



Design, architecture, pharmacy: making a difference to understanding anti-microbial resistance (AMR)

Sue Walker¹, Sue Hignett², Rosmary Lim¹, Caroline Parkhurst³, Flora Samuel¹
Miranda C. Mole¹

¹University of Reading, UK

²University of Loughborough, UK

³Day Lewis, UK and University of Reading, UK

ABSTRACT

This paper presents the work of the AHRC-funded cross-disciplinary project, 'Information and Architecture in Persuasive Pharmacy Space: combating antimicrobial resistance' (IDAPPS) which is designed to support one of the strategic aims of the UK 5-Year Antimicrobial Resistance strategy 2013-18, how to 'improve the knowledge and understanding of antimicrobial resistance'.

The paper introduces the working methods and outcomes of work to consider how we can use space within a pharmacy to encourage people to engage with information about AMR and self-care; and how we can design information so it is understood, whether on paper or in digital form. The research methods included review and analysis of archival material relevant to presenting information about drug-resistant infections; hierarchical task analysis; and co-design workshops with pharmacy workers and users.

One of the IDAPPS research outputs was a competition, designed to reinforce the cross-disciplinary approach that we propose is key to the challenge of communicating about AMR. The paper discusses and shows examples of the ideas and prototypes that emerged from the teams of designers, architects, behavioural scientists, and pharmacists.

See also www.amrpharmacy.org

Keywords: information design, human factors, community pharmacy, indoor built environment, antimicrobial resistance, drug resistant infection

Design, architecture, pharmacy: making a difference to understanding anti-microbial resistance (AMR)

How can we use space within a pharmacy to encourage people to engage with information about drug resistant infections and self-care? How can we design information through effective use of space, so it is understood, whether on paper or in digital form?

This paper introduces a cross-disciplinary health communication project funded by the UK's Arts and Humanities Research Council. The 'Information Design and Architecture in Persuasive Pharmacy Space: combating anti-microbial resistance' (IDAPPS) project explores 'persuasive space' in the presentation of information, its situation within a community pharmacy, and how users interact with it. This supports one of the strategic aims of the UK 5-Year Antimicrobial Resistance strategy 2013-18, to 'improve the knowledge and understanding of antimicrobial resistance'.

The project aims included:

- to raise the profile of design in science communication
- to reinforce the value of the community pharmacy environment as a health information provider
- to develop the research and innovation capacity of architecture and information design professionals

Community pharmacies play a key role in delivering public health. They are spaces in which there are complex interactions and functions, where people wait for prescriptions to be filled or to see a pharmacist. We want to improve the efficiency of use of this space to encourage engaged and creative interaction with information about drug-resistant infections in different formats and modes. The project brings together academics and practitioners in information design, architecture, ergonomics and human factors, and pharmacy.

Inspiration for the project came from work done by Otto and Marie Neurath to raise awareness of, and support prevention of, diseases such as tuberculosis (TB) and malaria in the 1930s and 1950s. Their approach prioritised pictorial and schematic communication over words; their use of striking and effective images was based on consistent and carefully considered principles. They worked with their intended target audiences to find out how they might receive and use the information they encountered, including health educators, health departments and schools (see Burke, Kindel & Walker 2013: 342–53; Walker 2017). In the case of a series of charts explaining about TB, the Neuraths included instructions about how the display should be arranged in a church hall or similar public space, thus linking the information content with the space in which it was displayed. Our



notion of 'persuasive space' incorporates ideas of using space in a community pharmacy and the use of space in document design to articulate structure and enable access to information.

Approach taken to the project

There are many experimental formats for developing interdisciplinary creativity. The IDAPPS model is based on architectural design studio as celebrated in the work of Donald Schön (1984). Sociologist Kate Pahl has taken 'design studio' beyond architecture and reused it in her work with diverse communities:

The studio is a conceptual space where groups form and grow things which emerge from something we recognise as working already. It involves a group of people who operate beyond the structures of the university and recognizes different types of expertise – all participants can emerge as 'experts'. It is adaptable and responsive to particular situations and is a space of action, process, and practice. (Pahl, 2014)

This approach had been tested by the AHRC Creative Exchange Knowledge Economy Project 'Home Improvements' which aimed to bring together academia, practice and the housebuilding industry to develop interdisciplinary design research solutions to some of the problems endemic to UK housing (Samuel, 2018: 193). This project used a competition format to reinforce practitioner and cross-disciplinary engagement and to generate ideas. The competition format has two advantages. First, people who would not normally collaborate are drawn together and, secondly, the solutions are arrived at in a far shorter time than in a commercial environment.

IDAPPS followed the 'Home Improvements' project model, and we posted an expression of interest asking for teams of at least three members from different disciplines – architecture/built environment, information design, human factors/ergonomics, behavioural science, psychology, linguistics, biological science, pharmacy. The brief was for proposals to 'use "persuasive space" to encourage pharmacy users to think about anti-microbial resistance and to get involved in the fight against it. We want to raise awareness of self-care for colds and other ailments that don't require antibiotics.' This call resulted in 12 expressions of interest, from which we selected 5 teams to attend an Ideas Lab at the University of Reading. The aim of the Ideas Lab was to encourage collaborative working within and across teams and to provide contextual information to support the design process. We incorporated approaches taken in user-centred information design projects where patients, families, carers, health professionals and designers work together (e.g. Black et al, 2013; Cerne Oven and Predan, 2013), and by the integrating and participatory principles of human factors and ergonomics (Taylor and Hignett, 2014).

Collaborative and cross-disciplinary working

In preparation for the Ideas Lab and to find out how people used the Day Lewis pharmacy we were working with, we collected observational data for a Hierarchical Task Analysis (HTA) to map possible customer (patient) pathways in the community pharmacy. HTA is a core Human Factors/Ergonomics method for understanding interactions among humans and other elements of a system. It is used to map systems by describing a task (e.g. collecting a prescription) as a higher-level goal with a hierarchy of superordinate and subordinate tasks. At each level of the subtasks, a plan directs the sequence and possible variance of task steps (Shepherd, 1998). The interactions were described as four stages of the pathways as shown in Figure 1 for the (1) approach to the pharmacy entrance and entry through the door; (2) journey from inside the door towards the shop/dispensing counter; (3) arrival and interactions at the counter; (4) departure, leaving the pharmacy. The use of plans allowed mapping of a variety of pathways, including purchasing medicines (over-the-counter and prescriptions) and other health and wellbeing shopping; seeking information for advice on medical conditions (especially when the GP surgery is closed or in an emergency when out of medication), getting rid of waste medicines, and using advanced NHS services including medicines review, flu vaccines, morning-after pill, stop smoking service, travel advice and NHS Health Checks.

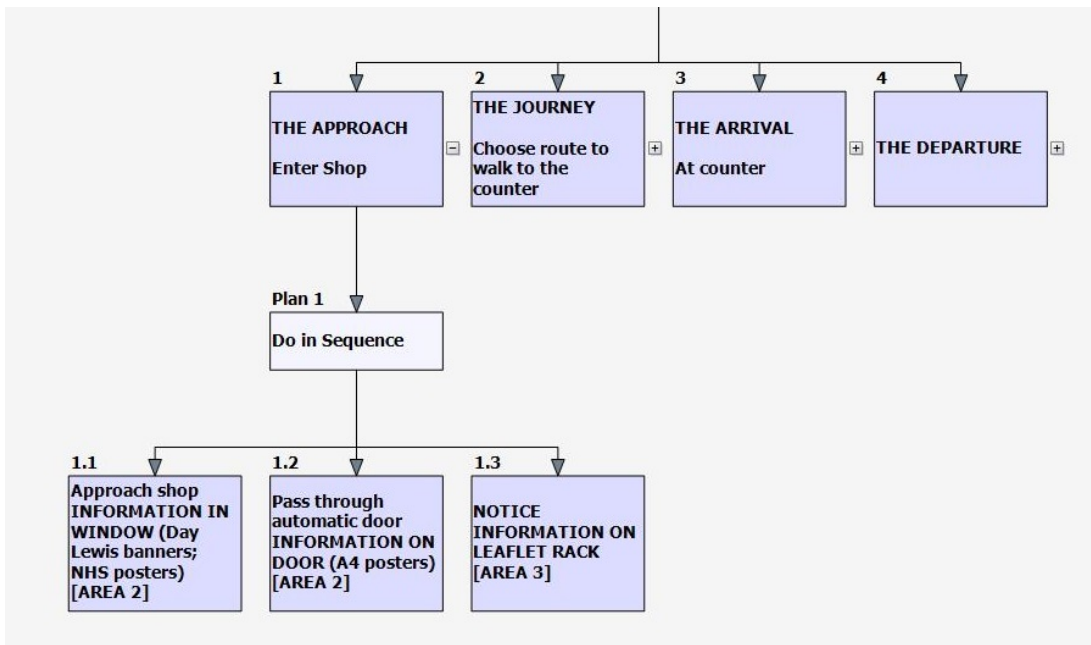


Figure 1. Hierarchical Task Analysis of interactions

We also undertook an historical review of printed ephemera to explore the kinds of graphic and verbal conventions used in the past to draw attention to issues such as personal hygiene, infection control and the dangers of particular diseases such as TB, malaria and diphtheria that were once

considered major public health threats but are now becoming increasingly resistant to antimicrobials. We considered how techniques used in them might be transferable to presenting information about drug-resistant infections today (see Walker, 2017). Two charts produced by the Neuraths which attracted interest and discussion at the Ideas Lab are shown in Figure 2.

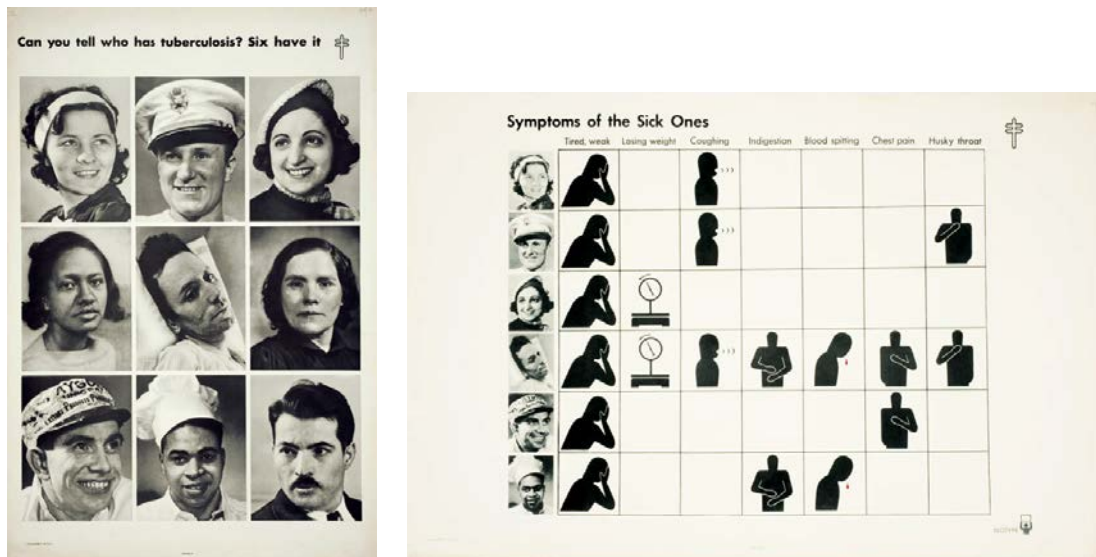


Figure 2 Two charts from the 'Fighting Tuberculosis' exhibition produced for The National Tuberculosis Association in the USA in 1938. Each chart measures 920 x 610 mm. *Otto and Marie Neurath Isotype Collection, University of Reading*

The HTA and the archival review were introduced in a briefing workshop to define the parameters of the Ideas Lab, to design the competition brief and produce the call for entries for teams to participate in the competition. The workshop brought together an interdisciplinary group including the academic research team, project partners (including people who worked at the pharmacy where the winning design would be installed), members of the project advisory group and advisors from the architecture, design and pharmacy disciplines. This was important to ensure views, concerns and constraints from key stakeholders were shared in an open and collaborative way and potential issues addressed before the start of the competition.

We explored and discussed the community pharmacy context. This included findings from an online survey of local pharmacy users (n=19) to provide baseline information about their understanding of antibiotics and AMR, and their experiences of visiting their local pharmacies. The survey found pharmacy users had very good knowledge about antibiotic use and resistance but there were some misconceptions about AMR suggesting clearer messages about antibiotic resistance were needed. Pharmacy users were interested to receive health information about AMR and suggested pharmacists and GPs could offer such information. However, limited space and the lack of privacy within the community pharmacy were key barriers to opportunities for such conversations. Knowledge about our community pharmacy project partner, Day Lewis as a company and local information about the specific pharmacy store where the design was to be installed, was also shared and discussed.



At the two-day Ideas Lab a key component was 'team time' where the teams spent time sharing ideas and learning from each other's disciplinary perspectives. Comments included: 'Part of the nature of something like this is that it is not easy to work in interdisciplinary groups, and you are finding a language together as much as anything else.' And '... one of the best things that has come out of today, is that we are all trying to understand each other, and that makes for really interesting conversations'. The team sessions were interrupted by 'show and tell' presentations where ideas were shared and discussed with the whole group. The competition teams had access to the expertise of our pharmacy partner, Day Lewis, and pharmacy users joined the Ideas Lab on the second day to respond to emerging ideas and to offer suggestions. Each team visited the particular pharmacy we are working with in Woodley, Reading.

After the Ideas Lab the teams had four weeks to work up a proposal – which they were asked to present as two A2 boards, with a written (or spoken) rationale and any models or artefacts that might be relevant. The project team, the manager of the Woodley Day Lewis Pharmacy and members of the project advisory board acted as judges and selected two proposals to take forward. These 'winning' proposals will be installed in the Day Lewis pharmacy in Woodley, Reading during summer 2018, where we will ask pharmacy users about their understanding of antimicrobial resistance after they have experienced the installations.

Competition outcomes

The competition format has enabled rapid generation of different approaches to considering how space in community pharmacies can be used to facilitate engagement with information about antimicrobial resistance. Each of the five solutions is relevant and feasible and offers potential for future work.

The value and benefit of cross-disciplinary working is well-known. Using a design-led approach that includes user-centred, collaborative working is not new. But in the context of this project the combination of disciplines, including architecture/built environment, user-centred design, human factors and ergonomics, pharmacy practice and behavioural science was an unusual mix that appears to have been particularly relevant in considering 'persuasive space' in a community pharmacy. A key design driver was the involvement of the manager of the Day Lewis pharmacy that we were working with. He provided invaluable context, including about the particular demographic in Woodley. Beyond the local Day Lewis environment, the overarching Day Lewis philosophy of the healthy living pharmacy and their promotion of this through staff support and training provided invaluable insight about the kinds of interaction likely between pharmacy users and staff.

Introducing the notion of 'persuasive space' alerted the teams to the ways in which people moved around the pharmacy and how the constraints imposed by a particular indoor built environment were affected by Day Lewis's requirements for product placement, and the arrangement of shop fittings – the tension between retail and health care as noted by Rapport (2009), and between educating and advising pharmacy users, and dispensing prescriptions described by Pronk et al

(2002) in relation to pharmacies in Holland. The consideration of these and related issues was evident in the proposals submitted by the teams. Ideas around 'inside' and 'outside' space featured in three of the proposals: the idea of a garden environment where people can sit; graphics on the pavement to instil curiosity as they walk towards the pharmacy; and looking in from the outside at an interactive, outward-facing installation. Consideration of how people moved around within and used the internal spaces was evident in all the proposals. Some non-design professionals in the group realised that design had a part to play in encouraging thinking about ways of solving problems and devising solutions (as opposed to something that was brought in at the end of a project as a presentational tool).

Already, the IDAPPS project is raising the profile of how community pharmacies might be used to encourage people to engage with the dangers of, and prevention of, drug-resistant infection. The next steps will be to consider the feedback from pharmacy user and pharmacy workers about the two winning solutions, examples of which are shown in Figure 3 below.



Figure 3 Examples from proposals from the two winning competition entries. See www.amrpharmacy.org

References

Black, A., A. Gibb, C. Carey, S. Barker, C. Leake, C. and L. Solomons. 2013. Designing a questionnaire to gather carer input to pain assessment for hospitalized people with dementia. *Visible Language*, 47 (2), pp. 37-60.

Burke, C., E. Kindel and S. Walker (eds). 2013. *Isotype: design and contexts 1925–1971*. London: Hyphen Press, pp. 342–353.

Cerne Oven, P., and B. Predan. 2013. *Designing an agenda, or, how to avoid solving problems that aren't. Focus: service and information design*. Ljubljana: The Pekinpah Association.

Pahl, K. 'Co-producing legacy: what is the role of artists within connected communities projects' (AHRC, 2014): <http://gtr.rcuk.ac.uk/projects?ref=AH/L013185/1>.

Rapport F., M. A. Doel and G. S. Jerzembek. 2009. "Convenient space" or "a tight squeeze": insider views on the community pharmacy. *Health & Place*. 15(1), 315-22.

Samuel, F. 2018. *Why architects matter: evidencing and communicating the value of architects*. London: Routledge.

Schön, D. A. 1984. The architectural studio as an exemplar of education for reflection-in-action, *Journal of Architectural Education*, 38:1, 2-9.

Shepherd, A. 1998. HTA as a framework for task analysis. *Ergonomics*, 41(11), 1537–1552.

Stanton, N. 2006. Hierarchical Task Analysis: developments, applications and extensions. *Applied Ergonomics*, 37, 55-79.

Taylor, E., and S. Hignett. 2014. The environment of safe care: considering building design as one facet of safety. *Proceedings of the HFES 2014 International Symposium on Human Factors and Ergonomics in Health Care*. Chicago, USA. 9-11 March 2014.

Walker, S. 2017. The contribution of typography and information design to health communication. In: Cooper, R. and Tseklevs, E. (eds.) *Design for health*. Routledge, pp. 92-109.