māori □
   - Tongan □
   - Niuean □
   - Chines □
   - Indian □
   - Other (such as Dutch, Japanese, Tokelauan) □

5. **Address:**
   - Please write your Post Code here:___________
   - If you do not know your Post Code please write the suburb where you live:________________________

6. **Employment Status:** Are you currently...? Please tick the box or boxes that apply to you.
   - Employed for wages □
   - Self-employed □
   - Unemployed □
   - A homemaker □
   - A student □
   - Retired □
   - Unable to work □

If you sign this consent form and the complete the questionnaire, you will automatically go into the draw to win a $100 Briscoes voucher. Please provide an email address or phone number so that you can be contacted should you be the winner:

   - Phone number: __________________  email address: ____________________________

*Note: This page is kept separate from your survey answers so that the project team cannot identify your answers to the survey.*
Competing interests:
DJV has been an employee of Health Hawke's Bay and during the research project was
employed by Hawke's Bay District Health Board, as Planning and Commissioning Manager
which includes commissioning community pharmacy services.

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