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A cross-sectional questionnaire study of the experiences of community pharmacists during the early phases of the COVID-19 pandemic: preparation, experience and response

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ABSTRACT

Objectives: To examine the views and experiences of the community pharmacy workforce in Northern Ireland (NI) regarding changes in community pharmacy practice/processes in preparation for, and response to, the COVID-19 pandemic.

Design: Cross-sectional telephone-administered questionnaire.

Setting and participants: Geographically stratified representative sample of 130 community pharmacists in NI between March and May 2021.

Outcome measures: Community pharmacists' responses to questions focusing on their preparation, experience and response to the COVID-19 pandemic. Descriptive analysis was conducted including frequencies and percentages. Free-text comments were summarised using thematic analysis.

Results: One hundred and thirty pharmacists completed the questionnaire. Pharmacists responded comprehensively to implementing infection control measures, e.g. management of social distancing in the shop (n=125, 96.2%), making adjustments to premises, e.g. barriers/screens (n=124, 95.4%), while maintaining medicines supply (n=130, 100.0%) and advice to patients (n=121, 93.1%). Newly commissioned services were provided, e.g. emergency supply service (n=121, 93.1%), flu vaccination for healthcare workers (n=101, 77.7%) and volunteer deliveries to vulnerable people (n=71, 54.6%). Pharmacists were least prepared for the increased workload and patients' challenging behaviour, but the majority (n=126, 96.9%) reported that they felt better prepared during the second wave. Pharmacists agreed/strongly agreed that they would be able to re-establish normal services (n=114, 87.7%), were willing to administer COVID-19 vaccines (n=105, 80.7%) and provide COVID-19 testing (n=79, 60.8%) in the future.

Conclusions: The pharmacy workforce remained accessible and maintained supply of essential medicines and advice to patients throughout the pandemic. Provision of modified and additional services such as vaccination reinforced the clinical and public health role of pharmacy

Strengths and limitations of this study

- Large representative sample of community pharmacists attained
- Method of questionnaire administration ensured there was very little missing data
- Focus on Northern Ireland making the results less generalisable

- Method of questionnaire administration limited the number of pharmacists who could be contacted due to time and resource constraints

INTRODUCTION

Since March 2020, healthcare provision has faced one of its greatest challenges in responding to the COVID-19 pandemic. Health services have been under immense pressure to provide information, prevent and manage COVID infection, and deal with the long-term sequalae of infection, while trying to maintain care for other patients with acute and long-term conditions. Community pharmacy is one of the most accessible health sectors and has played a vital frontline role during key stages of the current COVID-19 pandemic (i.e. prevention, preparedness, response, recovery.[1 2 3 4] Amid the restrictions imposed following the onset of the pandemic, community pharmacy was deemed an essential service which reflects the centrality of medicines to everyday life.[5] Governments and professional organisations in various countries have specifically acknowledged the need to support and maximise pharmacy as a resource in maintaining delivery of patient care.[6]

As society begins to emerge from the worst of the pandemic, it is important to learn from the experience so that health services can appropriately prepare for the next pandemic or emergency health crisis. This requires a consideration of the experiences of healthcare professionals who have worked during COVID-19. Therefore, the aim of this present study was to examine the immediate views and experiences of the community pharmacy workforce in Northern Ireland (NI) regarding changes in community pharmacy practice/processes in preparation for, and response to the COVID-19 pandemic.

METHOD

A cross-sectional study was undertaken involving administration of a brief telephone questionnaire with community pharmacists in NI to examine their immediate views and experiences of changes in community pharmacy practice/processes in preparation for, and in response to, COVID-19. This study received ethical approval from the Queen's University Belfast Faculty of Medicine, Health and Life Sciences Research Ethics Committee (Ref. No. MHLS 21_21).

Patient and Public Involvement

Two patient and public involvement (PPI) representatives were recruited to the Study Advisory Group via the Patient Involvement Enhancing Research (PIER) NI network from the

Health and Social Care Research and Development division. The Study Advisory Group also included members of the pharmacy profession representing practice, regulation and professional advocacy, along with a methodological advisor. The Group contributed to the development of the telephone questionnaire (see below) and advised on other aspects of the study.

Questionnaire development

The telephone questionnaire was developed based on documentary analysis of key policy publications from health policy, commissioning and professional organisations in NI, and relevant literature describing a framework of activities that pharmacy personnel can undertake in preparation/response to crises such as COVID-19.[7 8] The questionnaire included items on demographics, followed by six main sections encompassing community pharmacists' experiences of working during the pandemic and specifically during March-May 2020 (Wave 1) and September-December 2020 (Wave 2) , i.e. (1) prevention of infection spread, (2) maintaining pharmacy services, (3) preparedness for and response to the COVID-19 pandemic, (4) communicating with others (5) updating professional knowledge and (6) looking to the future. To minimise the impact of administering the questionnaire on daily practice, the content was designed to ensure that the questionnaire was concise. Respondents could skip any questions that they preferred not to answer. It was piloted with volunteer community pharmacists (n=5) to assess face and content validity and was refined on the basis of their responses. This piloting indicated that completion time for the questionnaire was approximately 15 minutes. Pilot responses were not included in the final analysis. A copy of the questionnaire is provided in Supplementary File 1.

Sampling

A purposive and geographically stratified sample of community pharmacists was recruited for the study. Using the publicly available information on contact details of registered pharmacies in NI, community pharmacies were stratified according to Local Commissioning Group (LCG) areas, of which there are five. LCGs commission health and social care services based on the needs of local populations. The numbers sampled were in proportion to the number of registered pharmacies in each locality to ensure representation across NI.

In November 2020, there were 528 community pharmacies in NI. In order to attain a statistically representative sample of pharmacists across NI, and to estimate the percentage response to any questions in the questionnaire within a precision of +/-7.5% (i.e. a 95% confidence level to within ±7.5% of any questionnaire responses), a sample of n=130 respondents to the questionnaire was required. Based on the total number of pharmacies across NI (n=528) and an anticipated response rate of 30%, up to a maximum number of 433 pharmacies were contacted (from the 528) to achieve the required sample size (n=130). This equated to a sampling fraction of 24% of the total number of pharmacies. Within each LCG area, a random list of pharmacies was generated. Pharmacies were telephoned sequentially in each LCG area by the researcher (SP) using the random list until the required number within each LCG area was achieved.

Recruitment and consent

To raise awareness in advance of recruitment, summary information about the study was made available to all community pharmacies through a number of pharmacy organisations e.g. Pharmacy Forum, Community Pharmacy NI, with close links with the community pharmacy sector.

Pharmacies were contacted by telephone (using publicly available contact details) in random order across the LCGs by the researcher (SP). SP briefly outlined the study and referred to the summary information circulated to pharmacies in advance to determine if a pharmacist would be interested in taking part. SP advised that the questionnaire would take approximately 15 minutes to complete. Community pharmacists were offered the opportunity to complete the questionnaire during the telephone call or to arrange a later time and date that was more convenient. Further information about the study, if requested, was provided via email. Community pharmacists interested in taking part were asked to provide verbal consent over the telephone; this was documented and audio-recorded. The explicit yes/no responses for consent were documented on the telephone questionnaire form. The records of consent were stored separately from the completed questionnaire responses.

Data collection

A unique study ID number was assigned to each community pharmacist participant and recorded on a hard copy of the questionnaire. The study IDs were stored in a password-protected Microsoft Excel spreadsheet which acted as a log, linking ID numbers to respondents known only to the researcher and stored on the researcher's secure and password-protected laptop. Verbal responses to the questions were recorded by the researcher (SP) on the form. If the community pharmacist was interrupted during the questionnaire data collection, they were asked if they were willing to complete the questionnaire at a later time and an appointment was arranged.

Data analysis

Data were analysed descriptively using SPSS v27 (SPSS Inc., Chicago, IL, USA), reporting frequencies, percentages and 95% confidence intervals. Free text responses to questions were recorded, and grouped into broad themes.

RESULTS

During March–May 2021, the researcher initially invited 175 community pharmacists. One hundred and thirty-nine (79.4%) community pharmacists agreed to participate and 130 (74.3%) completed the questionnaire by telephone with the researcher (representing 130 pharmacies). Nine community pharmacists were unable to complete the survey due to interruptions during administration and could not be contacted again. Completion of the telephone questionnaires took 46 working days, with 110 (62.9%) community pharmacists deferring the call to another day due to work pressures at the time of the arranged call.

The demographic characteristics of the 130 participating community pharmacists are reported in Table 1 and the characteristics of the pharmacies in which they worked are reported in Table 2. There was a higher percentage (55.4%) of pharmacist respondents who were female, most participants were aged between 25-54 years old, and 36.2% had been in practice for more than 11 years. The majority of respondents were employees (80.8%) and just over 50% (51.5%) were dispensary managers. The pharmacies in which the respondents worked were located in largely urban (43.1%) or suburban settings (37.7%); just over 30% (32.3%) were independently owned and 38.5% were part of a large chain (group of more than 20 pharmacies).

Table 1. Demographic characteristics of community pharmacists who completed the telephone questionnaire

Characteristic	n (%)
Gender	
Female	72 (55.4)
Male	58 (44.6)
Age	
< 25 years	6 (4.6)
25-34 years	53 (40.8)
35-44 years	38 (29.2)
45-54 years	21 (16.2)
≥ 55 years	12 (9.2)
Number of years in community pharmacy practice	36 (27.7)
≤ 5 years	22 (16.9)
6-10 years	25 (19.2)
11-15 years	47 (36.2)
≥ 15 years	-
Status	
Owner/contractor	25 (19.2)
Employee	105 (80.8)
Usual Role	
Owner manager	17 (13.1)
Responsible pharmacist	12 (9.2)
Dispensary manager	67 (51.5)
Locum pharmacist	13 (10.0)
Pharmacist team member	15 (11.5)
Superintendent	6 (4.6)
Shielding during Wave 1*	8 (6.2)

**Measures taken by those at highest risk of severe illness from COVID-19 (e.g. self-isolation)

Table 2. Characteristics of participating community pharmacies

Geographical Location (LCG Area)	n (%)
Belfast	32 (24.6)
Northern	28 (21.5)
South-Eastern	24 (18.5)
Southern	22 (16.9)

Western	24 (18.5)
Location Type	
Urban	56 (43.1)
Rural	36 (27.7)
Suburban	38 (29.2)
Pharmacy Type	
Independent	42 (32.3)
Small chain <5	18 (13.8)
Medium chain 5-20	20 (15.4)
Large chain >20	50 (38.5)

Questionnaire section 1: Preventing the spread of COVID-19

During the first wave, the most common measure was the management of social distancing in the pharmacy (96.2%; n=125), including one-way systems, limiting capacity within the pharmacy, and queue management (Table 3). Adjustments such as the erection of barriers or screens, were made to premises in 95.4% (n=124) of pharmacies to reduce the risk of contact between staff and patients. Cleaning and disinfection of premises became a routine task during the pandemic first wave, implemented in 93.8% (n=122) of pharmacies and performed at least twice a day in most. Public health information was displayed in 92.3% (n=120) pharmacies, using materials from the public health campaigns that focused on COVID-19-related issues.

Table 3 Measures taken during the onset of the pandemic (March-May 2020) to prevent the spread of COVID-19 in community pharmacies

Prevention of Infection Measures	**Implemented in March-May 2020**		**Stopped in June-August 2020**		**Started at a later date (after September 2020) n (%)**
	Yes n (%)	**No n (%)**	**Yes n (%)**	**No n (%)**	
Management of social distancing in the shop	125 (96.2)	5 (3.8)	~	122 (93.8)	~
Premises adjustments such as barriers, screens	124 (95.4)	6 (4.6)	115 (88.5)	9 (6.9)	5 (3.8)

Protocols for disinfection of pharmacy surfaces	122 (93.8)	8 (6.2)	5 (3.8)	122 (93.8)	0 (0.0)
Public health information on preventing Covid-19 displayed	120 (92.3)	10 (7.7)	~	119 (91.5)	~
Reduced face-to-face contact	120 (92.3)	10 (7.7)	6 (4.6)	116 (89.2)	0 (0.0)
Lunchtime closing	119 (91.5)	11 (8.5)	63 (48.5)	55 (42.3)	~
Use of PPE by pharmacy staff	115 (88.5)	15 (11.5)	~	116 (89.2)	11 (8.5)
Changes to the use of the available space	98 (75.4)	32 (24.6)	7 (5.4)	92 (70.8)	~
Shorter opening hours	87 (66.9)	43 (33.1)	69 (53.1)	17 (13.1)	0 (0.0)
Changes to staff working patterns	64 (49.2)	66 (50.8)	9 (6.9)	57 (43.8)	~

~ not reported as less than 5, and potentially identifiable; PPE: personal protective equipment

During the first wave, 88.5% (n=115), community pharmacists reported that staff were using personal protective equipment (PPE). When asked for further comments, pharmacists reported how government advice on PPE had changed and there was conflicting advice from other sources. Community pharmacists were concerned about protecting their staff, especially those with vulnerable family members and some introduced early protection measures, e.g. making visors when PPE was in short supply, ensuring adequate ventilation, setting up dispensary workstations two metres apart and asking delivery drivers to wear protective clothing.

Many pharmacies (75.4%; n=98) closed the shop floor space entirely or reduced it and reused the space to prepare and check prescriptions, monitored dosage system boxes and orders for delivery. Working patterns and break times were changed in 49.2% (n=64) pharmacies to reduce the number of staff working at any one time. Many staff worked longer hours and started early to manage the increased volume of prescriptions. Many of the changes outlined in Table 4 were maintained over the time periods assessed, except

lunchtime closing, which was stopped in almost 50% of pharmacies (48.5% n=63) in June-August 2020.

Questionnaire section 2: Maintaining pharmacy services during the pandemic

Community pharmacies normally provide a wide range of core services (provided by all pharmacies) or locally commissioned services (delivered by choice or driven by local need). At the outset of the pandemic, the commissioners stood down a number of additional patient-facing services, e.g. Medicines Use Reviews (MURs); some of these were reintroduced at a later date, e.g. Minor Ailments and Smoking Cessation (September 2020) with appropriate COVID-safe modifications. The immediate actions taken in relation to community pharmacy services in response to the pandemic and over time, up to the end of December 2020 are described below.

Core pharmacy services, principally dispensing, continued to be provided from all pharmacies throughout March–December 2020, while over-the-counter (OTC) medicines advice and supply were available from 128 (98.5%) and 121 (93.1%) pharmacies respectively (Table 4). Prescription collection and delivery services were maintained (and increased) by the majority of pharmacies (95.4%; n=124 and 88.5%; n=115 respectively). Of the 84 (64.6%) pharmacies that provided out-of-hours dispensing services, two stopped service provision during March-May 2020 and one restarted with a modified service during September-December 2020. Some pharmacies did not restart services until September-December 2020 and then provided them in a modified format, e.g. nursing home advice was provided by telephone or videocall by 12 (9.2%) pharmacies during Wave 2. All participating pharmacies, except one, normally provided Living Well campaigns (provision of key public health messages and advice through community pharmacies); 55 (42.3%) stopped this service at the onset of the pandemic, but by June-August 2020, 44 (33.8%) had restarted modified campaigns providing COVID-19 information to the public.

Most of the non-core services were stood down during March-May 2020, with the notable exception of needle and syringe exchange services (NSES) which were modified to reduce the COVID-19 transmission risk. Just over 70% (71.5%; n=93) of community pharmacies stopped smoking cessation services, 56.2% (n=73) restarted the service during June-August 2020 and 16.1% (n=21) reported providing a modified service by September-December

2020. Pharmacists reported that opioid substitution treatment supervision (OST) was initially stopped, but then as patients' needs were reassessed, it was recommenced in a modified format, e.g increased supervision by addiction team staff. Most private travel vaccination services did not restart as there was little demand for them.

During the pandemic, a number of new services were commissioned and provided by community pharmacies. In addition, many new initiatives were undertaken as the pandemic progressed such as "drive-through" pharmacies or the equivalent such as 'call and collect' and measures to flag/assist patients with sensitive issues such as domestic violence reporting. The new services/initiatives and their status over time are presented in Table 4 below:

Table 4. Newly commissioned services and community pharmacy initiatives during the COVID-19 pandemic.

New Services or Initiatives	Implemented in March-May 2020 n (%)		Stopped in June-August 2020 n (%)		Started at a later date n (%)
	Yes	No	Yes	No	
Emergency Supply during a pandemic service (ESS)	121 (93.1)	9 (6.9)	~	117 (90.0)	0 (0.0)
Flu vaccination service (frontline Health and Social Care workers)	101 (77.7)	29 (22.3)	101 (77.7)	0 (0.0)	0 (0.0)
Situation reporting (staffing/stock) to the Health and Social Care Board	74 (56.9)	56 (43.1)	10 (7.7)	64 (49.2)	0 (0.0)
Measures to flag/assist patients with sensitive issues such as domestic violence reporting	73 (56.2)	57 (43.8)	0 (0.0)	73 (56.2)	6 (4.6)
Prescription delivery by volunteers in the local community	71 (54.6)	59 (45.4)	32 (24.6)	39 (30.0)	0 (0.0)
Referrals to Test and Trace services	70 (53.8)	60 (46.2)	~	68 (52.3)	0 (0.0)
Employment of additional staff, e.g. dentists,	49 (37.7)	81 (62.3)	22 (16.9)	27 (20.8)	0 (0.0)

volunteers, students, retired pharmacists					
Drive-through (or equivalent) pharmacy services	33 (25.4)	97 (74.6)	~	32 (24.6)	0 (0.0)
Replenishment of care home pandemic packs	19 (14.6)	107 (82.4)	~	15 (11.5)	~
Palliative care on-call services	19 (14.6)	111 (85.4)	~	17 (13.1)	0 (0.0)
Supply of medicines usually supplied in the hospital setting (e.g. oncology, antiretroviral drugs, 'Healthcare at Home')	11 (8.5)	119 (91.5)	0 (0.0)	11 (8.5)	0 (0.0)
Medicines delivery service (to vulnerable people) (commissioned September 2020)	n/a	n/a	n/a	n/a	95 (73.1)

~ not reported as less than 5, and potentially identifiable

The Emergency Supply Service (allowing a month's supply of medicines to be provided in the absence of a prescription) was widely implemented from the onset of the pandemic. It was initially provided by 93.1% (n=121) of community pharmacies, four of whom stopped provision in June-August 2020. Pharmacists commented that this was due to an inappropriately excessive demand for pain medication in urban areas. The 'flu vaccination campaign was provided by 77.7% (n=101) of community pharmacies. Only 56.9% (n=74) reported participation in the Situation Reporting scheme (updating health officials on staffing and stock issues) and 56.2% (n=73) implemented measures to flag domestic violence ("Ask for ANI" initiative). Almost 55% (54.6%; n=71) used volunteer delivery services but by June-August 2020, 24.6% (n=32) had stopped and by September-December 2020, 73.1% (n=95) of pharmacies had switched to commissioned Home Delivery services. From free text comments, pharmacists commented that the volunteer services were invaluable but that in some cases, they had encountered problems with insurance and confidentiality issues.

Questionnaire section 3: Preparedness for and response to the COVID-19 pandemic

Pharmacists were asked to recall the initial outbreak of the pandemic (March-May 2020) and to reflect on their level of preparedness. The responses are shown in Table 5 and illustrate the changes in preparedness over time. Initially, 74.6% (n=97) of pharmacies reported having had appropriate working patterns in place and 66.2% (n=86) had sufficient PPE available for staff at the onset of the pandemic, but after six months, this increased to 95.4% (n=124) and 99.2% (n=129) respectively. Increases were also seen over the time period in the number of pharmacies reporting that business continuity plans were in place in their premises for prolonged staff absences or for the eventuality of pharmacy closure. Employee pharmacists in pharmacy multiples reported that they did not know about the existence of business continuity plans or financial resources available during the pandemic, e.g. 54 (41.5%) were unaware of financial resources during March-May 2020. Pharmacies having sufficient information about PPE increased from 53.1% (n=69) during March-May 2020 to 99.2% (n=129) in September-December 2020, reflecting the increasing amount of advice relevant to community pharmacy available from Public Health England and the Department of Health in NI. Sufficient stocks and supplies of medicines and hand sanitisers increased over the same time periods from 65.4% (n=85) to 94.6% (n=123) and 35.4% (n=46) to 99.2% (n=129) respectively.

Table 5. Community pharmacists' reflections on how prepared they felt they were for working during a pandemic

Did you have….	**During March-May 2020**			**During September-December 2020**		
	Yes n (%)	**No n (%)**	**Don't know n (%)**	**Yes n (%)**	**No n (%)**	**Don't know n (%)**
Appropriate staff working patterns in place	97 (74.6)	33 (25.4)	0 (0.0)	124 (95.4)	6 (4.6)	0 (0.0)
Enough supply of PPE for staff	86 (66.2)	44 (33.8)	0 (0.0)	129 (99.2)	~	0 (0.0)
A business continuity plan in place for use in the event of staff	85 (65.4)	26 (20)	19 (14.6)	101 (77.7)	10 (7.7)	19 (14.6)

absence over a prolonged period						
A business continuity plan in place for use in the event of pharmacy closure	85 (65.4)	21 (16.2)	24 (18.5)	100 (76.9)	7 (5.4)	23 (17.7)
Enough stock and supply of essential prescription and OTC medicines	85 (65.4)	43 (33.1)	~	123 (94.6)	6 (6 (4.6)	~
Enough information about PPE requirements for staff	69 (53.1)	60 (46.2)	~	129 (99.2)	0 (0.0)	~
Enough financial resources to cover the additional demands on your pharmacy business	63 (48.5)	13 (10.0)	54 (41.5)	76 (58.5)	~	53 (40.8)
A system to manage quantity limits for patients for the supply of individual medicines	56 (43.1)	73 (56.2)	~	38 (29.2)	91 (70.0)	~
Enough stock and supply of hand sanitisers	46 (35.4)	83 (63.8)	~	129 (99.2)	1 (0.8)	0 (0.0)

~ not reported as less than 5, and potentially identifiable

Pharmacists were asked about what single aspect of their work they felt most prepared for and what they felt least prepared for. Forty-three pharmacists commented that they felt most prepared for continuing core services, i.e. normal dispensary work with the help of a good staff team (n=17) who demonstrated resilience and were able to keep going. They were least prepared for the surge in the workload and the increased demand for medicines (n=73), the behaviour (e.g. aggression) exhibited by the public (n=33) and wearing PPE and dealing with the risk of COVID-19 infection (n=21).

Almost all participating pharmacists (96.9%; n=126) reported that they felt better prepared for working during the second wave of the pandemic (September-December 2020) compared to the first wave (March-May 2020).

Questionnaire Section 4: Communicating with others during the pandemic

During the pandemic, 84.6% (n=110) pharmacists said that they communicated differently with GP practices and 86.9% (n=113) reported communicating differently with patients during the pandemic compared with beforehand. The dominance of telephone communication is evident, representing 75% (Figure 1a) and 69% (Figure 1b) of the communication methods used for GPs and patients respectively.

Figure 1a and 1b about here

Questionnaire section 5: Updating professional knowledge during the pandemic

Almost 90% of community pharmacists (86.9%; n=113) reported that sufficient training resources were available to them during the pandemic to maintain their professional knowledge. The reported use of COVID-19 resources is illustrated in Figure 2 below:

Figure 2 about here

Other information sources used by pharmacists were online professional courses (n=20), COVID-19 vaccine training courses (n=6) and miscellaneous resources, e.g. pharmacy publications. Pharmacists commented that they were overwhelmed by the volume of information (n=19), but sometimes they needed more, for example, clinical information (n=18), and that information changed frequently which was confusing (n=16).

Questionnaire section 6: Looking to the future

Using a five-point Likert-scale, pharmacists were asked for their views on three post-pandemic activities, ranging from “strongly agree” to “strongly disagree”. The activities related to re-establishing normal patient care services, COVID vaccinations and COVID testing. The responses are summarised in Figure 3.

Figure 3 about here

Almost 90% (87.7%; n=114) pharmacists agreed or strongly agreed that they would be able to establish normal patient care services post-pandemic. Eighty per cent (80.7%; n=105) agreed or strongly agreed that they would be willing to provide and administer COVID-19

vaccinations when they were available through community pharmacies in NI. Sixty per cent (60.8%; n=79) agreed or strongly agreed that they would be willing to provide COVID-19 testing within the pharmacy if available in the future.

DISCUSSION

This study has provided an overview of experience and activities of NI community pharmacists over the early waves of the pandemic. Pharmacists responded comprehensively to implementing infection control measures, while maintaining medicines supply and advice to patients and providing newly commissioned services. They were least prepared for the increased workload and patients' challenging behaviour, but the majority reported that they felt better prepared during the second wave of the pandemic. Pharmacists agreed/strongly agreed that they would be able to re-establish normal services, were willing to administer COVID-19 vaccines and provide COVID-19 testing in the future.

The findings depict the activities undertaken by pharmacists in NI when the pandemic began in March 2020, with a focus on preventing the spread of infection, whilst also trying to maintain patient services. Pharmacies introduced a range of public health measures (social distancing, barriers, one-way systems, cleaning), and tried to provide PPE for staff, many of these measures have been noted in other community pharmacy studies.[2 9] Working patterns also changed to allow pharmacies to manage workload and to reduce the number of staff working at any one time. Many of these measures were sustained throughout 2020. By introducing such measures, pharmacists were able to maintain a range of core pharmacy services. However, it was deemed necessary to discontinue some services temporarily to allow critical tasks such as dispensing to continue. There was also an increase in collection and delivery services, particularly for vulnerable patients who were not in a position to come to a pharmacy personally. In circumstances such as these, priority will be given to what is deemed essential.[10]

The onset of the pandemic also provided an opportunity to innovate and introduce new services. Of particular note was the widespread introduction of a new emergency supply system for medicines and a 'flu vaccination service specifically for frontline health workers

(thus paving the way for COVID vaccinations later). There was also involvement in initiatives to help patients subjected to domestic violence. Many of these services reinforced the public health role of pharmacists and reflected the accessibility of the profession at a time when many other services were not available to patients.[4 11]

As might be expected, there was an increase in the reported perceived level of preparedness by pharmacists on most aspects of practice from March-May 2020 compared to September-December 2020. Notable increases were observed in having sufficient PPE (and relevant information) and hand sanitiser stock, and supplies of medicines. As pharmacists gained experience of working under pandemic conditions, there would have been growing awareness of where to access supplies such as PPE, and a better sense of the demand for medicines.[2] Some of these changes in working practices also represented areas for which they felt most and least prepared. Although they felt most prepared for maintaining core services such as dispensing, the increase in requirements for medicines and resultant increase in workload was somewhat unexpected.[12] These issues have been previously reported.[4 13]

Methods of communication needed to change with GPs and patients due to practices being closed, or patients isolating or being unable to come to the pharmacy in person. Telephone contact was the most common mode of communication. Although the use of online platforms for remote consultations has increased within general practice,[14] based on the findings of this survey, this does not seem to have been replicated to the same extent in community pharmacy, and which has also been noted elsewhere.[15]

Community pharmacists continued to maintain their professional knowledge over the course of the pandemic, largely in relation to COVID-19. Resources used mostly came from official sources such as the Department of Health, or professional organisations. Some pharmacists reported that the volume of information was overwhelming, or indeed contradictory which has been noted in other countries (e.g. USA, Netherlands).[2 15] The evidence base relating to COVID-19 changed rapidly, and other health professionals have reported how difficult it was to keep up-to-date.[16] An important lesson for future pandemic

planning is the need to rationalise the amount of information being released to health care professionals and to ensure consistency across different sources.

As pharmacists looked to a post-pandemic future, they were confident that they could re-establish normal services, but also participate in ongoing public health efforts such as COVID-19 vaccination and testing. Indeed, the latter two activities have become part of practice, with community pharmacy making a significant contribution to the vaccination programme,[17] and playing a critical role in the supply of lateral flow tests.[18 19]

The study has a number of strengths. We attained our target sample, and the mode of administration ensured that there was very little missing data. The sample was stratified ensuring broad geographical representation from across NI. However, the focus on NI is one of the limitations as the findings may not be generalisable to other regions within or beyond the UK. Telephone administration also meant that we were limited in the number of pharmacists who could be contacted due to time and resource constraints. Other modes of administration of the questionnaire had been considered, e.g. postal or online, but in view of the busyness of community pharmacies during the pandemic, we concluded that direct contact by telephone might yield a better response rate. Experience with postal questionnaires to community pharmacists has indicated that response rates rarely exceed 30%,[20] and online response rates are also extremely variable, therefore we feel that our choice of telephone administration is justified. The timing of administration was fortuitous as pharmacists appeared to have had sufficient time to reflect on how practice had changed over that time period. Attempting to administer the questionnaire at an earlier time point may have been difficult as pharmacists were still adjusting to new ways of working and coping with increased workload demands, which has been reported in other pharmacy studies.[21]

The results from this study have provided a snapshot of how pharmacy practice changed over the early phases of the COVID-19 pandemic, with essential services being maintained, other services suspended, and new services being introduced. Pharmacies had to introduce measures to prevent the spread of infection and to protect their staff and became more involved in public health activities such as vaccination. Despite feeling unprepared during

the first wave, this improved with time. They maintained contact with GP colleagues and patients, accessed pandemic information sources, and were confident that they could continue to contribute to public health efforts through COVID vaccination and testing; the latter was borne out after the study was completed. It has been generally recognised that community pharmacy made an immense contribution to health care during the pandemic when many other services were not available to patients.[4 22] These findings need to inform ongoing and future planning for community pharmacy services, and especially in the context of another pandemic.[23] Public health measures need to be instigated quickly, along with prioritisation of essential services. It may be necessary to have access to additional staff to deal with the observed increase in workload, or redeploy from sectors that are not under immediate pressure (this was done to some extent using dentists). Careful attention needs to be given to the volume and consistency of key information to avoid confusion, with greater coordination.[4 24] Important lessons have been learned as to the pressures that community pharmacists have faced, and these must be integral to future planning and implementation of services in preparation for the next crisis. [4 13 22]

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Ethics statement: This study received ethical approval from the Queen's University Belfast Faculty of Medicine, Health and Life Sciences Research Ethics Committee (Ref. No. MHLS 21_21).

REFERENCES

1. Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. *Res Social Adm Pharm* 2021;17:2032-2035
2. Koster ES, Philbert D, Bouvy ML. Impact of the COVID-19 epidemic on the provision of pharmaceutical care in community pharmacies. *Res Social Adm Pharm* 2021;17:2002-2004
3. Costa S, Romao M, Mendes M, et al. Pharmacy interventions on COVID-19 in Europe: Mapping current practices and a scoping review. *Res Social Adm Pharm* doi.org/10.1016/j.sapharm.2021.12.003
4. Bhamra SK, Parmar J, Heinrich M. Impact of the coronavirus pandemic (COVID-19) on the professional practice and personal well-being of community pharmacy teams in the UK. *Int J Pharm Pract* 2021;29:556-565
5. Bahlol M, Dewey RS. Pandemic preparedness of community pharmacies for COVID-19 *Res Social Adm Pharm* 2021;17:1888-1896
6. International Pharmaceutical Federation (FIP Health Advisory). Coronavirus 2019-nCoV Outbreak. Information and interim guidelines for pharmacists and the pharmacy workforce 2020 The Netherlands. Available from: https://www.fip.org/files/ content/priorityareas/coronavirus/Coronavirus-guidance-update-ENGLISH.pdf, [Accessed: February 21 2022]
7. Alkhalili M, Ma J, Grenier S. Defining roles for pharmacy personnel in disaster response and emergency preparedness. *Disaster Med Public Health Prep* 2017;11:496-504
8. Barry HE, Cadogan CA, O'Reilly E, et al. Changes to community pharmacy practice during the COVID-19 pandemic: a cross-country documentary analysis. *Int J Pharm Pract* 2022;30(S1):i21-i22

9. Zaidi STR, Hasan SS. Personal protective practices and pharmacy services delivery by community pharmacists during COVID-19 pandemic: results from a national study. *Res Social Adm Pharm* 2021;17:1832-1837
10. World Health Organisation. Maintaining Essential Health Services: Operational guidance for the COVID-19 context. Interim Guidance 1 June 2020. World Health Organisation, 2020. Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-essential_health_services-2020.2 [Accessed February 21 2022]
11. Visacri MB, Figueiredo IV, Lima TM. Role of pharmacist during the COVID-19 pandemic: A scoping review. *Res Social Adm Pharm* 2021;17:1799-1806
12. Wickware C. Pharmacies' dispensing increases by up to a third as a result of COVID-19, survey finds. *Pharm J* 2020;306:doi:10.1211/PJ.2020.20207917.
13. Romano S, Galante H, Figueira D, et al. Time-trend analysis of medicines sales and shortages during COVID-19 outbreak: data from community pharmacies. *Res Social Adm Pharm* 2021;17:1876-1881
14. Murphy M, Scott LJ, Salisbury C, et al. Implementation of remote consulting in UK primary care following the COVID-19 pandemic: a mixed-methods longitudinal study. *Br J Gen Pract* 2021;71:e166-e177
15. Carpenter DM, Hastings T, Westrick S, et al. Rural community pharmacies' preparedness for and responses to COVID-19. *Res Social Adm Pharm* 2021;17:1327-1331
16. Rosenquist JN. The stress of Bayesian medicine-uncomfortable uncertainty in the face of COVID-19. *New Engl J Med* 2021;384:7-9
17. Wickware C. Pharmacy leaders in 'urgent talks' with NHS as COVID-19 booster vaccination campaign is ramped up. *Pharm J* 2021;307:doi:10.1211/PJ.2021.1.12-231
18. Wickware C. Record numbers of lateral flow tests sent to pharmacies amid supply issues. *Pharm J* 2021;307:doi:10.1211/PJ.2021.1.121205
19. Wickware C. Community pharmacies fulfil 17 million lateral flow test requests, official data show. *Pharm J* 2022;308:doi:10.1211/PJ.2022.1.129133
20. Patton DE, Ryan C, Hughes CM. Enhancing community pharmacists' provision of medication adherence support to older adults: a mixed methods study using the Theoretical Domains Framework. *Res Social Adm Pharm* 2021;17:406-418
21. Austin Z, Gregory P. Resilience in the time of pandemic: the experience of community pharmacists during COVID-19. *Res Social Adm Pharm* 2021;17:1867-1875
22. Parkhurst C, Purewal GS, Donyai P. Community pharmacy and COVID-19-the unsung heroes on our high streets. *J Patient Exp* 2020;7:282-284
23. Maidment I, Young E, MacPhee M, et al. Rapid realist review of the role of community pharmacy in the public health response to COVID-19. *BMJ Open* 2021;11:e050043. doi:10.1136/ bmjopen-2021-050043
24. Lloyd-Smith MK. The COVID-19 pandemic: resilient organisational response to a low-chance, high-impact event. *BMJ Leader* 2020;4:109-112

Figure legends

Figure 1a Pharmacists' methods of communication with GP practices during the pandemic

Figure 1b Pharmacists' methods of communication with patients during the the pandemic

Figure 2 COVID-19 Information sources used by community pharmacists (n=130)

HSCNI and DoH: Advisory letters/emails were provided regularly by the Health and Social Care Board, the Department of Health and related agencies
Summarised information: Distilled information provided by the contractor/head office or a professional organisation e.g. Community Pharmacy NI, Pharmacy Forum
FAQs: Frequently Asked Questions updated daily on the Business Services Organisation (BSO) website
ECHO sessions: Online video sessions provided by Department of Health and Health & Social Care Board

Figure 3 Views of pharmacists (n=130) on selected post-pandemic activities

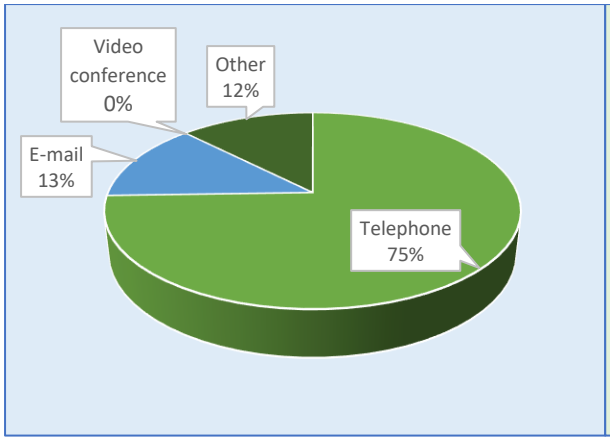


Figure 1a Pharmacists' methods of communication with GP practices during the pandemic

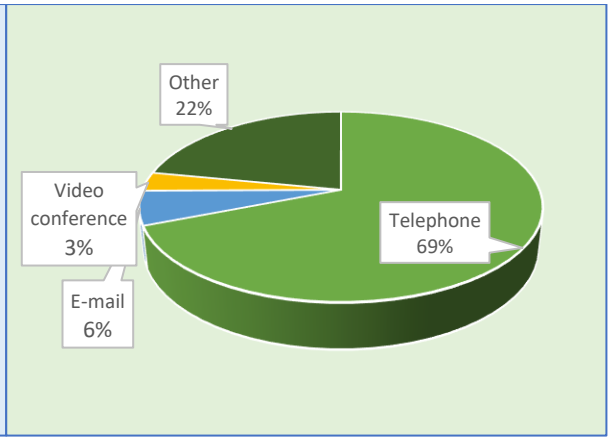
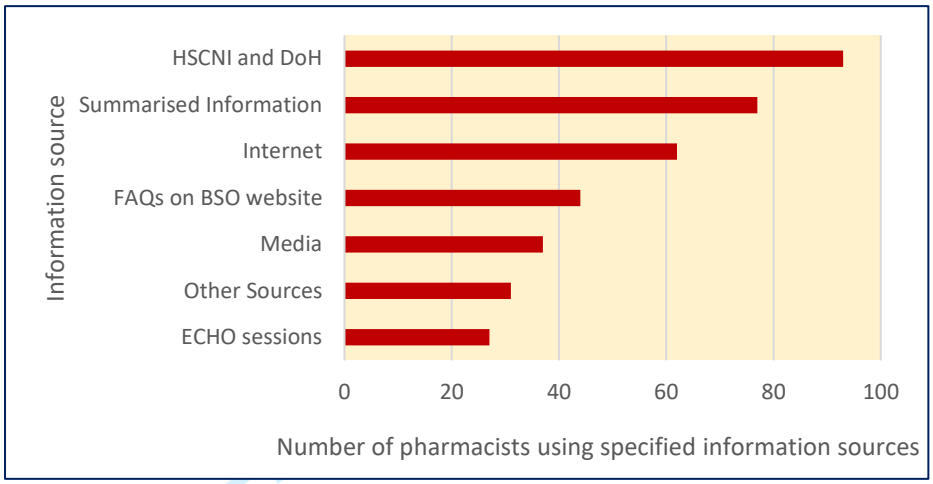


Figure 1b Pharmacists' methods of communication with patients during the the pandemic



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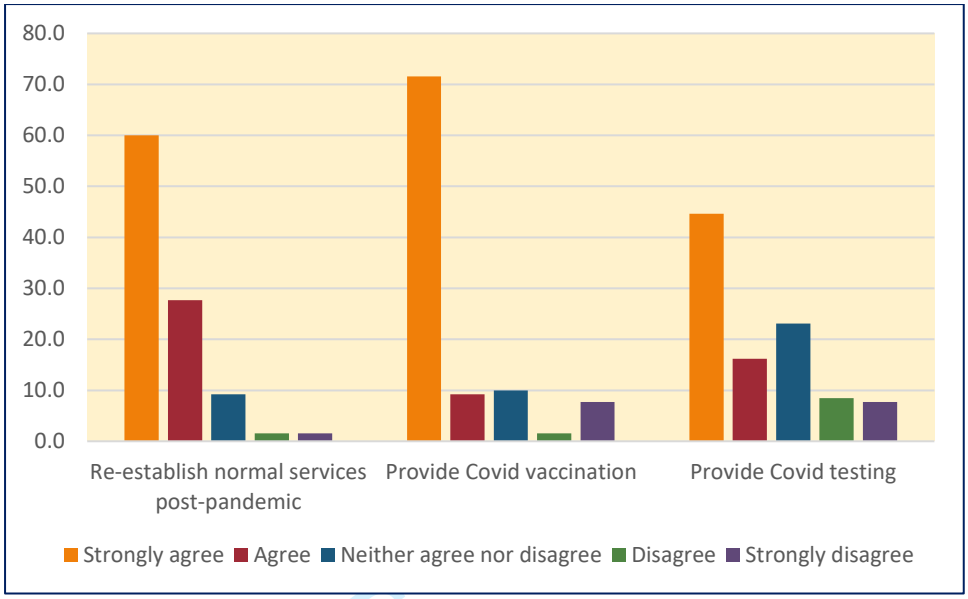

Figure 3 Views of pharmacists (n=130) on selected post-pandemic activities

---------- Section 1: Introduction and Consent ----------

Community Pharmacy COVID-19 Study: Telephone questionnaire

"A mixed methods study of the community pharmacy workforce's preparedness for, and response to, the COVID-19 pandemic"

INTRODUCTION

Hello, my name is Susan Patterson. I'm from the School of Pharmacy, Queen's University Belfast and I'm a pharmacist undertaking a research study about community pharmacy's preparedness for and response to the COVID-19 pandemic in Northern Ireland. I'm phoning to see if you might be interested in taking part in a short telephone questionnaire. The Pharmacy Forum and NPA recently circulated information about the study to all community pharmacists. Your experience of working in community pharmacy during the pandemic will be vitally important to help shape how community pharmacies prepare for any future pandemics or public health crises. Does this sound like something you would be interested in?

Yes ☐ **No** ☐

The questionnaire takes roughly 15 minutes and can be completed with me now or alternatively I can call back later at a time that suits you[1].

CONSENT

Completion of this questionnaire is completely voluntary, and the results will be anonymous to anyone other than the research team who will treat all the information confidentially. You have the right to skip questions and to withdraw from the study, without giving a reason, at any time. If you withdraw, you can contact me on this phone number or at the School of Pharmacy and I will delete all data relating to you.

I will now read you a series of statements about the study which I would like you to respond to with either "Yes" or "No". I will audio-record and note your responses on the telephone questionnaire form.

1. I confirm that I have read, or had read to me, and understand the information provided in advance by email for the study. I have had the opportunity to ask questions and these have been answered fully

[1] Suitable dates/times for call backs to be recorded by the researcher in a separate spreadsheet

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Yes ☐ **No** ☐

2. I understand that my participation is voluntary and I am free to withdraw at any time, without giving any reason.

Yes ☐ **No** ☐

3. I understand the study is being conducted by researchers from Queen's University Belfast and that my personal information will be held securely on University premises and handled in accordance with the provisions of the Data Protection Act 2018.

Yes ☐ **No** ☐

4. I understand that data collected as part of this study may be looked at by authorized individuals from Queen's University Belfast, Trinity College Dublin and Royal College of Surgeons in Ireland) where it is relevant to my taking part in this research. I give permission for these individuals to have access to this information.

Yes ☐ **No** ☐

5. I agree to take part in the above study.

Yes ☐ **No** ☐

- **If the reply is No,**

"Thank you for speaking to me today and goodbye".

- **If the reply is Yes**, proceed with completing the questionnaire.

"In the interests of time, I will try to keep this as short as possible. Please help me by keeping your responses brief. If we are interrupted, can I call back later to finish it?"

Yes ☐ **No** ☐

Suitable alternative times:

_____

_____

_____

Community Pharmacy COVID-19 Study ID _____

---------- **Section 2: Telephone Questionnaire** ----------

PHARMACIST AND PHARMACY CHARACTERISTICS (DEMOGRAPHICS)

To begin, I will ask you some questions about you and the community pharmacy in which you work.

1. **Pharmacist characteristics**

1.1 Can I confirm the gender you identify as?

Female	Male	Prefer not to disclose	Other (please specify)
☐	☐	☐	☐

Other: _____

1.2 Which of the following categories includes your age?

<25	25 - 34	35 - 44	45 - 54	55 - 64	≥65
☐	☐	☐	☐	☐	☐

1.3 How many years have you been practising as a pharmacist?

≤5	6 – 10	11 – 15	≥15
☐	☐	☐	☐

1.4 Are you the pharmacy owner (contractor) or an employee pharmacist?

Owner (contractor) ☐ Employee ☐

1.5 What is your <u>usual</u> role in the pharmacy? Please choose one of the following:

Owner manager	Responsible pharmacist	Dispensary manager	Locum	Other (please specify)
☐	☐	☐	☐	☐

Other: _____

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1.6 Were you shielding during the early stages of the pandemic (approximately from March to May 2020)?

Yes ☐ **No** ☐

[*If the response is yes, researcher to discuss services in Questions 4 and 6 from the time period when the pharmacist returned to work (Question 5 refers only to June/July onwards)*]

1.7 Are you on the temporary Pharmaceutical Register?

Yes ☐ **No** ☐

2. Community pharmacy characteristics

2.1 Researcher to record: Local Commissioning Group (LCG) (or Trust) Area:

Belfast	Northern	South Eastern	Southern	Western
☐	☐	☐	☐	☐

2.2 *Researcher to record: Location of the pharmacy:*

Urban (population >10,000)	Rural (population <5,000)	Suburban (population of 5,000 – 10,000)
☐	☐	☐

2.3 Which of the following options best describes the community pharmacy in which you work?

Independent	☐
Small chain (group of <5 pharmacies)	☐
Medium chain (group of 5-20 pharmacies)	☐
Large chain (group of >20 pharmacies)	☐

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A. PHARMACIST'S EXPERIENCE OF WORKING DURING THE PANDEMIC

I will now ask you a series of questions about your experience of working during the pandemic. The questions are about what happened from March 2020 onwards and largely follow the sequence of events up to December 2020.

PREVENTING THE SPREAD OF COVID-19

This first set of questions deal with preventing the spread of COVID-19.

I would like you to think about March to May 2020 when answering these initial questions. I will read out a series of statements, and for each one, please respond with either Yes or No.

3. Part I **Did you have any of the following measures in place in your pharmacy between March and May 2020 to prevent the spread of COVID-19?**	**Part I** **Yes (Y)/No (N)**	**Part II** **Measures stopped in June to August 2020? Yes (Y)/No (N)**
3.1 Public health information on preventing COVID-19, e.g. posters, 'Living Well' campaign COVID booklet?	☐	☐
3.2 Protocols for disinfection of pharmacy surfaces	☐	☐
3.3 Use of Personal Protective Equipment (PPE) by pharmacy staff, e.g. masks, gloves, aprons, eye protection	☐	☐
3.4 Management of social distancing, e.g. number of people in the shop, floor markings for queuing in the pharmacy	☐	☐
3.5 Shorter opening hours to facilitate cleaning, re-stocking, staff breaks	☐	☐
3.6 Lunchtime closing	☐	☐
3.7 Changes to how your available space was used, e.g. using consultation room for staff breaks	☐	☐
3.8 Adjustments to premises, e.g. physical barriers at counters in pharmacies, screens, partitions	☐	☐
3.9 Reduced opportunity for face-to-face contact, e.g. temporary suspension of direct patient care services	☐	☐
3.10 Changes to staff working patterns to facilitate social distancing	☐	☐
Part II **And did you stop any of these at a later date, for example, during June to August 2020?** [*Record Yes (Y)/No (N) in 2nd column]*		

3.12 Were there any other measures put in place in your pharmacy to prevent the spread of COVID-19 that you would like to mention?
[document free-text response]

_____

_____

_____

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PHARMACY SERVICES

The next set of questions focuses on your experience of the immediate actions taken in relation to community pharmacy services in response to the pandemic over time up to the end of December 2020.

I will ask you about each pharmacy service in turn, and I would like to think about how you responded initially and if anything changed over time. Again, please provide Yes or No responses or state "not applicable" if you don't usually provide the service.

4. Part I **Did you have to stop providing any of the following services during March-May 2020 (first wave)? If so, did you restart during June-August? (after 1st wave).**	**Part I**			**Part II**
	Service provision **stopped during March-May 2020** (Wave 1) **Yes (Y)/No (N)**	**N/A** Service is not usually provided	**If stopped,** Re-started by pharmacy Jun-Aug 2020 (after Wave 1) **Yes (Y)/No (N)**	Service provision **stopped during Sept-Dec 2020** (Wave 2) **Yes (Y)/No (N)**
4.1 Dispensing acute and repeat (chronic) medicines				
4.2 Supply of OTC medicines				
4.3 Medicines advice to patients				
4.4 #Living Well campaigns				
4.5 Nursing/residential homes' support and advice				
4.6 Dispensing of out-of-hours prescriptions				

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Question 4 continued……	Part I			Part II
Part I **Did you have to stop providing any of the following services during March-May 2020 (first wave)? If so, did you restart during June-August? (after 1st wave).**	Service provision **stopped during March-May 2020** (Wave 1) **Yes (Y)/No (N)**	**N/A** Service is not usually provided	**If stopped,** Re-started by pharmacy Jun-Aug 2020 (after Wave 1) **Yes (Y)/No (N)**	Service provision **stopped during Sept-Dec 2020** (Wave 2) **Yes (Y)/No (N)**
4.7 Prescription collection*				
4.8 Prescription delivery service*				
4.9 #Minor Ailments Scheme/ Pharmacy First				
4.10 #Medicines Use Review				
4.11 #Managing Your Medicines				
4.12 #Smoking Cessation				
4.13 Adherence support (e.g. weekly dispensing)				
4.14 #Supervision of Opioid Substitution Treatment*				
4.15 Needle and syringe exchange service*				
4.16 Travel Vaccination				

4.17 Any others? Please specify:_____

_____

***If usually provided by your pharmacy** **#Stood down by HSCB during March-May 2020**

Part II *[On completion of Part 1 above, list services again and add responses to table above]*
Did you have to stop providing any services again during Sep-Dec (the 2nd wave)? Which ones?

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During the pandemic, a number of new services were commissioned; many pharmacies also developed new and innovative ways of working.

5 Part I **Did you implement any of the following new ways of working in response to COVID-19 between March and May 2020 (Wave 1)?**	**Part I** **Yes (Y)/No (N)**	**Part II** **Stopped at a later date? Yes (Y)/No (N)**
5.1 Community Pharmacy Emergency Supply during a Pandemic service	☐	☐
5.2 Prescription delivery services by volunteers	☐	☐
5.3 Replenishment of Care Home Pandemic packs	☐	☐
5.4 Palliative care on-call services	☐	☐
5.5 Employment of additional staff, e.g. dentists, volunteers, undergraduate students, retired pharmacists	☐	☐
5.6 Flu vaccination service (frontline Health and Social Care workers)	☐	☐
5.7 Supply of medicines usually supplied in the hospital setting (e.g. oncology, antiretroviral drugs, 'Healthcare at Home')	☐	☐
5.8 Measures to flag/assist patients with sensitive issues such as domestic violence reporting	☐	☐
5.9 Drive-through pharmacy services (initiated or increased)	☐	☐
5.10 Daily reporting of staffing/stock situation to the Health and Social Care Board	☐	☐
5.11 Referrals to Test and Trace services	☐	☐
5.12 Commissioned Prescription delivery service (starting Sept 2020)	☐	☐
5.13 Any others? Please specify: _____ _____ _____		
Part II **And did you stop any of these afterwards at a later date?** *[Record Y/N Yes (Y)/No (N) in 2nd column]*		

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PREPAREDNESS

Having now had the experience of working during the pandemic, I'd like to ask you to reflect on how well prepared you felt you were.

6. Thinking back to the start of the initial outbreak of COVID-19 firstly in March-May 2020 and secondly in Sept-Dec 2020, did you have…	**March - May 2020 (beginning of Wave 1) Yes (Y)/No (N)**	**Sept - Dec 2020 (beginning of Wave 2) Yes (Y)/No (N)**
6.1 A business continuity plan in place for use in the event of staff absence over a prolonged period?	☐	☐
6.2 A business continuity plan in place for use in the event of pharmacy closure?	☐	☐
6.3 Enough stock and supply of essential prescription and OTC medicines?	☐	☐
6.4 Enough financial resources to cover the additional demands on your pharmacy business	☐	☐
6.5 Enough stock and supply of hand sanitisers	☐	☐
6.6 Enough information about PPE requirements for staff	☐	☐
6.7 Enough supply of PPE for staff	☐	☐
6.8 A system to manage quantity limits for patients for the supply of individual medicines	☐	☐
6.9 Appropriate staff working patterns in place	☐	☐
6.10 Did you have to close the pharmacy at any stage during the pandemic?	☐	☐
6.11 And if so, for how long? *[document free text response]*		

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7.1 What single aspect of your work, if any, did you feel MOST prepared for during March to May 2020 (Wave 1)?

_____

_____

7.2 What single aspect of your work, if any, did you feel LEAST prepared for during March to May 2020 (Wave 1)?

_____

_____

_____

7.3 Overall, did you feel better or worse prepared for working during Wave 2 in Sept-Dec 2020 compared to Wave 1 in March-May 2020?	Better prepared	Worse prepared
	☐	☐

7.4 If worse, can you briefly explain why?

_____

_____

_____

COMMUNICATION

Now I'd like you to think about how you were able to communicate with others during the pandemic.

	Yes	No
8.1 Did you communicate differently with GPs and patients during the pandemic?	☐	☐

How did you communicate?

8.2 GPs	**8.3 Patients**
Telephone ☐	Telephone ☐
E-mail ☐	E-mail ☐
Video call ☐	Video call ☐
Other ☐	Other ☐
_____	_____
_____	_____
_____	_____

UPDATING PROFESSIONAL KNOWLEDGE

Community Pharmacy COVID-19 Study ID _____

This question is about keeping your clinical knowledge of COVID-19 up to date.

9.1 Were sufficient training resources available to you?	**Yes** ☐	**No** ☐

9.2 What resources did you use? Tick all that apply

Remote training (ECHO) sessions ☐

Frequently Asked Questions for community pharmacists on the BSO website ☐

Distilled / summarised information sources provided by CPNI, NPA or your employer ☐

Internet ☐

Media ☐

Dept of Health, Health & Social Care Board, Public Health Agency COVID-19 guidance ☐

Other, please specify ☐

_____

_____

LOOKING TO THE FUTURE

The final few questions will focus on your views about returning to normal activities post-pandemic. On a scale of 1-5 where 1= strongly agree and 5= strongly disagree, please indicate your level of agreement with the following statements:

10.1 I am confident that I will be able to re-establish normal patient care services post-pandemic				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	2	3	4	5

10.2 I am willing to provide and administer COVID-19 vaccinations when they are available through community pharmacies in N. Ireland				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	2	3	4	5

10.3 I am willing to provide COVID-19 testing within the pharmacy if available in the future				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	2	3	4	5

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Community Pharmacy COVID-19 Study ID	_____

---------- Section 3: Conclusion and Interview Information ----------

CONCLUSION	**Thank you for participating & information about participation in a future interview**

- Thank you very much for taking the time to answer these questions. Your responses will provide a very helpful insight into how community pharmacy has responded to the pandemic.

- This questionnaire is part of a larger study about community pharmacy and COVID-19. In the next stage, we plan to invite a range of key stakeholders to take part in interviews to explore, in more depth, the role of community pharmacists over the course of the pandemic. The interview will last about 40 minutes. If you think you might be willing to be interviewed, I can send you further information about what this will entail. Please be assured that by requesting information you are not committing to take part. Would you like more information about the study?

  Yes ☐ **No** ☐

- **If the reply is yes,**

Could you provide me with your contact details?

- Name: _____
- E-mail address: _____
- Telephone number: _____

- **If the reply is no, thanks again for your time and goodbye.**

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1 and 2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4, 6, 7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5, 6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5
Bias	9	Describe any efforts to address potential sources of bias	5, 6
Study size	10	Explain how the study size was arrived at	5, 6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	N/A
		(*c*) Explain how missing data were addressed	N/A
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7, 8 (Table 1)
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8 (Table 1 and Table 2)
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	Tables 3-5; Figs 1-3
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17-20
Generalisability	21	Discuss the generalisability (external validity) of the study results	19
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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A cross-sectional questionnaire study of the experiences of community pharmacists in Northern Ireland during the early phases of the COVID-19 pandemic: preparation, experience and response

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A cross-sectional questionnaire study of the experiences of community pharmacists in Northern Ireland during the early phases of the COVID-19 pandemic: preparation, experience and response

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ABSTRACT

Objectives: To examine the views and experiences of community pharmacists in Northern Ireland (NI) regarding changes in community pharmacy practice/processes in preparation for, and response to, the COVID-19 pandemic.

Design: Cross-sectional telephone-administered questionnaire.

Setting and participants: Geographically stratified representative sample of 130 community pharmacists in NI between March and May 2021.

Outcome measures: Community pharmacists' responses to questions focusing on their preparation, experience and response to the COVID-19 pandemic. Descriptive analysis was conducted including frequencies and percentages. Free-text comments were summarised using thematic analysis.

Results: One hundred and thirty pharmacists completed the questionnaire. Pharmacists responded comprehensively to implementing infection control measures, e.g. management of social distancing in the shop (96.2%), making adjustments to premises, e.g. barriers/screens (95.4%), while maintaining medicines supply (100.0%) and advice to patients (93.1%). Newly commissioned services were provided, e.g. emergency supply service (93.1%), flu vaccination for healthcare workers (77.7%) and volunteer deliveries to vulnerable people (54.6%). Pharmacists were least prepared for the increased workload and patients' challenging behaviour, but the majority (96.9%) reported that they felt better prepared during the second wave. Pharmacists agreed/strongly agreed that they would be able to re-establish normal services (87.7%), were willing to administer COVID-19 vaccines (80.7%) and provide COVID-19 testing (60.8%) in the future.

Conclusions: Community pharmacists remained accessible and maintained supply of essential medicines and advice to patients throughout the pandemic. Provision of modified and additional services such as vaccination reinforced the clinical and public health role of pharmacy

Strengths and limitations of this study

- Large representative sample of community pharmacists attained
- Method of questionnaire administration ensured there was very little missing data
- Focus on Northern Ireland making the results less generalisable

- Method of questionnaire administration limited the number of pharmacists who could be contacted due to time and resource constraints

INTRODUCTION

Since March 2020, healthcare provision has faced one of its greatest challenges in responding to the COVID-19 pandemic. Health services have been under immense pressure to provide information, prevent and manage COVID infection, and deal with the long-term sequalae of infection, while trying to maintain care for other patients with acute and long-term conditions. Community pharmacy is one of the most accessible health sectors and has played a vital frontline role during key stages of the current COVID-19 pandemic (i.e. prevention, preparedness, response, recovery.[1] [2] [3] [4] However, community pharmacy had to markedly adapt its usual working practices.

Community pharmacies typically provide a wide range of core services (e.g. dispensing, supply of over the counter medication, health promotion activities), with some providing locally commissioned services (e.g. smoking cessation) that are delivered by choice or driven by local need. At the outset of the pandemic, the commissioners stood down a number of additional patient-facing services, e.g. Medicines Use Reviews (MURs); some of these were reintroduced at a later date, e.g. Minor Ailments and Smoking Cessation (September 2020) with appropriate COVID-safe modifications. Most of the non-core services were stood down during March-May 2020, with the notable exception of needle and syringe exchange services (NSES) which were modified to reduce the COVID-19 transmission risk.[5]

Amid the restrictions imposed following the onset of the pandemic, community pharmacy was deemed an essential service which reflects the importance of medicine-taking in everyday life, [6] especially at a time when other services were not readily accessible. [2],[4] Governments and professional organisations in various countries have specifically acknowledged the need to support and maximise pharmacy as a resource in maintaining delivery of patient care. [7]

As society begins to emerge from the worst of the pandemic, it is important to learn from the experience so that health services can appropriately prepare for the next pandemic or emergency health crisis. This requires a consideration of the experiences of healthcare professionals who have worked during COVID-19. A three-phase research project was undertaken in Northern Ireland (NI) to assess community pharmacy's preparedness for and

response to the pandemic, using Donabedian's over-arching three-pillar model of quality of care: structure, process and outcome. [8] Phase 1 (representing structure) was a documentary analysis of guidance and policy documents released over the initial months of the pandemic, [5] this current paper describes the findings of a telephone-administered questionnaire with community pharmacist participants (Phase 2, process) while Phase 3 was a series of semi-structured interviews with community pharmacists and key stakeholders (outcomes). [9] The aim of this present study was to examine the immediate views and experiences of the community pharmacy workforce in Northern Ireland (NI) regarding changes in community pharmacy practice/processes in preparation for, and response to the COVID-19 pandemic.

METHOD

A cross-sectional study was undertaken involving administration of a brief telephone questionnaire with community pharmacists in NI to examine their immediate views and experiences of changes in community pharmacy practice/processes in preparation for, and in response to, COVID-19. This study received ethical approval from the Queen's University Belfast Faculty of Medicine, Health and Life Sciences Research Ethics Committee (Ref. No. MHLS 21_21).

Patient and Public Involvement

Two patient and public involvement (PPI) representatives were recruited to the Study Advisory Group via the Patient Involvement Enhancing Research (PIER) NI network from the Health and Social Care Research and Development division. The Study Advisory Group also included members of the pharmacy profession representing practice, regulation and professional advocacy, along with a methodological advisor. The Group contributed to the development of the telephone questionnaire (see below) and advised on other aspects of the study, including providing commentary on the findings.

Questionnaire development

The telephone questionnaire was developed based on documentary analysis of key policy publications from health policy, commissioning and professional organisations in NI, and relevant literature describing a framework of activities that pharmacy personnel can

undertake in preparation/response to crises such as COVID-19. [10] [11] The questionnaire included items on demographics, followed by six main sections encompassing community pharmacists' experiences of working during the pandemic and specifically during March-May 2020 (Wave 1) and September-December 2020 (Wave 2) , i.e. (1) prevention of infection spread, (2) maintaining pharmacy services, (3) preparedness for and response to the COVID-19 pandemic, (4) communicating with others (5) updating professional knowledge and (6) looking to the future. To minimise the impact of administering the questionnaire on daily practice, the content was designed to ensure that the questionnaire was concise. Respondents could skip any questions that they preferred not to answer. It was piloted with volunteer community pharmacists (n=5) to assess face and content validity and was refined on the basis of their responses. This piloting indicated that completion time for the questionnaire was approximately 15 minutes. Pilot responses were not included in the final analysis. A copy of the questionnaire is provided in Supplementary File 1.

Sampling

A purposive and geographically stratified sample of community pharmacists was recruited for the study. Using the publicly available information on contact details of registered pharmacies in NI, community pharmacies were stratified according to Local Commissioning Group (LCG) areas, of which there are five. LCGs commission health and social care services based on the needs of local populations. The numbers sampled were in proportion to the number of registered pharmacies in each locality to ensure representation across NI.

In November 2020, there were 528 community pharmacies in NI. In order to attain a statistically representative sample of pharmacists across NI, and to estimate the percentage response to any questions in the questionnaire with a 95% confidence level to within +/- 7.5% (i.e. a 95% confidence level to within ±7.5% of any questionnaire responses), a sample of n=130 respondents to the questionnaire was required. Based on the total number of pharmacies across NI (n=528) and an anticipated response rate of 30%, up to a maximum number of 433 pharmacies were contacted (from the 528) to achieve the required sample size (n=130). This equated to a sampling fraction of 24% of the total number of pharmacies. Within each LCG area, a random list of pharmacies was generated. Pharmacies were telephoned sequentially in each LCG area by the researcher (SP) using the random list until the required number within each LCG area was achieved.

Recruitment and consent

To raise awareness in advance of recruitment, summary information about the study was made available to all community pharmacies through a number of pharmacy organisations e.g. Pharmacy Forum, Community Pharmacy NI, with close links with the community pharmacy sector.

Pharmacies were contacted by telephone in random order across the LCGs by the researcher (SP). SP briefly outlined the study and referred to the summary information circulated to pharmacies in advance to determine if a pharmacist would be interested in taking part. SP advised that the questionnaire would take approximately 15 minutes to complete. Community pharmacists were offered the opportunity to complete the questionnaire during the telephone call or to arrange a later time and date that was more convenient. Further information about the study, if requested, was provided via email. Community pharmacists interested in taking part were asked to provide verbal consent over the telephone; this was documented and audio-recorded. The explicit yes/no responses for consent were documented on the telephone questionnaire form. The records of consent were stored separately from the completed questionnaire responses.

Data collection

A unique study ID number was assigned to each community pharmacist participant and recorded on a hard copy of the questionnaire. The study IDs were stored in a password-protected Microsoft Excel spreadsheet which acted as a log, linking ID numbers to respondents known only to the researcher and stored on the researcher's secure and password-protected laptop. Verbal responses to the questions were recorded by the researcher (SP) on the form. If the community pharmacist was interrupted during the questionnaire data collection, they were asked if they were willing to complete the questionnaire at a later time and an appointment was arranged. All participants completed the questionnaire only once.

Data analysis

Data were analysed descriptively using SPSS v27, [12] reporting frequencies, percentages and 95% confidence intervals. Free text responses to questions were recorded, and grouped into broad themes.

RESULTS

During March–May 2021, the researcher initially invited 175 community pharmacists. Just under 80% (79.4%; n=139) of community pharmacists agreed to participate and 74.3% (n=130) completed the questionnaire by telephone with the researcher (representing 130 pharmacies). Nine community pharmacists were unable to complete the survey due to interruptions during administration and could not be contacted again. Completion of the telephone questionnaires took 46 working days, with 62.9% (n=110) community pharmacists deferring the call to another day due to work pressures at the time of the arranged call.

The demographic characteristics of the 130 participating community pharmacists are reported in Table 1 and the characteristics of the pharmacies in which they worked are reported in Table 2. There was a higher percentage (55.4%; n=72) of pharmacist respondents who were female, most participants were aged between 25-54 years old, and 36.2% (n=47) been in practice for more than 11 years. The majority of respondents were employees (80.8%; n=105) and just over 50% (51.5%; n=67) were dispensary managers. The pharmacies in which the respondents worked were located in largely urban (43.1%; n=56) or suburban settings (37.7%; n=38); just over 30% (32.3%; n=42) were independently owned and 38.5% (n=50) were part of a large chain (group of more than 20 pharmacies).

Table 1. Demographic characteristics of community pharmacists who completed the telephone questionnaire

Characteristic	n (%)
Gender	
Female	72 (55.4)
Male	58 (44.6)
Age	
< 25 years	6 (4.6)
25-34 years	53 (40.8)
35-44 years	38 (29.2)

45-54 years	21 (16.2)
≥ 55 years	12 (9.2)
Number of years in community pharmacy practice	
≤ 5 years	36 (27.7)
6-10 years	22 (16.9)
11-15 years	25 (19.2)
≥ 15 years	47 (36.2)
Status	-
Owner/contractor	25 (19.2)
Employee	105 (80.8)
Usual Role	
Owner manager	17 (13.1)
Responsible pharmacist	12 (9.2)
Dispensary manager	67 (51.5)
Locum pharmacist	13 (10.0)
Pharmacist team member	15 (11.5)
Superintendent	6 (4.6)
Shielding during Wave 1*	8 (6.2)

**Measures taken by those at highest risk of severe illness from COVID-19 (e.g. self-isolation)

Table 2. Characteristics of participating community pharmacies

Geographical Location (LCG Area)	**n (%)**
Belfast	32 (24.6)
Northern	28 (21.5)
South-Eastern	24 (18.5)
Southern	22 (16.9)
Western	24 (18.5)
Location Type	
Urban	56 (43.1)
Rural	36 (27.7)
Suburban	38 (29.2)
Pharmacy Type	
Independent	42 (32.3)
Small chain <5	18 (13.8)
Medium chain 5-20	20 (15.4)
Large chain >20	50 (38.5)

Preventing the spread of COVID-19

During the first wave, the most common measure was the management of social distancing in the pharmacy (96.2%; n=125), including one-way systems, limiting capacity within the pharmacy, and queue management (Table 3). Adjustments such as the erection of barriers or screens, were made to premises in 95.4% (n=124) of pharmacies to reduce the risk of contact between staff and patients. Cleaning and disinfection of premises became a routine task during the pandemic first wave, implemented in 93.8% (n=122) of pharmacies and performed at least twice a day in most. Public health information was displayed in 92.3% (n=120) pharmacies, using materials from the public health campaigns that focused on COVID-19-related issues.

Table 3 Measures taken during the onset of the pandemic (March-May 2020) to prevent the spread of COVID-19 in community pharmacies

Prevention of Infection Measures	Implemented in March-May 2020		Stopped in June-August 2020		Started at a later date (after September 2020) n (%)
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
Management of social distancing	125 (96.2)	5 (3.8)	~	122 (93.8)	~
Premises adjustments such as barriers, screens	124 (95.4)	6 (4.6)	115 (88.5)	9 (6.9)	5 (3.8)
Protocols for disinfection of pharmacy surfaces	122 (93.8)	8 (6.2)	5 (3.8)	122 (93.8)	0 (0.0)
Public health information on preventing Covid-19 displayed	120 (92.3)	10 (7.7)	~	119 (91.5)	~
Reduced face-to-face contact	120 (92.3)	10 (7.7)	6 (4.6)	116 (89.2)	0 (0.0)
Lunchtime closing	119 (91.5)	11 (8.5)	63 (48.5)	55 (42.3)	~
Use of PPE by pharmacy staff	115 (88.5)	15 (11.5)	~	116 (89.2)	11 (8.5)

Changes to the use of the available space	98 (75.4)	32 (24.6)	7 (5.4)	92 (70.8)	~
Shorter opening hours	87 (66.9)	43 (33.1)	69 (53.1)	17 (13.1)	0 (0.0)
Changes to staff working patterns	64 (49.2)	66 (50.8)	9 (6.9)	57 (43.8)	~

~ not reported as less than 5, and potentially identifiable; PPE: personal protective equipment

During the first wave, 88.5% (n=115), community pharmacists reported that staff were using personal protective equipment (PPE). When asked for further comments, pharmacists reported how government advice on PPE had changed and there was conflicting advice from other sources. Community pharmacists were concerned about protecting their staff, especially those with vulnerable family members and some introduced early protection measures, e.g. making visors when PPE was in short supply, ensuring adequate ventilation, setting up dispensary workstations two metres apart and asking delivery drivers to wear protective clothing.

Many pharmacies (75.4%; n=98) closed the shop floor space entirely or reduced it and reused the space to prepare and check prescriptions, monitored dosage system boxes and orders for delivery. Working patterns and break times were changed in 49.2% (n=64) pharmacies to reduce the number of staff working at any one time. Many staff worked longer hours and started early to manage the increased volume of prescriptions. Many of the changes outlined in Table 4 were maintained over the time periods assessed, except lunchtime closing, which was stopped in almost 50% of pharmacies (48.5% n=63) in June-August 2020.

Maintaining pharmacy services during the pandemic

Core pharmacy services, principally dispensing, continued to be provided from all pharmacies throughout March–December 2020, while over-the-counter (OTC) medicines advice and supply were available from 128 (98.5%) and 121 (93.1%) pharmacies respectively (Table 4). Prescription collection and delivery services were maintained (and increased) by the majority of pharmacies (95.4%; n=124 and 88.5%; n=115 respectively). Of the 84 (64.6%) pharmacies that provided out-of-hours dispensing services, two stopped service provision during March-May 2020 and one restarted with a modified service during September-December 2020. Some pharmacies did not restart services until September-December 2020

and then provided them in a modified format, e.g. nursing home advice was provided by telephone or videocall by 12 (9.2%) pharmacies during Wave 2. All participating pharmacies, except one, normally provided Living Well campaigns (provision of key public health messages and advice through community pharmacies); 55 (42.3%) stopped this service at the onset of the pandemic, but by June-August 2020, 44 (33.8%) had restarted modified campaigns providing COVID-19 information to the public.

Just over 70% (71.5%; n=93) of community pharmacies stopped smoking cessation services, 56.2% (n=73) restarted the service during June-August 2020 and 16.1% (n=21) reported providing a modified service by September-December 2020. Pharmacists reported that opioid substitution treatment supervision (OST) was initially stopped, but then as patients' needs were reassessed, it was recommenced in a modified format, e.g increased supervision by addiction team staff. Most private travel vaccination services did not restart as there was little demand for them.

During the pandemic, a number of new services were commissioned and provided by community pharmacies. In addition, many new initiatives were undertaken as the pandemic progressed such as "drive-through" pharmacies or the equivalent such as 'call and collect' and measures to flag/assist patients with sensitive issues such as domestic violence reporting. The new services/initiatives and their status over time are presented in Table 4 below:

Table 4. Newly commissioned services and community pharmacy initiatives during the COVID-19 pandemic.

New Services or Initiatives	Implemented in March-May 2020 n (%)		Stopped in June-August 2020 n (%)		Started at a later date n (%)
	Yes	No	Yes	No	
Emergency Supply during a pandemic service (ESS)	121 (93.1)	9 (6.9)	~	117 (90.0)	0 (0.0)
Flu vaccination service (frontline Health and Social Care workers)	101 (77.7)	29 (22.3)	101 (77.7)	0 (0.0)	0 (0.0)

Situation reporting (staffing/stock) to the Health and Social Care Board	74 (56.9)	56 (43.1)	10 (7.7)	64 (49.2)	0 (0.0)
Measures to flag/assist patients with sensitive issues such as domestic violence reporting	73 (56.2)	57 (43.8)	0 (0.0)	73 (56.2)	6 (4.6)
Prescription delivery by volunteers in the local community	71 (54.6)	59 (45.4)	32 (24.6)	39 (30.0)	0 (0.0)
Referrals to Test and Trace services	70 (53.8)	60 (46.2)	~	68 (52.3)	0 (0.0)
Employment of additional staff, e.g. dentists, volunteers, students, retired pharmacists	49 (37.7)	81 (62.3)	22 (16.9)	27 (20.8)	0 (0.0)
Drive-through (or equivalent) pharmacy services	33 (25.4)	97 (74.6)	~	32 (24.6)	0 (0.0)
Replenishment of care home pandemic packs	19 (14.6)	107 (82.4)	~	15 (11.5)	~
Palliative care on-call services	19 (14.6)	111 (85.4)	~	17 (13.1)	0 (0.0)
Supply of medicines usually supplied in the hospital setting (e.g. oncology, antiretroviral drugs, 'Healthcare at Home')	11 (8.5)	119 (91.5)	0 (0.0)	11 (8.5)	0 (0.0)
Medicines delivery service (to vulnerable people) (commissioned September 2020)	n/a	n/a	n/a	n/a	95 (73.1)

~ not reported as less than 5, and potentially identifiable

The Emergency Supply Service (allowing a month's supply of medicines to be provided in the absence of a prescription) was widely implemented from the onset of the pandemic. It was initially provided by 93.1% (n=121) of community pharmacies, four of whom stopped provision in June-August 2020. Pharmacists commented that this was due to an inappropriately excessive demand for pain medication in urban areas. The 'flu vaccination campaign was provided by 77.7% (n=101) of community pharmacies. Only 56.9% (n=74)

reported participation in the Situation Reporting scheme (updating health officials on staffing and stock issues) and 56.2% (n=73) implemented measures to flag domestic violence ("Ask for ANI" initiative). Almost 55% (54.6%; n=71) used volunteer delivery services but by June-August 2020, 24.6% (n=32) had stopped and by September-December 2020, 73.1% (n=95) of pharmacies had switched to commissioned Home Delivery services. From free text comments, pharmacists commented that the volunteer services were invaluable but that in some cases, they had encountered problems with insurance and confidentiality issues.

Preparedness for and response to the COVID-19 pandemic

Pharmacists were asked to recall the initial outbreak of the pandemic (March-May 2020) and to reflect on their level of preparedness. The responses are shown in Table 5 and illustrate the changes in preparedness over time. Initially, 74.6% (n=97) of pharmacies reported having had appropriate working patterns in place and 66.2% (n=86) had sufficient PPE available for staff at the onset of the pandemic, but after six months, this increased to 95.4% (n=124) and 99.2% (n=129) respectively. Increases were also seen over the time period in the number of pharmacies reporting that business continuity plans were in place in their premises for prolonged staff absences or for the eventuality of pharmacy closure. Employee pharmacists in pharmacy multiples reported that they did not know or were unsure about the existence of business continuity plans or financial resources available during the pandemic, e.g. 54 (41.5%) were unaware of financial resources during March-May 2020. Pharmacies having sufficient information about PPE increased from 53.1% (n=69) during March-May 2020 to 99.2% (n=129) in September-December 2020, reflecting the increasing amount of advice relevant to community pharmacy available from Public Health England and the Department of Health in NI. Sufficient stocks and supplies of medicines and hand sanitisers increased over the same time periods from 65.4% (n=85) to 94.6% (n=123) and 35.4% (n=46) to 99.2% (n=129) respectively.

Table 5. Community pharmacists' reflections on how prepared they felt they were for working during a pandemic

Did you have….	During March-May 2020	During September-December 2020

	Yes n (%)	No n (%)	Don't know/Unsure n (%)	Yes n (%)	No n (%)	Don't know/Unsure n (%)
Appropriate staff working patterns in place	97 (74.6)	33 (25.4)	0 (0.0)	124 (95.4)	6 (4.6)	0 (0.0)
Enough supply of PPE for staff	86 (66.2)	44 (33.8)	0 (0.0)	129 (99.2)	~	0 (0.0)
A business continuity plan in place for use in the event of staff absence over a prolonged period	85 (65.4)	26 (20)	19 (14.6)	101 (77.7)	10 (7.7)	19 (14.6)
A business continuity plan in place for use in the event of pharmacy closure	85 (65.4)	21 (16.2)	24 (18.5)	100 (76.9)	7 (5.4)	23 (17.7)
Enough stock and supply of essential prescription and OTC medicines	85 (65.4)	43 (33.1)	~	123 (94.6)	6 (6 (4.6)	~
Enough information about PPE requirements for staff	69 (53.1)	60 (46.2)	~	129 (99.2)	0 (0.0)	~
Enough financial resources to cover the additional demands on	63 (48.5)	13 (10.0)	54 (41.5)	76 (58.5)	~	53 (40.8)

your pharmacy business						
A system to manage quantity limits for patients for the supply of individual medicines	56 (43.1)	73 (56.2)	~	38 (29.2)	91 (70.0)	~
Enough stock and supply of hand sanitisers	46 (35.4)	83 (63.8)	~	129 (99.2)	1 (0.8)	0 (0.0)

~ not reported as less than 5, and potentially identifiable

Pharmacists were asked (using open questions) about what single aspect of their work they felt most prepared for and what they felt least prepared for. Forty-three pharmacists commented that they felt most prepared for continuing core services, i.e. normal dispensary work with the help of a good staff team (n=17) who demonstrated resilience and were able to keep going. They were least prepared for the surge in the workload and the increased demand for medicines (n=73), the behaviour (e.g. aggression) exhibited by the public (n=33) and wearing PPE and dealing with the risk of COVID-19 infection (n=21).

Almost all participating pharmacists (96.9%; n=126) reported that they felt better prepared for working during the second wave of the pandemic (September-December 2020) compared to the first wave (March-May 2020).

Communicating with others during the pandemic

During the pandemic, 84.6% (n=110) pharmacists said that they communicated differently with GP practices and 86.9% (n=113) reported communicating differently with patients during the pandemic compared with beforehand. The dominance of telephone communication is evident, representing 75% (Figure 1a) and 69% (Figure 1b) of the communication methods used for GPs and patients respectively.

Figure 1a and 1b about here

Updating professional knowledge during the pandemic

Almost 90% of community pharmacists (86.9%; n=113) reported that sufficient training resources were available to them during the pandemic to maintain their professional knowledge. The reported use of COVID-19 resources is illustrated in Figure 2 below:

Figure 2 about here

Other information sources used by pharmacists were online professional courses (n=20), COVID-19 vaccine training courses (n=6) and miscellaneous resources, e.g. pharmacy publications. Pharmacists commented that they were overwhelmed by the volume of information (n=19), but sometimes they needed more, for example, clinical information (n=18), and that information changed frequently which was confusing (n=16).

Looking to the future

Using a five-point Likert-scale, pharmacists were asked for their views on three post-pandemic activities, ranging from "strongly agree" to "strongly disagree". The activities related to re-establishing normal patient care services, COVID vaccinations and COVID testing. The responses are summarised in Figure 3.

Figure 3 about here

Almost 90% (87.7%; n=114) pharmacists agreed or strongly agreed that they would be able to establish normal patient care services post-pandemic. Eighty per cent (80.7%; n=105) agreed or strongly agreed that they would be willing to provide and administer COVID-19 vaccinations when they were available through community pharmacies in NI. Sixty per cent (60.8%; n=79) agreed or strongly agreed that they would be willing to provide COVID-19 testing within the pharmacy if available in the future.

DISCUSSION

This study has provided an overview of experience and activities of NI community pharmacists over the early waves of the pandemic. Pharmacists responded comprehensively to implementing infection control measures, while maintaining medicines supply and advice to patients and providing newly commissioned services. They were least prepared for the increased workload and patients' challenging behaviour, but the majority reported that they felt better prepared during the second wave of the pandemic.

Pharmacists agreed/strongly agreed that they would be able to re-establish normal services, were willing to administer COVID-19 vaccines and provide COVID-19 testing in the future.

In the early stages of the pandemic, pharmacies introduced a range of public health measures (social distancing, barriers, one-way systems, cleaning), and tried to provide PPE for staff. Many of these measures have been noted in other community pharmacy studies which highlighted the need to change the physical environment and protect staff as far as possible. [2] [13] Working patterns also changed to allow pharmacies to manage workload and to reduce the number of staff working at any one time. By introducing such measures, pharmacists were able to maintain a range of core pharmacy services. However, it was deemed necessary to discontinue some services temporarily to allow critical tasks such as dispensing to continue. There was also an increase in collection and delivery services, particularly for vulnerable patients who were not in a position to come to a pharmacy personally. In circumstances such as these, priority will be given to what is deemed essential. [14]

The onset of the pandemic also provided an opportunity to innovate and introduce new services. Of particular note was the widespread introduction of a new emergency supply system for medicines and a 'flu vaccination service specifically for frontline health workers](thus paving the way for COVID vaccinations later). Many of these services reinforced the public health role of pharmacists and reflected the accessibility of the profession at a time when many other services were not available to patients. [4] [15]

As might be expected, there was an increase in the reported perceived level of preparedness by pharmacists on most aspects of practice from March-May 2020 compared to September-December 2020. Notable increases were observed in having sufficient PPE (and relevant information) and hand sanitiser stock, and supplies of medicines. As pharmacists gained experience of working under pandemic conditions, there would have been growing awareness of where to access supplies such as PPE, and how to manage workload. [2] Although they felt most prepared for maintaining core services such as dispensing, the increase in requirements for medicines and resultant increase in workload was somewhat unexpected.[15] These issues have been previously reported. [4] [15] A time-

trend analysis of data from community pharmacies in Portugal revealed an increase in the demand for medicines, and accompanying shortages in the early stages of the pandemic. [16] Bharma et al. [4] who undertook a cross-sectional study of a range of community pharmacy staff noted that 94% of participants reported an increase in workload, partly driven by a higher volume of medication dispensing activities.

Methods of communication needed to change with GPs and patients due to practices being closed, or patients isolating or being unable to come to the pharmacy in person. Telephone contact was the most common mode of communication. Although the use of online platforms for remote consultations has increased within general practice, [17] based on the findings of this survey, this does not seem to have been replicated to the same extent in community pharmacy, and which has also been noted elsewhere. [18] Carpenter et al. noted that digital connectivity issues can impact on the ability to provide online consultations. [18]

Community pharmacists continued to maintain their professional knowledge over the course of the pandemic, largely in relation to COVID-19, using resources from the Department of Health, or professional organisations. Some pharmacists reported that the volume of information was overwhelming, contradictory or unclear e.g. advice in relation to PPE, which has been noted in other countries (e.g. Netherlands, USA). [2] [18] The evidence base relating to COVID-19 changed rapidly, and other health professionals have reported how difficult it was to keep up-to-date. [19] An important lesson for future pandemic planning is the need to rationalise the amount of information being released to health care professionals and to ensure consistency across different sources.

As pharmacists looked to a post-pandemic future, they were confident that they could re-establish normal services, but also participate in ongoing public health efforts such as COVID-19 vaccination and testing. Indeed, the latter two activities have become part of practice, with community pharmacy making a significant contribution to the vaccination programme, [20] and playing a critical role in the supply of lateral flow tests. [21] [22]

The study has a number of strengths. We attained our target sample, and the mode of administration (which was novel in this context) ensured that there was very little missing

data. The sample was stratified ensuring broad geographical representation from across NI. However, the focus on NI is one of the limitations as the findings may not be generalisable to other regions within or beyond the UK. Telephone administration also meant that we were limited in the number of pharmacists who could be contacted due to time and resource constraints. Other modes of administration of the questionnaire had been considered, e.g. postal or online, but in view of the busyness of community pharmacies during the pandemic, we concluded that direct contact by telephone might yield a better response rate. Experience with postal questionnaires to community pharmacists has indicated that response rates rarely exceed 30%,[23] and online response rates are also extremely variable, therefore we feel that our choice of telephone administration is justified. The timing of administration was fortuitous as pharmacists appeared to have had sufficient time to reflect on how practice had changed over that time period. Attempting to administer the questionnaire at an earlier time point may have been difficult as pharmacists were still adjusting to new ways of working and coping with increased workload demands, which has been reported in other pharmacy studies. [24]

The results from this study have provided a snapshot of how pharmacy practice changed over the early phases of the COVID-19 pandemic, with essential services being maintained, other services suspended, and new services being introduced. The survey aligned with the 'process' aspect of Donabedian's model of quality of care, focusing on how practice (processes) had changed. [8] Despite feeling unprepared during the first wave, this improved with time, which although not unexpected, appears not to have been reported before. It has been generally recognised that community pharmacy made an immense contribution to health care during the pandemic when many other services were not available to patients. [4] [25] This has been recognised by other key stakeholders (e.g. other health professions, professional and governing organisations), and is reported in an accompanying paper.[9] These findings need to inform ongoing and future planning for community pharmacy services, and especially in the context of another pandemic. [26] Public health measures need to be instigated quickly, along with prioritisation of essential services. It may be necessary to have access to additional staff to deal with the observed increase in workload, or redeploy from sectors that are not under immediate pressure (this was done to some extent using dentists). Careful attention needs to be given to the volume and consistency of

key information to avoid confusion, with greater coordination. [4] [27] Important lessons have been learned as to the pressures that community pharmacists have faced, and these must be integral to future planning and implementation of services in preparation for the next crisis. [4] [16] [25]

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Patient consent for publication: Not required

Data availability statement: Data are available upon reasonable request

Ethics statement: This study received ethical approval from the Queen's University Belfast Faculty of Medicine, Health and Life Sciences Research Ethics Committee (Ref. No. MHLS 21_21).

REFERENCES

1. Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. *Res Social Adm Pharm* 2021;17:2032-2035
2. Koster ES, Philbert D, Bouvy ML. Impact of the COVID-19 epidemic on the provision of pharmaceutical care in community pharmacies. *Res Social Adm Pharm* 2021;17:2002-2004
3. Costa S, Romao M, Mendes M, et al. Pharmacy interventions on COVID-19 in Europe: Mapping current practices and a scoping review. *Res Social Adm Pharm* doi.org/10.1016/j.sapharm.2021.12.003
4. Bhamra SK, Parmar J, Heinrich M. Impact of the coronavirus pandemic (COVID-19) on the professional practice and personal well-being of community pharmacy teams in the UK. *Int J Pharm Pract* 2021;29:556-565
5. Barry HE, Cadogan CA, O'Reilly E, et al. Changes to community pharmacy practice during the COVID-19 pandemic: a cross-country documentary analysis. *Int J Pharm Pract* 2022;30(S1):i21-i22
6. Bahlol M, Dewey RS. Pandemic preparedness of community pharmacies for COVID-19 *Res Social Adm Pharm* 2021;17:1888-1896
7. International Pharmaceutical Federation (FIP Health Advisory). Coronavirus 2019-nCoV Outbreak. Information and interim guidelines for pharmacists and the pharmacy workforce 2020 The Netherlands. Available from: https://www.fip.org/files/ content/priorityareas/coronavirus/Coronavirus-guidance-update-ENGLISH.pdf, [Accessed: February 21 2022]
8. Donabedian A. The quality of care. How can it be assessed? *JAMA* 1988;260:1743-8.
9. Patterson SM, Cadogan CA, Barry HE, et al. *"It stayed there, front and centre"*: Perspectives on community pharmacy's contribution to front-line health care services during the COVID-19 pandemic. BMJ Open, submitted
10. Alkhalili M, Ma J, Grenier S. Defining roles for pharmacy personnel in disaster response and emergency preparedness. *Disaster Med Public Health Prep* 2017;11:496-504
11. Zaidi STR, Hasan SS. Personal protective practices and pharmacy services delivery by community pharmacists during COVID-19 pandemic: results from a national study. *Res Social Adm Pharm* 2021;17:1832-1837
12. SPSS Inc. Released 2008. SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc
13. World Health Organisation. Maintaining Essential Health Services: Operational guidance for the COVID-19 context. Interim Guidance 1 June 2020. World Health Organisation, 2020. Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-essential_health_services-2020.2 [Accessed February 21 2022]
14. Visacri MB, Figueiredo IV, Lima TM. Role of pharmacist during the COVID-19 pandemic: A scoping review. *Res Social Adm Pharm* 2021;17:1799-1806
15. Wickware C. Pharmacies' dispensing increases by up to a third as a result of COVID-19, survey finds. *Pharm J* 2020;306:doi:10.1211/PJ.2020.20207917.

16. Romano S, Galante H, Figueira D, et al. Time-trend analysis of medicines sales and shortages during COVID-19 outbreak: data from community pharmacies. *Res Social Adm Pharm* 2021;17:1876-1881
17. Murphy M, Scott LJ, Salisbury C, et al. Implementation of remote consulting in UK primary care following the COVID-19 pandemic: a mixed-methods longitudinal study. *Br J Gen Pract* 2021;71:e166-e177
18. Carpenter DM, Hastings T, Westrick S, et al. Rural community pharmacies' preparedness for and responses to COVID-19. *Res Social Adm Pharm* 2021;17:1327-1331
19. Rosenquist JN. The stress of Bayesian medicine-uncomfortable uncertainty in the face of COVID-19. *New Engl J Med* 2021;384:7-9
20. Wickware C. Pharmacy leaders in 'urgent talks' with NHS as COVID-19 booster vaccination campaign is ramped up. *Pharm J* 2021;307:doi:10.1211/PJ.2021.1.12-231
21. Wickware C. Record numbers of lateral flow tests sent to pharmacies amid supply issues. *Pharm J* 2021;307:doi:10.1211/PJ.2021.1.121205
22. Wickware C. Community pharmacies fulfil 17 million lateral flow test requests, official data show. *Pharm J* 2022;308:doi:10.1211/PJ.2022.1.129133
23. Patton DE, Ryan C, Hughes CM. Enhancing community pharmacists' provision of medication adherence support to older adults: a mixed methods study using the Theoretical Domains Framework. *Res Social Adm Pharm* 2021;17:406-418
24. Austin Z, Gregory P. Resilience in the time of pandemic: the experience of community pharmacists during COVID-19. *Res Social Adm Pharm* 2021;17:1867-1875
25. Parkhurst C, Purewal GS, Donyai P. Community pharmacy and COVID-19-the unsung heroes on our high streets. *J Patient Exp* 2020;7:282-284
26. Maidment I, Young E, MacPhee M, et al. Rapid realist review of the role of community pharmacy in the public health response to COVID-19. *BMJ Open* 2021;11:e050043. doi:10.1136/ bmjopen-2021-050043
27. Lloyd-Smith MK. The COVID-19 pandemic: resilient organisational response to a low-chance, high-impact event. *BMJ Leader* 2020;4:109-112

Figure legends

Figure 1a Pharmacists' methods of communication with GP practices during the pandemic

Figure 1b Pharmacists' methods of communication with patients during the the pandemic

Figure 2 COVID-19 Information sources used by community pharmacists (n=130)

HSCNI and DoH: Advisory letters/emails were provided regularly by the Health and Social Care Board, the Department of Health and related agencies
Summarised information: Distilled information provided by the contractor/head office or a professional organisation e.g. Community Pharmacy NI, Pharmacy Forum
FAQs: Frequently Asked Questions updated daily on the Business Services Organisation (BSO) website
ECHO sessions: Online video sessions provided by Department of Health and Health & Social Care Board

Figure 3 Views of pharmacists (n=130) on selected post-pandemic activities

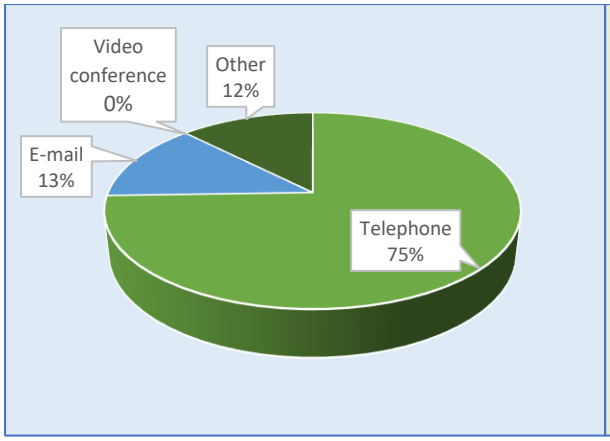


Figure 1a Pharmacists' methods of communication with GP practices during the pandemic

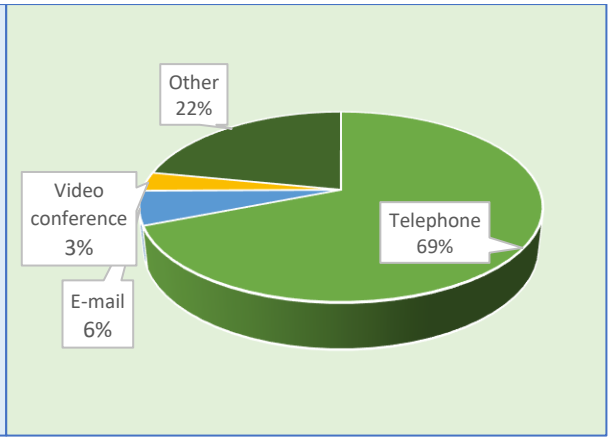
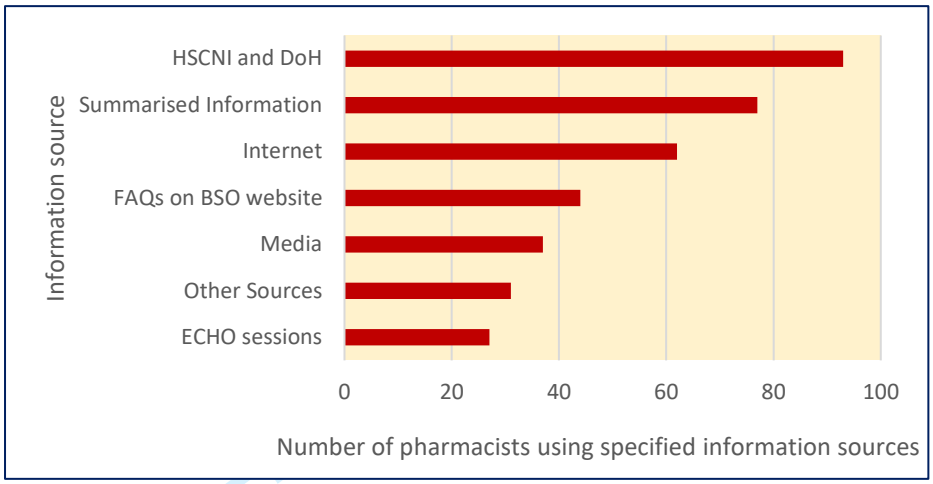


Figure 1b Pharmacists' methods of communication with patients during the the pandemic



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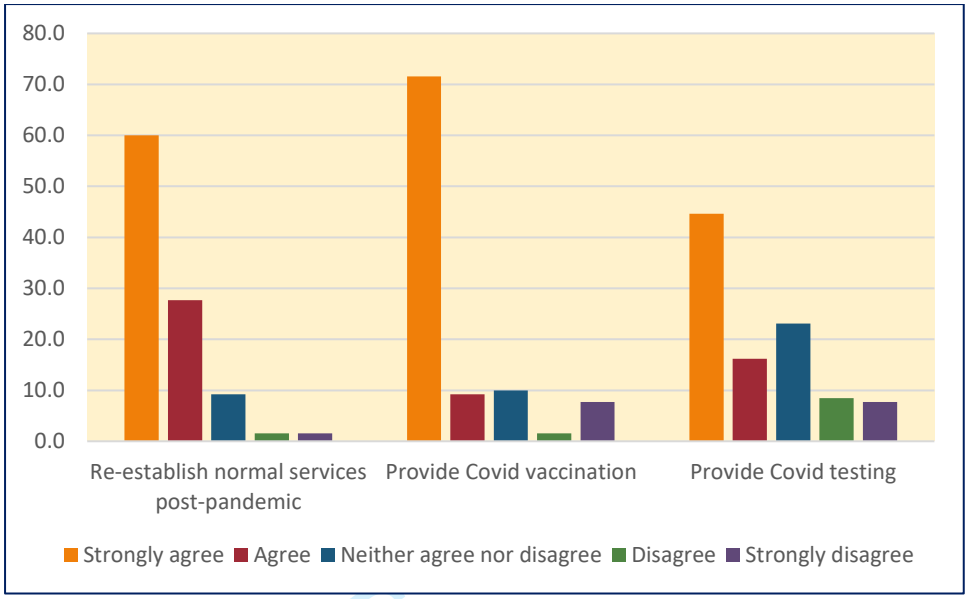

Figure 3 Views of pharmacists (n=130) on selected post-pandemic activities

---------- Section 1: Introduction and Consent ----------

Community Pharmacy COVID-19 Study: Telephone questionnaire

"A mixed methods study of the community pharmacy workforce's preparedness for, and response to, the COVID-19 pandemic"

INTRODUCTION

Hello, my name is Susan Patterson. I'm from the School of Pharmacy, Queen's University Belfast and I'm a pharmacist undertaking a research study about community pharmacy's preparedness for and response to the COVID-19 pandemic in Northern Ireland. I'm phoning to see if you might be interested in taking part in a short telephone questionnaire. The Pharmacy Forum and NPA recently circulated information about the study to all community pharmacists. Your experience of working in community pharmacy during the pandemic will be vitally important to help shape how community pharmacies prepare for any future pandemics or public health crises. Does this sound like something you would be interested in?

Yes ☐ **No** ☐

The questionnaire takes roughly 15 minutes and can be completed with me now or alternatively I can call back later at a time that suits you[1].

CONSENT

Completion of this questionnaire is completely voluntary, and the results will be anonymous to anyone other than the research team who will treat all the information confidentially. You have the right to skip questions and to withdraw from the study, without giving a reason, at any time. If you withdraw, you can contact me on this phone number or at the School of Pharmacy and I will delete all data relating to you.

I will now read you a series of statements about the study which I would like you to respond to with either "Yes" or "No". I will audio-record and note your responses on the telephone questionnaire form.

1. I confirm that I have read, or had read to me, and understand the information provided in advance by email for the study. I have had the opportunity to ask questions and these have been answered fully

[1] Suitable dates/times for call backs to be recorded by the researcher in a separate spreadsheet

Community Pharmacy COVID-19 Study ID _____

Yes ☐ **No** ☐

2. I understand that my participation is voluntary and I am free to withdraw at any time, without giving any reason.

Yes ☐ **No** ☐

3. I understand the study is being conducted by researchers from Queen's University Belfast and that my personal information will be held securely on University premises and handled in accordance with the provisions of the Data Protection Act 2018.

Yes ☐ **No** ☐

4. I understand that data collected as part of this study may be looked at by authorized individuals from Queen's University Belfast, Trinity College Dublin and Royal College of Surgeons in Ireland) where it is relevant to my taking part in this research. I give permission for these individuals to have access to this information.

Yes ☐ **No** ☐

5. I agree to take part in the above study.

Yes ☐ **No** ☐

- **If the reply is No,**

"Thank you for speaking to me today and goodbye".

- **If the reply is Yes**, proceed with completing the questionnaire.

"In the interests of time, I will try to keep this as short as possible. Please help me by keeping your responses brief. If we are interrupted, can I call back later to finish it?"

Yes ☐ **No** ☐

Suitable alternative times:

_____

_____

_____

Community Pharmacy COVID-19 Study ID _____

---------- **Section 2: Telephone Questionnaire** ----------

PHARMACIST AND PHARMACY CHARACTERISTICS (DEMOGRAPHICS)

To begin, I will ask you some questions about you and the community pharmacy in which you work.

1. **Pharmacist characteristics**

1.1 Can I confirm the gender you identify as?

Female	Male	Prefer not to disclose	Other (please specify)
☐	☐	☐	☐

Other: _____

1.2 Which of the following categories includes your age?

<25	25 - 34	35 - 44	45 - 54	55 - 64	≥65
☐	☐	☐	☐	☐	☐

1.3 How many years have you been practising as a pharmacist?

≤5	6 – 10	11 – 15	≥15
☐	☐	☐	☐

1.4 Are you the pharmacy owner (contractor) or an employee pharmacist?

Owner (contractor) ☐ Employee ☐

1.5 What is your <u>usual</u> role in the pharmacy? Please choose one of the following:

Owner manager	Responsible pharmacist	Dispensary manager	Locum	Other (please specify)
☐	☐	☐	☐	☐

Other: _____

Community Pharmacy COVID-19 Study ID _____

1.6 Were you shielding during the early stages of the pandemic (approximately from March to May 2020)?

Yes ☐ **No** ☐

[*If the response is yes, researcher to discuss services in Questions 4 and 6 from the time period when the pharmacist returned to work (Question 5 refers only to June/July onwards)*]

1.7 Are you on the temporary Pharmaceutical Register?

Yes ☐ **No** ☐

2. Community pharmacy characteristics

2.1 Researcher to record: Local Commissioning Group (LCG) (or Trust) Area:

Belfast	Northern	South Eastern	Southern	Western
☐	☐	☐	☐	☐

2.2 *Researcher to record: Location of the pharmacy:*

Urban (population >10,000)	Rural (population <5,000)	Suburban (population of 5,000 – 10,000)
☐	☐	☐

2.3 Which of the following options best describes the community pharmacy in which you work?

Independent	☐
Small chain (group of <5 pharmacies)	☐
Medium chain (group of 5-20 pharmacies)	☐
Large chain (group of >20 pharmacies)	☐

Community Pharmacy COVID-19 Study ID _____

A. PHARMACIST'S EXPERIENCE OF WORKING DURING THE PANDEMIC

I will now ask you a series of questions about your experience of working during the pandemic. The questions are about what happened from March 2020 onwards and largely follow the sequence of events up to December 2020.

PREVENTING THE SPREAD OF COVID-19

This first set of questions deal with preventing the spread of COVID-19.

I would like you to think about March to May 2020 when answering these initial questions. I will read out a series of statements, and for each one, please respond with either Yes or No.

3. Part I **Did you have any of the following measures in place in your pharmacy between March and May 2020 to prevent the spread of COVID-19?**	**Part I** **Yes (Y)/No (N)**	**Part II** **Measures stopped in June to August 2020? Yes (Y)/No (N)**
3.1 Public health information on preventing COVID-19, e.g. posters, 'Living Well' campaign COVID booklet?	☐	☐
3.2 Protocols for disinfection of pharmacy surfaces	☐	☐
3.3 Use of Personal Protective Equipment (PPE) by pharmacy staff, e.g. masks, gloves, aprons, eye protection	☐	☐
3.4 Management of social distancing, e.g. number of people in the shop, floor markings for queuing in the pharmacy	☐	☐
3.5 Shorter opening hours to facilitate cleaning, re-stocking, staff breaks	☐	☐
3.6 Lunchtime closing	☐	☐
3.7 Changes to how your available space was used, e.g. using consultation room for staff breaks	☐	☐
3.8 Adjustments to premises, e.g. physical barriers at counters in pharmacies, screens, partitions	☐	☐
3.9 Reduced opportunity for face-to-face contact, e.g. temporary suspension of direct patient care services	☐	☐
3.10 Changes to staff working patterns to facilitate social distancing	☐	☐
Part II **And did you stop any of these at a later date, for example, during June to August 2020?** [*Record Yes (Y)/No (N) in 2nd column]*		

3.12 Were there any other measures put in place in your pharmacy to prevent the spread of COVID-19 that you would like to mention?
[document free-text response]

_____

_____

_____

Community Pharmacy COVID-19 Study ID _____

PHARMACY SERVICES

The next set of questions focuses on your experience of the immediate actions taken in relation to community pharmacy services in response to the pandemic over time up to the end of December 2020.

I will ask you about each pharmacy service in turn, and I would like to think about how you responded initially and if anything changed over time. Again, please provide Yes or No responses or state "not applicable" if you don't usually provide the service.

4. Part I **Did you have to stop providing any of the following services during March-May 2020 (first wave)? If so, did you restart during June-August? (after 1st wave).**	**Part I**			**Part II**
	Service provision **stopped during March-May 2020** (Wave 1) **Yes (Y)/No (N)**	**N/A** Service is not usually provided	**If stopped,** Re-started by pharmacy Jun-Aug 2020 (after Wave 1) **Yes (Y)/No (N)**	Service provision **stopped during Sept-Dec 2020** (Wave 2) **Yes (Y)/No (N)**
4.1 Dispensing acute and repeat (chronic) medicines				
4.2 Supply of OTC medicines				
4.3 Medicines advice to patients				
4.4 #Living Well campaigns				
4.5 Nursing/residential homes' support and advice				
4.6 Dispensing of out-of-hours prescriptions				

Community Pharmacy COVID-19 Study ID _____

Question 4 continued……	Part I			Part II
Part I **Did you have to stop providing any of the following services during March-May 2020 (first wave)? If so, did you restart during June-August? (after 1st wave).**	Service provision **stopped during March-May 2020** (Wave 1) **Yes (Y)/No (N)**	**N/A** Service is not usually provided	**If stopped,** Re-started by pharmacy Jun-Aug 2020 (after Wave 1) **Yes (Y)/No (N)**	Service provision **stopped during Sept-Dec 2020** (Wave 2) **Yes (Y)/No (N)**
4.7 Prescription collection*				
4.8 Prescription delivery service*				
4.9 #Minor Ailments Scheme/ Pharmacy First				
4.10 #Medicines Use Review				
4.11 #Managing Your Medicines				
4.12 #Smoking Cessation				
4.13 Adherence support (e.g. weekly dispensing)				
4.14 #Supervision of Opioid Substitution Treatment*				
4.15 Needle and syringe exchange service*				
4.16 Travel Vaccination				

4.17 Any others? Please specify:_____

_____

***If usually provided by your pharmacy** **#Stood down by HSCB during March-May 2020**

Part II *[On completion of Part 1 above, list services again and add responses to table above]*
Did you have to stop providing any services again during Sep-Dec (the 2nd wave)? Which ones?

Community Pharmacy COVID-19 Study ID _____

During the pandemic, a number of new services were commissioned; many pharmacies also developed new and innovative ways of working.

5 Part I **Did you implement any of the following new ways of working in response to COVID-19 between March and May 2020 (Wave 1)?**	**Part I** **Yes (Y)/No (N)**	**Part II** **Stopped at a later date? Yes (Y)/No (N)**
5.1 Community Pharmacy Emergency Supply during a Pandemic service	☐	☐
5.2 Prescription delivery services by volunteers	☐	☐
5.3 Replenishment of Care Home Pandemic packs	☐	☐
5.4 Palliative care on-call services	☐	☐
5.5 Employment of additional staff, e.g. dentists, volunteers, undergraduate students, retired pharmacists	☐	☐
5.6 Flu vaccination service (frontline Health and Social Care workers)	☐	☐
5.7 Supply of medicines usually supplied in the hospital setting (e.g. oncology, antiretroviral drugs, 'Healthcare at Home')	☐	☐
5.8 Measures to flag/assist patients with sensitive issues such as domestic violence reporting	☐	☐
5.9 Drive-through pharmacy services (initiated or increased)	☐	☐
5.10 Daily reporting of staffing/stock situation to the Health and Social Care Board	☐	☐
5.11 Referrals to Test and Trace services	☐	☐
5.12 Commissioned Prescription delivery service (starting Sept 2020)	☐	☐
5.13 Any others? Please specify: _____ _____ _____		
Part II **And did you stop any of these afterwards at a later date?** *[Record Y/N Yes (Y)/No (N) in 2nd column]*		

Community Pharmacy COVID-19 Study ID _____

PREPAREDNESS

Having now had the experience of working during the pandemic, I'd like to ask you to reflect on how well prepared you felt you were.

6. Thinking back to the start of the initial outbreak of COVID-19 firstly in March-May 2020 and secondly in Sept-Dec 2020, did you have…	**March - May 2020 (beginning of Wave 1) Yes (Y)/No (N)**	**Sept - Dec 2020 (beginning of Wave 2) Yes (Y)/No (N)**
6.1 A business continuity plan in place for use in the event of staff absence over a prolonged period?	☐	☐
6.2 A business continuity plan in place for use in the event of pharmacy closure?	☐	☐
6.3 Enough stock and supply of essential prescription and OTC medicines?	☐	☐
6.4 Enough financial resources to cover the additional demands on your pharmacy business	☐	☐
6.5 Enough stock and supply of hand sanitisers	☐	☐
6.6 Enough information about PPE requirements for staff	☐	☐
6.7 Enough supply of PPE for staff	☐	☐
6.8 A system to manage quantity limits for patients for the supply of individual medicines	☐	☐
6.9 Appropriate staff working patterns in place	☐	☐
6.10 Did you have to close the pharmacy at any stage during the pandemic?	☐	☐
6.11 And if so, for how long? *[document free text response]*		

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7.1 What single aspect of your work, if any, did you feel MOST prepared for during March to May 2020 (Wave 1)?

_____

_____

7.2 What single aspect of your work, if any, did you feel LEAST prepared for during March to May 2020 (Wave 1)?

_____

_____

_____

7.3 Overall, did you feel better or worse prepared for working during Wave 2 in Sept-Dec 2020 compared to Wave 1 in March-May 2020?	Better prepared	Worse prepared
	☐	☐

7.4 If worse, can you briefly explain why?

_____

_____

_____

COMMUNICATION

Now I'd like you to think about how you were able to communicate with others during the pandemic.

	Yes	No
8.1 Did you communicate differently with GPs and patients during the pandemic?	☐	☐

How did you communicate?

8.2 GPs	**8.3 Patients**
Telephone ☐	Telephone ☐
E-mail ☐	E-mail ☐
Video call ☐	Video call ☐
Other ☐	Other ☐
_____	_____
_____	_____
_____	_____

UPDATING PROFESSIONAL KNOWLEDGE

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This question is about keeping your clinical knowledge of COVID-19 up to date.

9.1 Were sufficient training resources available to you?	**Yes** ☐	**No** ☐

9.2 What resources did you use? Tick all that apply

Remote training (ECHO) sessions ☐

Frequently Asked Questions for community pharmacists on the BSO website ☐

Distilled / summarised information sources provided by CPNI, NPA or your employer ☐

Internet ☐

Media ☐

Dept of Health, Health & Social Care Board, Public Health Agency COVID-19 guidance ☐

Other, please specify ☐

_____

_____

LOOKING TO THE FUTURE

The final few questions will focus on your views about returning to normal activities post-pandemic. On a scale of 1-5 where 1= strongly agree and 5= strongly disagree, please indicate your level of agreement with the following statements:

10.1 I am confident that I will be able to re-establish normal patient care services post-pandemic				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	2	3	4	5

10.2 I am willing to provide and administer COVID-19 vaccinations when they are available through community pharmacies in N. Ireland				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	2	3	4	5

10.3 I am willing to provide COVID-19 testing within the pharmacy if available in the future				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	2	3	4	5

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---------- Section 3: Conclusion and Interview Information ----------

CONCLUSION	**Thank you for participating & information about participation in a future interview**

- Thank you very much for taking the time to answer these questions. Your responses will provide a very helpful insight into how community pharmacy has responded to the pandemic.

- This questionnaire is part of a larger study about community pharmacy and COVID-19. In the next stage, we plan to invite a range of key stakeholders to take part in interviews to explore, in more depth, the role of community pharmacists over the course of the pandemic. The interview will last about 40 minutes. If you think you might be willing to be interviewed, I can send you further information about what this will entail. Please be assured that by requesting information you are not committing to take part. Would you like more information about the study?

  Yes ☐ **No** ☐

- **If the reply is yes,**

Could you provide me with your contact details?

- Name: _____
- E-mail address: _____
- Telephone number: _____

- **If the reply is no, thanks again for your time and goodbye.**

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1 and 2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4, 6, 7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5, 6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5
Bias	9	Describe any efforts to address potential sources of bias	5, 6
Study size	10	Explain how the study size was arrived at	5, 6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	N/A
		(*c*) Explain how missing data were addressed	N/A
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7, 8 (Table 1)
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8 (Table 1 and Table 2)
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	Tables 3-5; Figs 1-3
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	17-20
Generalisability	21	Discuss the generalisability (external validity) of the study results	19
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.