Supplementary Appendix Methods: Table 1 Training and Learning Message Development and Distribution.

Phase	Description
Training Phase and Provider Engagement	Prior to the study start, hospital pharmacists received training on the study definition of pADE, definition of ADE causality amd preventability criteria, and procedures for screening. The research nurse also received training in qualitative interview techniques and the nature of various anticipated pADEs.[1] Family physicians in the local community also received notification via their usual newsletter of study purpose and expected invitation for interviews. This was also communicated to local hospital physicians. The inter-rater reliability of pharmacists ADE screening of patients was assessed by independent review of 20 charts prior to the start of the study. Due to the limitations of a chart review, preventability was not part of this assessment, but this component and type of information to required to assess preventability was discussed at final review of the cases. All 9 pharmacists reviewed the same 20 charts to identify presence of a possible ADE or not. Fleiss' kappa was used to assess inter-rater reliability for ADE identification by pharmacists performing the sceening.[2] During pharmacist screening training, inter-rater agreement for ADE identification was "moderate agreement" bordering on "substantial agreement" [Fleiss' kappa 0.60 (95%CI 0.53 - 0.68)].
Development and Distribution of Learning Messages to Community Providers	Development work on learning messages was sequential and began as soon as the investigator committee identified a theme reflecting emerging root causes. To be a candidate for a learning message, the theme needed to be able to be translated into specific actions that providers and families could follow to reduce recurrence of the pADE. Messages were prioritized according to potential impact and effort required to develop. The learning message was not completed until most potentially related pADE cases relevant to that message had been reviewed by the committee (to ensure learning was maximized). This resulted in messages being distributed from March 2018 to May 2019. All content of learning messages was either developed by or reviewed and approved by the investigator committee (if local experts were involved). Messages were deployed in the form of 1-page 2-sided documents for distribution to care providers in the local community by paper mail to all pharmacies and doctors and published in the Division of Family Practice's newsletter (reaching 60% of local family physicians). These messages were also presented orally at a regular family doctors meeting (by RC) and a special meeting was convened for local community pharmacists, primary care and Emergency Department (ED) nurses. Select messages and the purpose of the pADE Program (term used to describe initiative following formal study closure) was presented by JdL, CN, RC and a local expert (KD). Learning messages for the public were reviewed by our health authority's department of Community Engagement and were translated into Traditional Chinese for this significant demographic in the community. All provider messages were published digitally on our institutional research organization's website, and leaflets for patients/families were published on our health authority's patient educational website. Links to these messages and information about the pADE Program are also posted on the hospital's intranet. The Provincial Academic Detailing Service acted as a knowledge broker for 2 key messages (sick day management, pneumonia) by adding these to their related education programs for physicians and pharmacists.

References:

1) Fleiss J.L. Measuring nominal scale agreement among many raters. *Psychological Bulletin* 1971;76:378-382.

Supplementary Appendix Methods: Table 2. pADE Surveillance tool: Development and Implementation

Phase	Description
pADE Surveillance tool: Development and Implementation	In addition to the investigator committee, we engaged a key stakeholder, head of the hospital's hospitalist group (TC) to develop this tool. The availability of the tool and the purpose of the pADE system was shared at a specially convened meeting for the local hospital physicians and at relevant department meetings by the Emergency Department member of the Investigator Committee (RC) and the PI (JdL).
	RC also presented the purpose of this system and pADE Program, prior to its' launch, at a regular family doctor's meeting so that these providers would be aware that they will receive letters (when patients present to hospital with a pADE) to share the root causes and learning of the pADE found. This information was also published in the Division of Family Practice's newsletter and shared with local community pharmacists and Emergency Department nurses at the specially convened meeting (by JdL, RC and CN).
	The health authority's project support group supported development of an implementation plan for the surveillance tool. This included, development of a key performance metric (5% of medical admissions equal to 50 % of expected pADEs). The hospital's decision support group set up weekly automated reports by admitting service to permit calculation of this metric. Plans were also developed to improve reporting or referral of potential pADEs by target users (physicians, pharmacists and Emergency Department nurses). Finally a reporting structure was developed to share aggregated pADE reports with physician department heads, the hospital's Patient Safety & Quality Committee and the hospital's medical leadership. Technical development started in February 2018 and the system was implemented in October 2019.
	The pADE reporting tool is accessible to any hospital provider from the hospitals intranet. However, to print a PDF letter does require specific user permission and log-in to the hospital's computer network. This two-stage process was set up to allow easier reporting into the system by any user at the point of care while providing the appropriate level of required privacy/security. This also provides a means for the PI (or designated pharmacists) to review reported pADEs to coordinate subsequent patient care follow-up.
	Reports can be generated to evaluate weekly metrics, and those pADEs that meet the criteria for an ADR are shared (by a secure file transfer protocol) with the relevant Provincial Agency as part of the mandatory national ADR surveillance program.

Supplementary Appendix Results: Table 1. All root causes identified

Root Cause (Number of patients impacted)	Explanation
1. **Action Plans for HF, COPD and Asthma** (13)	Lack of provider provision; furosemide for HF requires separate blister pack to permit Home Support Worker to administer within a specific plan under supervision of Home Care Nurse.
2. **Antibiotics referral to guideline** (6)	Lack of prescriber/pharmacist referring to CAP guideline; http://www,bugsanddrugs.org is available to provide local antibiotic recommendations but providers do not look at this. Unaware that macrolide monotherapy inadequate for *S.pneumoniae* and unaware of correct amoxicillin dose.
3. **Anticipate issue** (6)	Lack of anticipation of future need for therapy (laxative for opioid escalation) or combined toxicity of medications (e.g. CNS effects)
4. **Bleeding Risk Assessment** (6)	Lack of bleeding risk assessment (e.g. not asking adequate screening questions for NSAIDs and not referring to a guideline for indications to provide primary prevention therapy)
5. **Deferring** (8)	3 types: 1) Patients deferring to physician or specialist or hospital (these providers not requiring demonstration of skills, not acknowledging process well done e.g. process of patient measuring BP not acknowledged as well done, providers take over care of patient 2) Physician deferring to physician (hospital MD to GP, GP to specialist 3) Hospital MD or community pharmacist deferring issue to patient to discuss with GP
6. **Device** (6)	Poor technique due to lack of provider incorporating assessment into routine practice; use of samples results in bypass of Pharmacist, same for devices given directly to patient from nursing unit during hospital stay (unlabelled with dose and regimen).
7. **Drug-Drug Interactions** (2)	Pharmacist downplaying interactions even if alerted by computer system (Pharmacist unsure how to handle, QTc prolongation – palpitations counselling)
8. **Form*** (4)	Patients had misunderstood hospital personalized discharge plan document because it specifies medications to take over the rest of that day (not those already taken).* Could be considered a causal factor (rather than root cause), as provider did not confirm that patient/family had understood information. Patients interpreted partial list to mean complete medication list.
9. **Home Support** (4)	Require specific parameters to be ordered and explicit instructions about what to do when threshold met e.g. call MD if HR less than 50 bpm vs monitor HR daily; not always made use of (for monitoring) even if visit patient regularly
10. **Independence** (3)	Providers could not manage conflict between providing support and patients perceived intrusion on independence leading to inability to recognize and respond to medication side effects and medication non-ahderence.
11. **Intentional Non-Adherence** (20)	Due to provider not helping patient understand purpose/benefit of medication, identifying barriers to use (e.g. cost) or concerns or beliefs/preferences or understanding of need/presence of medical condition or purpose behind task of monitoring or lack of continued positive feedback for following task (BP always normal so stopped as MD did not mention it was a problem).
12. **Medication Adjustment Provider** (12)	Provider overlooking test results indicating an adjustment needed (TSH, perhaps not interpreting in light of information on adherence; not adjusting for renal dysfunction (DOACs)
13. **Medication Change Provider** (8)	Providers not ensuring patients/families understand implications of medication changes; getting new prescription for new medication or changed dose; managing stopped medications; discharging physician not referring to admission medication list to stop medications not ordered as an in-patient (does not appear on computer generated discharge list).
14. **Medical Decision Making** (1)	Not involving patient and family in deciding whether to take anticoagulation for stroke prevention
15. **Medication Effect** (17)	Patient unaware of how to know if medication is working

Supplemental material

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Root Cause (Number of patients impacted)	Explanation
16. **Medication Monitoring Provider** (18)	Provider had not implemented a monitoring plan (e.g. thyroid stimulating hormone monitoring, serum creatinine), even if supports available to carry out (heart rate by Home Support Worker with Home Care Nurse liaison)
17. **Medication Side Effect Patient** (28)	Patient unaware of how to know if causing side effect (Provider did not confirm ability to do this)
18. **Medication Side Effect Provider** (3)	Provider did not consider if new symptoms could be side effects of current drug therapy; common (e.g. falls) or rare (bullous pemphigoid due to primidone, tremors due to amiodarone)
19. **Medication Monitoring Competency** (11)	Providers fail to assess competency of patient and family to monitor medical condition and respond appropriately to change in clinical status; As a result fails to identify need to arrange required medication support
20. **Medication Use Competency** (12)	Provider not assessing medication use competency; can patient and family safely take medications themselves? Not engaging potentially competent family member; as a result fails to identify need to arrange required medication support
21. **Out-of-Country Medication or Use of Family Member's Medication** (2)	Providers unaware of (fails to ask) patient's use in context of frequent or lengthy periods out-of-country ; use of relative's benzodiazepine (provider not asking careful questions regarding such medication use in conext of known benzodiazepine dependency)
22. **Pharmacists Assessment** (3)	Not challenging dose of antibiotic for CAP (not referring to guideline); Not assessing dose of drug or monitoring requirements.
23. **Pharmacist Declines Access** (3)	Pharmacist not fulfilling duty of care in not dispensing furosemide (and other meds) for patient new to Province; same for steroids for action COPD plan for patients with prior prescriptions but no active prescription on file.
24. **Pictures*** (1)	Providers lack of using pictures to support patient understanding of complex issues e.g. hypoglycemia ; coud be considered a causal factor (not a root cause) as it led to a problem because understanding not confirmed.
25. **Prescribing** (18) (other than antibiotics)	Unclear indications for drug therapy (not referring to guideline); inappropriate dose (too high or low) ; need for drug therapy but not prescribed (laxative, glucose gel)
26. **Provider-Provider Communication** (2)	Specialist to Specialist non-direct communication via Provincial electronic record (CareConnect) assumes receiving Specialist reviews that (direct phone call better); No closed loop communication system between nursing team responsible for transition home with discharging physician resulting in home supports (medication delivery) not set-up in time for patient discharge leading to patient returning with heart failure due to lack of furosemide.
27. **Referral to Other Provider** (1)	Provider's not making use of community Respiratory Therapist (over-arching); Family MD not making use of Internal Medicine consult (for new hyperthyroidism)
28. **Sample** (2)	Use of samples results in bypass of pharmacist for counselling of purpose/effect/side effect (e.g. agent for constipation caused severe diarrhea)
29. **Sick Day** (15)	Lack of provision of sick day plan (relatively new, not incorporated into routine practice, warfarin and caloric section new components).
30. **Surrogate** (4)	Provider may not confirm that surrogate (if picking up instructions) will convey instructions or confirm understanding of these.
31. **System Gaps** (3)	Missing sotalol amiodarone interaction in hospital computer system; lack of reminder to prescriber to adjust phenytoin reported level for low albumin in community private laboratory system.

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Root Cause (Number of patients impacted)	Explanation
	Reminder to adjust with link to online resource added by laboratory to reporting format, with 1-800 telephone# to add albumin.
32. TeachBack (35)	Provider not following a process to verify patient or competent family member understanding of information, instructions. If this was routine process, need to use translator services (available 24/7) would be routine.
33. Over-arching root cause in hospital	Providers take over the care of the patient Passive process of"providing" information, viewed as a single "episode of care" left to end of hospital stay, patient/family feels rushed and cannot process information or plan how to manage medication changes.

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