

THE EVOLUTION OF ONLINE PHARMACIES

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ABSTRACT

The issue of buying medicines online has exercised the pharmacy and wider healthcare community over the last decade. The Internet offers another choice to people who seek medicines, with or without a prescription, and many commentators have listed associated risks and benefits. In this review article, peer-reviewed literature and associated commentary are examined to illustrate the evolution of online pharmacy. Whilst it is recognised that the issues of counterfeit medicines and wider use of consumer medicines information on the internet are closely associated with this issue, these topics are beyond the scope of this paper. The material considered here reveals differing perspectives about consumer motivations and experience when buying medicines online. Negative perceptions of online medicines supply are reflected, such as the procurement of restricted medicines without a prescription, and the lack of information offered to complement the product. There is also a strong seam that documents good practice within online pharmacy, even from the earliest anarchic pre-regulation phase. Whilst the benefits of 24/7 access and privacy seem to be well substantiated, cost benefits are more contested. Despite evidence that some illicit medicine procurement occurs online, research contends that the main sources of diversion remain dealers, family/friends and legitimate medical prescriptions. Moreover, regulatory strategies – despite cynicism that the Internet could ever be regulated – seem to have had a positive impact for illicit controlled substances. Adequate consumer ‘ehealth literacy’ is necessary, alongside effective regulation, to minimise harm, but even the most recent research shows serious expertise deficits within the general population. Online pharmacy has a place in future medicines provision, and could explore its potential to provide cognitive services alongside medicines. Bricks-and-mortar pharmacies should reflect upon the value that they add to the transaction in order to avoid losing a younger ‘wired’ generation of future parents and carers.

Key words: Internet, Online Pharmacy, Consumer, Medicine, Health Literacy, ehealth.

INTRODUCTION

The Internet has developed over the last decade into a first-line information source about all aspects of life for many people. Interest in purchasing products online has similarly increased, including medicines. This review of peer-reviewed literature and associated commentary will describe a number of issues associated with online pharmacy operations, within the wider healthcare context, and will conclude with some ideas for future developments.

WHAT DO WE MEAN BY ONLINE PHARMACIES?

Medicines are available for sale both on sites identifying themselves as ‘pharmacies’ and those that do not. In parallel with other types of online retailers, the market is split between those who extended their offline presence (like Boots and Walgreens) and those who entered the market

as a purely online brand (like Pharmacy2U and Kwikmed). Gallagher and Colaizzi asserted in 2000 that 'As Internet pharmacy has grown in the past year, it has become apparent to the major pharmacy chains that they must pursue the online route as well to prevent a loss of market share'¹.

An online pharmacy might fulfil any or all of a number of functions:

- The sale or supply of medicines, including repeat prescription services
- The sale or supply of other healthcare products
- Providing information about medicines
- Providing advice about symptoms
- Hosting online support groups

Information or advice might be personalised (through personal email/message board/live chat contact) or general (hosted on static pages and as FAQs). Information might also be self-generated or streamed/syndicated (such as the partnership between Boots UK and WebMD, or Pharmacy2U and Patient UK).

Online pharmacies are utilising different forms of technology to extend and enhance their site functionality, such as video streaming on health topics and mobile apps and text reminders for ordering repeat prescriptions. The inclusion of personal records of regular prescriptions also increases the involvement that a consumer might have with the online pharmacy.

FACTORS AFFECTING THE PURCHASE OF MEDICINES ONLINE

A paper as early as 1999 indicated that 'the prototypical web consumer leads a wired lifestyle and is time starved', and that this was more likely to predict online purchasing behaviour than demographic factors². The authors also asserted that looking for product information on the Internet was the most important predictor of online buying behaviour. A study of 300 UK consumers in 2004 resulted in a more sophisticated consumer typology that describes different motivations for buying medicines or healthcare products online [Box 1]³.

Box 1 – Market segmentation of online medicine consumers (Gurău 2005³)

Consumer A: young, with low revenues, less interested in online service quality and less sensitive to online risks, but concerned about price and online payment security.

Consumer B: middle-aged, with good purchasing power, requiring privacy and discreetness of delivery.

Consumer C: middle-aged, high-revenue customer that requires a high service quality, anonymity, rich online information and choice.

Customer D: old-aged, with low or medium purchasing power, attracted by the convenience of online shopping and home delivery, but highly concerned about online transaction risks.

Qualitative work by the author of this review in 2001 challenged British students aged 11-18 to think about whether they might buy medicines online⁴. Although they reported that they and peers had purchased other products online (such as music and clothing), they were more

hesitant about buying medicines. When Gurău presented UK consumers with his typology of pharmacies A-D (Box 2), the 'D-OTC' pharmacies were preferred by many participants³. He felt that this was perhaps because "of their clear conformity with safety standards and regulations". He noted that younger customers (18-25 year-olds) showed greater willingness to buy from 'C-No prescription' pharmacies. Similarly, a study in Belgium showed a greater acceptance of an online distribution route for OTC medicines among consumers aged 45 or less⁵.

Box 2 – Typology of online pharmacies (Adapted from Gurău, 2005³)

- A. Send prescription:** An existing prescription, written by a licensed practitioner, is sent to the online pharmacy by post, fax or email.
- B. Online consultation and prescription:** Customers have to register with the pharmacy site, and then complete an online questionnaire. Based on the submitted information, a doctor prescribes a treatment, and the online pharmacy sells the medicines to the patient.
- C. No prescription required:** Regulated medicines are sold without prescription. The site states that responsibility for the selection and purchase of medicines rests with the consumer.
- D. OTC medicines:** Pharmacies selling only non-prescription medicines, including vitamins, dietary supplements and homeopathic remedies.

Several authors, commentators and indeed sites have described possible advantages/benefits and disadvantages/risks of using online pharmacies, as summarised in Table 1. Access and convenience seem to be weighed against safety. Cost appears as an issue on both sides.

Table 1 (Compiled from www.pharmacychecker.com and^{12,16})

Perceived benefits and risks of purchasing medicines online	
Benefits/Advantages	Risks/Disadvantages
<ul style="list-style-type: none"> • Lower prices • Privacy / Anonymity • Convenience (e.g. housebound patients) • Medical Information • Available 24 hours a day, 7 days a week • Added value through functionality like personal medication profiles • Price comparison possible through online mediators • Regulated medicines available without prescription • Not limited by traditional pharmacy supplies 	<ul style="list-style-type: none"> • Unlicensed dispensing • Counterfeit drugs • Lack of protection of personal and financial information • Lack of pharmacy information (e.g. address) • Additional fees (e.g. shipping fee, account set-up fee) • Prices can change quickly • Inadequate safeguards to personal health • Sale of medicines that are dangerous if taken without medical supervision • Pharmacist not always immediately available online • Fears about the integrity of the medicines supplied • Damage through inadequate storage or delivery precautions • Fears about the qualification of the prescriber • Bypassing the health professional-patient relationship • Limited participation by third-party payers

Regarding access to restricted medicines, there has been substantial interest in the illicit purchase of regulated drugs online. A US organisation reported, in 2006, that 34 illegal Internet pharmacies dispensed more than 98 million dosage units of hydrocodone products⁶. Commentators have showed particular concern about the possibility of young people accessing psychoactive drugs by this route⁷. The research literature, however, includes other perspectives. A multi-method study by Cicero *et al.* concluded that ‘The assertion that the Internet has become a dangerous new avenue for the diversion of scheduled prescription opioid analgesics appears to be based on no empirical evidence and is largely incorrect.’⁸ Their survey of over 1,000 prescription analgesic misusers from treatment centres had reported that the main supply routes were still dealers, friends/relatives, and legitimate doctors’ prescriptions, with the Internet cited in less than 6% of cases. Then the authors attempted to purchase analgesics and were unsuccessful in procuring any scheduled analgesics (although the unscheduled drug tramadol was widely available). A larger, later study by the same group had very consistent results: they identified the same three main sources, and the Internet accounting for about 3% of reports, with a suggested decline since 2006⁹. A UK study of the sale of dextropropoxyphene suggested that there was a significant increase in the number of vending sites between 2003 and 2005 that then tailed off towards the end of that year¹⁰.

Many commentators acknowledge that there are treatments which people would be embarrassed to request in person from a doctor, but that can be supplied discreetly online – with or without a prescription. Sildenafil/Viagra[®] is one popular example¹¹, but authors acknowledge that people living with other conditions – such as psoriasis – might also seek prescription products online for this reason¹², as reflected in the recent acquisition by the UK LloydsPharmacy chain of the ‘Dr Thom’ website (supplying treatments for a range of embarrassing conditions).

The relationship between cost and likelihood of buying medicines online is complex, although a benefit of buying medicines at lower cost is often cited. The cost of the medicines purchased in a study by Bessell *et al.* showed the price for a set product to be widely variable¹³. Studies in other online markets have revealed issues that may be particularly relevant to medicines: for example, a study of wine retailers showed that consumers became less price-sensitive and more loyal as the information quality on the site increased¹⁴. Moreover, Kung *et al.* comment that ‘when buyers are faced with imperfect information and an inability to assess quality, and therefore the ability to determine their degree of satisfaction prior to purchase, they may use price to infer quality and their expected degree of satisfaction’¹⁵. There are studies and commentaries/reviews citing cost benefits from Internet pharmacies: indeed, a recent article from young Indian scientists expressed a desire for the Indian government to back internet pharmacy in order to enable Indian people to access less expensive medicines¹⁶. This is likely to remain a complex and contested area.

British school students explicitly described two sorts of risk when buying medicines online: receiving medicines that were harmless but ineffective, or medicines that may be harmful due to adulteration⁴. They also felt that the delay in getting the medicines would be unacceptable in an acute illness situation. They acknowledged that buying medicines from a pharmacy

with an offline presence might reduce, but not eliminate, the risks of receiving ineffective or adulterated medicines.

In a study by Bessell *et al.*, basic risks like damage to medicines upon delivery and dispensing errors were seen¹³. Commentary regarding online pharmacies as a haven for counterfeit medicines is widespread. The importance of understanding what to look for on websites is further underlined by the counterfeit medicines update through WHO in 2006, that 'medicines purchased over the Internet from sites that conceal their actual physical address are counterfeit in over 50% of cases'¹⁷.

A US study by Bate and Hess tested a number of drugs bought online using spectrometry techniques¹⁸. They used the National Association of Boards of Pharmacy, Verified Internet Pharmacy Practice Sites (NABP VIPPs) programme to choose a sample of online pharmacies with a range of ratings. None of the drugs from approved pharmacies failed. The only drug that failed tests was sildenafil/Viagra®, and the authors felt that there were other clues to challenge its authenticity from the packaging or the website: they felt that US consumers could employ a combination of approved ratings and "commonsense" checking techniques.

Advance access to product information is acknowledged as a possible advantage to purchasing medicines online. A study from 2001, however, used the health information quality tool DISCERN¹⁹ to gauge the quality of information provided by 104 websites selling OTC medicines, and found the majority of sites providing inadequate details of important issues, such as drug interactions¹³. Only 5 of 104 pharmacies received the highest 'good' DISCERN rating, and a further 25 received a 'moderate' rating. Even a 'moderate' DISCERN rating indicates that further support would be needed, so it could be argued that the vast majority of online pharmacies were not providing sufficient information to support medicines use. It was noted by the authors, who ordered products from a number of the study websites, that no further written information was supplied with the medicine upon delivery. Some pharmacies performed well on identifying interactions and contacting consumers accordingly, but they were in a minority. Another study, however, has shown that online pharmacies, despite variability in information provision, performed better on providing comprehensive information in general than community pharmacy drugstores²⁰.

If consumers perceive no difference between their online and in-person pharmacy experience, other factors of access and convenience may encourage them to stay online. A US study in 2004 by eMarketer showed that only 10% of people buying their medicines online felt less satisfied with that route than their traditional experience²¹.

REGULATION OF ONLINE PHARMACIES

There are good examples of national procedures to safeguard consumers. The General Pharmaceutical Council in Great Britain has an Internet pharmacy registration procedure, during which a green cross electronic logo is issued to qualifying pharmacies with a unique registration number²². The US National Association of Boards of Pharmacy run the 'Verified Internet Pharmacy Practice Sites' (VIPPs) programme²³, where VIPP-accredited pharmacies

can be sought online by consumers and are similarly identified by a logo.

Some would argue that it is all too easy to fake such accreditation marks, if a rogue outlet so wished. The bigger question, however, is whether consumers recognise - and act upon - the information provided by the presence or absence of such logos. If not, then there is little motivation to even try and circumvent the regulatory system. Tony Delamothe, web editor of the BMJ, mused upon these very issues in 2000²⁴. He noted that one of the potentially harmful developments had been a proliferation of web content quality measures that had not been validated and could thus do more harm than good. He also noted the arguably greater impact of the market on rogue practice following the crash in share value of drkoop.com which had intermingled information and advertising.

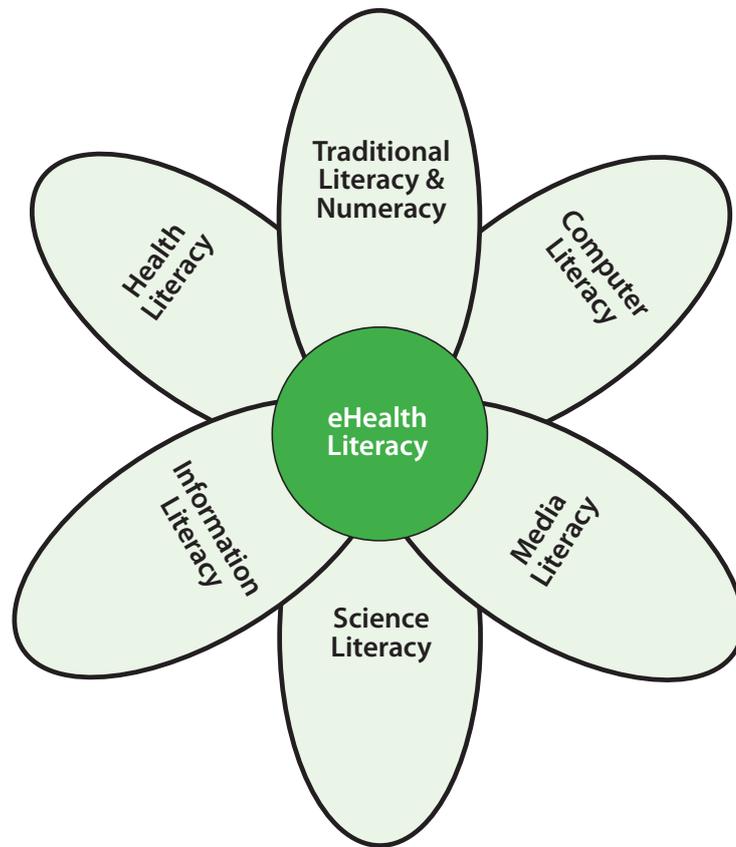
Commentary and research reporting actual or potential illicit use abound, and often conclude with a call for national and international enforcement co-operation²⁵⁻²⁹. Whilst there is concern that enforcement of regulation on the Internet is difficult, there are recent studies that show some regulatory effectiveness. Boyer and Wines, for example, undertook a study of online opioid purchase without prescription and concluded that the 2005 'CYBERx' operation by the US Drug Enforcement Agency had resulted in 'striking decreases' in availability³⁰.

CONSUMER E-HEALTH LITERACY

In order to optimise an online experience, a consumer should have the skills to find, appraise and use relevant information. Although the first 'digital divide' involving access to Internet-linked computers has eased for many (but not all) communities, a second more insidious divide might still result from inequalities in search skills. The concept of "e-health literacy" has been characterised as a combination of six separate relevant literacies³¹ (Figure 1): health; computer; traditional (basic literacy and numeracy); science; media, and information. Similarly, Nutbeam's classic definition incorporates the notions of functional, critical and interactive health literacies that have been applied by the author of this review to the online health environment³². Critical literacy challenges in finding relevant online health information, for example, might include information overload and knowing whom to trust³³. A recent study has concluded that the general population does not have the Internet skills necessary to maximise their use of online information, and that this may be a particular concern for young users, who are assumed to have more expertise than other age groups³⁴.

Ironically, an example of highly developed consumer e-health literacy might be reflected in the Drugbuyers site (www.drugbuyers.com)*. The nature of this site was described by Boyer and Wines (2008) in an account of drug enforcement efforts to restrict online availability of controlled analgesics without prescription³⁰. This web community of individuals gathered intelligence on sources of prescription analgesics, including observation of overseas sites and access to "understanding and compassionate doctors". It claimed that some doctors and some online pharmacy owners were also message board participants.

**This site said the forum was 'closed for maintenance' when visited on 27/4/11, but cached pages from Google from 24th April 2011 exist for review.*

Figure 1 – The eHealth literacy ‘Lily’ model (Norman & Skinner, 2006³¹)

Norman CD, Skinner HA. eHealth Literacy: Essential Skills for Consumer Health in a Networked World. *J Med Internet Res.* 2006 Apr–Jun; 8(2): e9.

Published online 2006 June 16. doi: 10.2196/jmir.8.2.e9.

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The circumvention of the traditional patient-professional relationship has been a concern of a number of authors on this topic^{26,28,35}. Consider Lineberry and Bostwick’s summary of the interplay between roles, from patient to consumer and back again³⁵: ‘With no physician involved, patients cease to be patients. Instead, they become consumers able to buy prescription medications, even controlled substances, from anonymous providers offering no ongoing treatment relationship and taking no responsibility for the drugs dispensed. When complications occur, these consumers become patients, turning back to the traditional medical system to manage overdoses, addictions, and drug adverse effects and interactions.’

Indeed, as seen in the bricks-and-mortar pharmacy environment, sometimes people act as independent ‘consumers’ and sometimes they act as ‘patients’ seeking professional advice. These roles will vary according to their symptoms and their self-perception of expertise in a health situation. The system cannot predict the need: it must be flexible and responsive, and perhaps that is something more often recognised hitherto in the consumer sector than in health services.

The question may be whether professionals have made themselves sufficiently available to their patients and the public, and thus whether the online route has exposed a gap in this relationship that should be reviewed by all the parties involved. Is a new professional role needed, one that is beginning to be seen in the live chat facilities and online support groups hosted by pharmacies?

THE FUTURE FOR ONLINE PHARMACIES?

Pharmacies fulfil a number of roles, many of which are linked to other parts of the health service, and a sustainable future for pharmacy includes an online platform. There are examples of plans for integrated e-healthcare systems incorporating web-based pharmacy interfaces that are accessible by pharmacists and patients alike³⁶. There has been a call to develop secure 'patient portals' that offer communication, content, commerce and community – what the authors of the paper called the “4 basic Cs” of the Internet³⁷. This perspective was offered in the context of supporting independent living for older people, focusing on wellness rather than anticipating illness.

There are acute situations for which online pharmacies will never be the first choice, but consumers of long-term medicines and health care products have compelling reasons to favour an online channel. Beyond the supply of product, online pharmacies may wish to consider how they might provide services online for which payment is made. As yet, online pharmacies are not actively promoting online adherence support for patients. Rather, some provide information about compliance support devices that can be accessed in-store. It would be interesting to see programmes available through online pharmacies to provide online support for people taking medicines, be it through group support for people taking certain medicines (like statins, where the risk of discontinuation at the beginning of therapy is considerable), or through reminders and live chat contact with a member of the pharmacy team trained in motivational interviewing and adherence support. Just as bricks-and-mortar pharmacies have moved in recent years from a focus on products to services, there is scope for developing the online cognitive pharmacy service sector. For example, if patients build an online medicines portfolio, what would then prevent their pharmacist from engaging in online chat with housebound patients to undertake periodic medication review?

Many pharmacies are extending their online functionality, and some have a presence within social network systems like Facebook. Whilst writing this review, some of the UK and US pharmacy facebook sites were visited: features were associated with wellness and a wider range of healthcare products. A social networking role for pharmacists in “micro- and macroscale projects that inform the public about health issues, mobilize partnerships to confront public health issues, and engage in research about new insights into health solutions” has already been proposed³⁸.

Pharmacy staff need to focus on the extra value that they bring to a face-to-face transaction. If customers perceive that they get personalised advice and treatment from staff, they are

arguably less likely to look elsewhere. Some consumer literature has highlighted the greater preference of younger consumers for online medicines distribution^{3,5}. There is a risk of losing a generation who have a 'wired lifestyle' and do not have the chance to build relationships with health care staff – missing out on preventive opportunities. The combination of the online and offline presence – with people starting a conversation online and then having the chance to follow it up in person – is worth exploring. Nutbeam's domain of interactive health literacy is about acting upon information obtained³², and yet one of the most difficult things to find on the Internet has been information about local support³⁹. Pharmacies with online and offline presence could capitalise upon this combination, beyond the 'store locator' function.

Isaac Montoya insightfully summarises the current dilemma of the online pharmacy⁴⁰: 'Healthcare marketing concepts guide business owners to identify the patients' wants and distinguish them from their needs...Some Internet pharmacies misinterpret proven marketing principles and become overly aggressive in the marketplace and focus on sales and profit only, rather than focusing on the big picture that includes concern for patient safety and long term success for the Internet pharmacy.' Wagner *et al.* advised community pharmacies to reflect: 'The growing presence of Internet pharmacies should motivate community pharmacists to foster more personal relationships with patients by increasing educational programs, counseling, and disease state monitoring, as patients will use the pharmacy that best fits their needs'²⁰.

In many studies and commentaries we see reference to online pharmacy operators who were maintaining high standards. Even the earliest studies, in perhaps the most anarchic phase, reported a 'surprisingly high' number of online pharmacies who refused to supply sildenafil without prescription¹¹. There is no doubt that there is a place for good online pharmacies as choices available to consumers. It will be a combination of sharing good practice (including regulatory practice) and empowering medicine consumers that will influence the spread of high quality online pharmacy provision.

Statement of Interests: None

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