

Impact of NHS 111 Online on the NHS 111 telephone service and urgent care system: a mixed-methods study

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Scientific summary

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Scientific summary

Background

The NHS emergency and urgent care system in England is under sustained pressure as demand for services rises each year. NHS England has a number of strategies to address this problem, including continuing to develop the NHS 111 urgent care telephone service to provide patients with the right care first time. One initiative has been to provide an online service for NHS 111 using a website or a smartphone application (app). NHS 111 Online became available across England at the end of 2018. People can access the service on a computer, tablet or smartphone. They describe their health problem and then answer a series of questions, which results in the generation of a 'disposition' or recommendation about which service to contact. A call back from an NHS 111 clinician (usually a nurse) may be offered to some people. In some areas, there may also be options to receive a call back from a GP or to make an appointment. This evaluation was commissioned to assess the current and potential future impact of the NHS 111 Online service and how the service might be developed further.

Aim and objectives

The aim of this study was to evaluate the impact of an NHS 111 Online service on the existing NHS 111 telephone service and on the wider emergency and urgent care system. The objectives were to:

1. update and summarise the evidence on digital and telephone-based services for accessing urgent care
2. measure the impact of the NHS 111 Online system on contacts with the NHS 111 telephone service and other services in the emergency and urgent care system
3. compare the characteristics, user experience and satisfaction of users of NHS 111 Online with that of users of the telephone service
4. assess the practical issues associated with the implementation of the new service and the effects on staff
5. estimate the cost-consequences for the NHS of implementing an NHS 111 Online service.

Methods

This was a mixed-methods study with five related work packages: a rapid evidence review (objective 1); an interrupted time series analysis (objective 2); a comparison of the NHS 111 Online and telephone populations using descriptive statistics and a qualitative study of service users (objective 3); a qualitative study of staff and stakeholders (objective 4); and a cost-consequences analysis (objective 5).

Evidence review

We updated two previous systematic reviews on telephone triage (2012) and digital symptom checkers and triage tools (2019). Earlier search strategies to identify research evidence on accuracy, appropriateness, safety and user satisfaction were repeated. We identified 22 relevant papers on telephone triage and eight on digital symptom checkers and triage tools, and we performed a narrative summary of evidence and the quality of studies.

Interrupted time series and patient characteristics

We conducted an interrupted time series analysis to assess changes in activity before and after the introduction of NHS 111 Online in 18 out of a potential 38 provider sites across England. Data comprised NHS 111 telephone activity from the NHS 111 minimum data set for the years 2017–19 and NHS 111

Online contacts supplied by NHS Digital for 2019. The primary outcome was changes in the number of calls to the NHS 111 telephone service. Secondary outcomes were changes in the number of recommendations to access other services, including ambulance, emergency department and primary care. These data were also used to compare the demographic characteristics of the two user populations.

Service user perspective

There were two qualitative studies. First, a survey of NHS 111 users was undertaken in two telephone services (Yorkshire and the Humber, and Hampshire) and nationally for the NHS 111 Online service. We adapted the existing surveys service that providers already use to monitor patient experience. Survey data for 3728 users of NHS 111 Online and 795 telephone users were collected during the period September 2019–May 2020 and were analysed using descriptive statistics. Second, we undertook semistructured telephone interviews with 32 recent users of the NHS 111 Online service recruited from online service survey respondents. We asked about their experience of using NHS 111 Online, their preferences for using the online service or telephone service, and if they would use the online service in the future. Interviews were analysed using framework analysis.

Staff and stakeholder perspective

We undertook telephone interviews with 16 NHS 111 staff recruited by invitation from four NHS 111 sites between November 2019 and June 2020. Health advisers, clinical advisers, team leaders and commissioners with 1–8 years' experience were included. We asked about the impact of NHS 111 Online on workload, challenges to implementation, perceptions of how people use NHS 111 Online, the role of NHS 111 Online within the emergency and urgent care system, and future development using thematic analysis to identify key issues.

Cost-consequences analysis

A cost-consequences analysis was undertaken, which estimated the cost per contact for each of the NHS 111 Online and telephone services, including any health service use within 7 days. Costs were estimated for each service operating in isolation and running in parallel, and the national costs of these three models were calculated. The unit costs for each service were taken from standard sources, using 2018/19 prices, and service use was taken from the results of the user survey.

Results

Evidence review

For telephone triage, the most important new evidence is revealing the more complex patient and system factors that can explain variation in compliance and in the behaviours that affect service use. For digital symptom checkers and triage tools, there is little new evidence that adds to our recent findings that the evidence on patient safety, diagnostic accuracy and triage accuracy is weak and variable.

Interrupted time series analysis and patient characteristics

Pooled data from 18 sites showed that the online service had little impact on the number of triaged calls to the NHS 111 telephone service during the first year of operation. On average, for every 1000 contacts with NHS 111 Online, there was a 1.3% increase in calls triaged by the telephone service, but this was not statistically significant (incidence rate ratio per 1000 online contacts 1.013, 95% confidence interval 0.996 to 1.029; $p = 0.127$). For secondary outcomes, there was an increase of between 4.2% and 6.7% in recommendations to attend an emergency or urgent care service for each 1000 NHS 111 Online contacts. This suggests a potential net increase in demand for emergency and urgent care services. The exception was clinician call-backs to service users, which decreased by 5.4%. These analyses reflect *recommendations* for care, not actual care accessed.

Comparisons between the two NHS 111 services showed that users of the online service are younger, with > 60% in the 16–34 years age group. Ten per cent of contacts with the online service are offered a clinician call-back. For NHS 111 Online, the peak activity occurs in the morning and late afternoon/early evening and at weekends. The assessment process is rapid, with most contacts completed within 6 minutes and 95% of contacts reaching a disposition. The most common health problems the service is used for are dental problems and abdominal pain.

Patient perspective

User survey

The response rate was 12–13% for the telephone user surveys and 0.7% for the online service. Respondents were mainly white British, and fewer older people were among the online service participants. Respondents using NHS 111 Online were less satisfied than users of the NHS 111 telephone service (50% vs. 71%; $p < 0.001$) and less likely to recommend the service to friends and family (57% vs. 69%; $p < 0.001$). NHS 111 Online users were less likely to report full compliance with the advice given by NHS 111 (67.5% vs. 88%; $p < 0.001$). In the 7 days after their contact with NHS 111 Online, users were less likely to report contacting the 999 ambulance service (1% vs. 9%; $p < 0.001$) or visiting an emergency department (7% vs. 33%; $p < 0.001$) than telephone users and were more likely to report not making any contact with a health service (31% vs. 16%; $p < 0.001$). When asked why they had chosen to use the online service rather than the telephone service, 35% reported that they did not want to use the telephone service, 26% reported not having thought about using the telephone service, and 11% had tried to access the telephone service but found the wait for the call to be answered was too long.

User interview summary

Interview participants were also mainly white British and more than half were aged 45–65 years. Younger users were under-represented. Participants shared mixed views about NHS 111 Online. Although the majority of participants expressed satisfaction with the ease and speed with which an NHS 111 Online assessment was obtained, there were elements of the service that they were less satisfied with. Dissatisfaction predominantly focused on a perception that the questions were simplistic, which, for some, led to a lack of confidence in the advice given.

Most participants reported they would use NHS 111 Online again, most likely for help with simple health problems or when it was difficult to access other forms of health care. More than half expressed a preference for using NHS 111 Online before accessing the telephone service, whereas others preferred the reassurance and greater depth offered by verbal interaction with the telephone service. A quickly accessible online format was preferable for some people, such as those with busy lives or those with communication difficulties. NHS 111 Online was also seen as service that used minimal NHS resources, which became important to participants during the COVID-19 pandemic.

Staff and stakeholder perspective

NHS 111 telephone staff had limited awareness of the impact of the online service overall, partly because of the small numbers who were referred to the clinical queues for a call back, but also because of uncertainty about how NHS 111 Online operated. Participants presented no evidence of a shift from telephone to online, with some not aware of online user volumes and whether or not this affected telephone call volumes. There was evidence of some additional work required as a result of the increased length of time required to re-triage online referrals and responding to external queries about online referrals. Staff felt that improved information about how the online services work would benefit users and staff. Other suggested refinements included streamlining the process of triage for online referrals, allowing NHS 111 telephony to have access to online referral case notes, and including local commissioners in services development.

Cost-consequences

The overall cost per contact (including subsequent health-care contacts) is £68 higher for the telephone NHS 111 service, primarily because users of the online service accessed fewer emergency services and total services within 7 days of their contact. We estimated that the annual costs would be £537M for an online-only service and £1471M for a telephone-only service. If the online service were used in parallel with and with no substitution from the telephone service, then the annual costs would be higher, at £1551M; however, if $\geq 38\%$ of telephone contacts moved to online, then there would be a cost saving in comparison with a telephone-only service.

Conclusions

There is some evidence that there has been little substitution between services, creating potential 'new' demand. The same effect has been found previously when new services and access points for emergency and urgent care have been introduced. This has implications for the emergency and urgent care system as contacts with the NHS 111 online service have increased substantially; there were 2 million contacts during 2019, and this increased to 7.5 million during the first 10 months of 2020 (partly fuelled by the COVID-19 pandemic). This reinforces the need to take steps to try to increase the channel shift from the telephone service to the online service and to minimise the duplication of service use and the growth in new demand.

Our research has shown that there is a gap between recommendations from the triage system and the action that people subsequently take, with online users much less likely to contact emergency services. Further scrutiny of the online triage process to reduce overtriage would be likely to improve users' confidence in the service, particularly as the evidence suggests that the online user population seek help for lower-acuity problems.

There is a clear value to providing an online service; one-third of NHS 111 Online respondents used the service because they did not want to contact NHS 111. It also met a need for groups of the population who prefer services delivered online rather than over the telephone. However, at the moment, the online service does not seem to meet some users' expectations. To encourage more people to use the online service instead of the telephone service, it may be helpful to provide more explicit information about what the online service can provide and when to use it. Revisiting some of the questioning may also help people find it easier to use and trust the advice given. They may then be more likely to use it again and recommend it to others.

Limitations

The main limitations are as follows. First, because NHS 111 Online is a national service, we have not been able to use an experimental design with a control arm. This means that we cannot establish if the effects we have found are the direct result of introducing the new service or because of other factors. Second, we were unable to access patient-level data for the NHS 111 telephone service and had to use publicly available aggregated data. We were able to include only 18 out of 38 potential sites in the interrupted time series analysis, so we have not been able to establish a national estimate of impact. This also limited the comparison of characteristics of the NHS 111 telephone and online populations. Third, this evaluation took place during the early stage of implementation, when use was growing and the service had been in operation for only 12–18 months. As the service expands and contacts increase, it is possible that the impact will change. Finally, the estimates of costs have considered the NHS 111 telephone and online users as equivalent groups, but they are probably not directly comparable as they are different self-selected patient groups. In addition, cost estimates are based on relatively small surveys, which introduces sampling and respondent errors.

Research recommendations

We have identified four areas of useful research related to the effects of further expansion and service maturity and service development and improvement:

1. re-evaluation of the impact of NHS 111 Online on the NHS 111 service and wider health system using linked data to provide a more comprehensive assessment of the different types of demand, subsequent service utilisation and associated costs
2. further research with service users to explore expectations, reasons for using the service, improvements to the triage questioning process and the interface with human communication
3. additional patient-level comparisons of the characteristics of the two NHS 111 populations to help identify which people are most likely to benefit from the service
4. further follow-up to assess health outcomes of patients who do not follow advice to assess if their decisions were correct, which, in turn, could help to improve the triage process.

Trial registration

This trial is registered as ISRCTN51801112.

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