MODERN HUMAN

ROYAL PHARMACEUTICAL SOCIETY

BNF British National Formulary

Modern Human For The Royal Pharmaceutical Society

For publication

Design Business Effectiveness Awards, 2018 entry

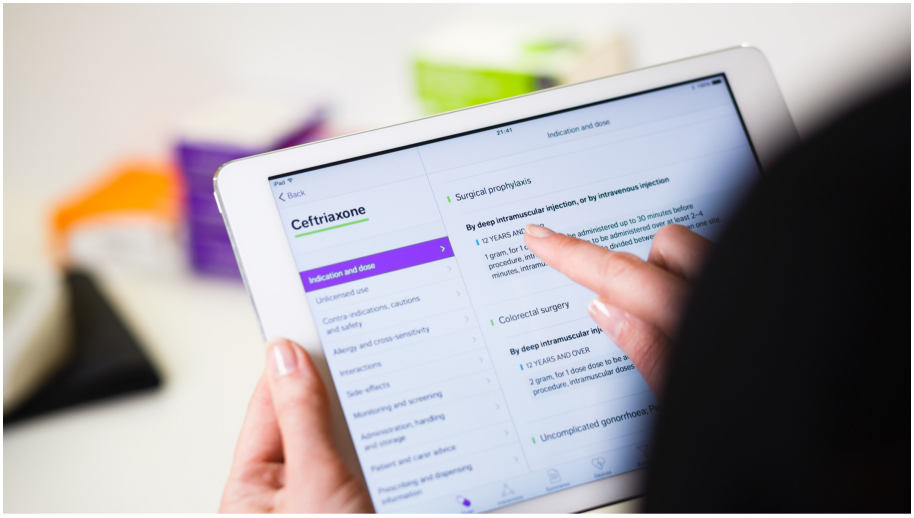
Executive Summary

Unless you are a medical professional, you may not have heard of the British National Formulary (BNF), but almost everyone in the UK will have benefitted from it, at one time or another. Published jointly by the British Medical Association and the Royal Pharmaceutical Society, it is used every day by doctors, nurses, pharmacists, and paramedics to safely prescribe medicines to patients across the UK.

First published in 1949, the BNF is a comprehensive register of all the medicines that are currently available to the National Health Service, including side-effects, doses, legal classifications, interactions, prices, indications (symptoms that suggests certain medical treatment is necessary) and contraindications (specific situations in which a drug should not be used).

At its peak, half a million copies were printed, and it is thought the format of the book was originally designed to fit in the pocket of a doctor's traditional white coat.

We helped transform the BNF from a primarily paper format to a specialist app using human-centred design, working closely with clinicians to design the BNF around their needs and workflows.



Launched in July 2017, the app is now used to check a drug every 3 seconds. Over 126,000 clinicians (a third of prescribing clinicians within the NHS) use it in over 2 million cases each

month. Over the last year, it has been used to safely prescribe drugs to over 15 million patients. It is estimated that the app saves each clinician 15 hours a year or approximately 150,000 hours across the NHS each month. Adoption is growing by about 18,000 users a month.

The app has been described as indispensable by clinicians and has opened potential new revenue streams for the Royal Pharmaceutical Society.

Case Study

Business Objectives

- Reduce the time it takes to prescribe drugs to patients
- Maintain patient safety
- Introduce a new channel for BNF information
- Migrate clinicians from unofficial sources of BNF content and establish the official app as the best place for drug content
- Identify and introduce new tools that increase clinician efficiency and effectiveness whilst improving safety
- Enable clinicians to treat their patients more efficiently and effectively
- Contribute to NHS targets for being paper-free by 2020.

Scope

- Product strategy for BNF products and complete portfolio review
- Ethnographic design research with doctors, nurses and pharmacists
- Redesigned the product identity across the product portfolio (BNF), BNF for Children (BNFC), and Nurse Practitioners Formulary (NPF)
- Concept for a new digital BNF product: the BNF App
- Full user experience and interaction design through to launch of the BNF App.

Key Facts

Launched: July 2017
[Redacted Confidential data]

Pharmaceutical Press asked us to reimagine the BNF product family with a focus on integrating digital and print products. We designed a suite of user-centred medical information products that have since been described as ‘indispensable’ to doctors in the UK.

The BNF provides all the information needed to safely prescribe medicines to patients for doctors, nurses, pharmacists and paramedics. It is the authoritative and comprehensive catalogue of details about the medicines that

are currently available on the National Health Service, including indications, contraindications, side effects, doses, legal classifications and prices.

First published in 1949, it is rumoured that the BNF was originally designed to fit in the pocket of a doctor's white coat. In the modern NHS you are more likely to see a doctor carrying an iPad than wearing a white coat so Pharmaceutical Press approached us to reimagine this vital medical resource. They specifically wanted us to focus on developing integrated digital and print products that would provide authoritative and clear access to drug information. The result is a family of products that provide intuitive, authoritative and immediate access to drug information for medical professionals in the NHS.

To redesign the print products and identify opportunities for digital products that would have real impact on medical professionals we needed to understand more about how, when and why medical professionals use the BNF. We immersed ourselves in the worlds of doctors, nurses and pharmacists, to find out how they work and their needs for drug information. We shadowed doctors as they went about their ward rounds. We observed nurses as they administered drugs. We watched pharmacists checking and dispensing prescriptions in busy hospital pharmacies. We went on home visits with GPs. We sat with nurses attending to patients in the treatment room.

Our ethnographic design research gave us an unprecedented understanding of the working lives of medical professionals. Observing their behaviour and witnessing their workflows enabled us to understand their goals, identify their latent needs, and discover what was most important to them about the BNF. The research made it abundantly clear that future products had to provide intuitive and fast access to clear information. Mistakes could cause serious harm.

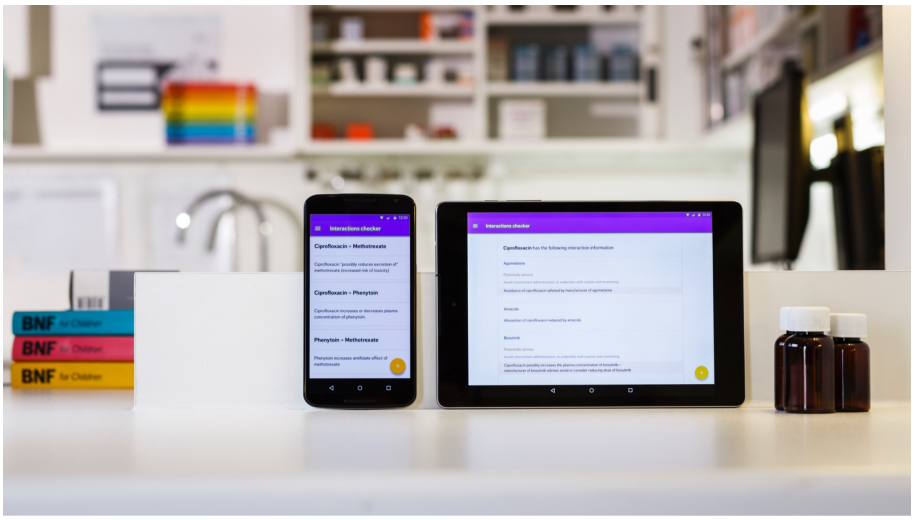
We set about refreshing the product identities of the print publications. Our design research had given us a deep insight into the things that medical professionals really valued about the BNF. We had observed them stroking the large edition number on the cover and knew that the colour of each book reassured them that they were using the latest possible drug information. We looked back at the history of the BNF and took inspiration from the original 1949 design, but introduced

a new, modern, vibrant colour palette. We utilised the award-winning sans serif typeface FF Dagny because of its presence, modern aesthetic, legibility and range of weights. The combination of bright new colour palette and modern typeface created a cover that looked towards the future, while still honouring the history of the publication. We also moved from the bespoke size, originally designed to fit in a doctor's coat pocket, to a standard A5 size. The standard size better fits alongside other books on a bookshelf and reduces future printing costs.

The BNF product family includes the sister publications, the British National Formulary for Children (BNFC) and Nurse Practitioner's Formulary (NPF). The NPF is a much thinner publication than the BNF, so there was no danger of confusing the two. The BNFC, on the other hand, is similar in thickness to the BNF. We utilised the secondary colours from our new colour palette and designed a distinctive cover and spine layout, to ensure the BNFC could be easily differentiated at a glance. BNF70 was published in October 2015 and was the first edition to bear the new design.

It would have been very easy to simply digitise the book and turn it into an app, but that would miss the point of having computing power in the palm of a clinician's hand. It was clear that the app needed to go beyond the book. We iterated our concepts through rounds of testing with healthcare professionals in different clinical settings and in July 2017 the BNF App was launched.

The app has already been widely praised by doctors, nurses and pharmacists around the UK. Key to the user interface is



the super-fast search and easy to use interaction checker that, at a single touch of the screen, helps clinicians ensure the safety of their patients by checking for possible drug interactions (interactions define which drugs cannot be used with others). It contains both the adult's and children's versions of the BNF and is updated monthly, meaning doctors always have access to the most comprehensive and up-to-date information. The app also requires no log in, meaning the information is accessible immediately at any time.

It was clear that clinicians needed to focus on the patient, not their device. We deliberately took a minimalist approach when applying our new BNF product identity to digital. Whilst we wanted to create the sense of a product family between print and digital products, we did not want to lose sight of the key objective - to facilitate fast, intuitive access to vital information. The app needed to feel native to each platform it was released on. We applied the standard interaction patterns of the respective platforms to make the app as intuitive as possible for clinicians. If they knew how to use their email, they would be able to use the app.

The app also had to provide clear, simple, and fast access to information, regardless of where the health professional was. Accuracy was key, as mistakes had the potential to cause serious harm to patients. We iteratively tested prototypes of an app in a variety of clinical settings to assess safety, accuracy and identify opportunities to save clinicians valuable time. We also had to take apart the huge amount of

information contained in the BNF book and repackage it to fit within an app format.

Results

Summary of impact

_ New app launched in July 2017 on iOS and Android
_ App used to treat over 2 million patients a month.
_ The app has been used to treat over 15 million patients in the last 12 months.
_ Used regularly by a third of prescribing clinicians in the NHS (126,000 doctors, nurses and pharmacists).
_ Saves clinicians between 1m:12s and 8m:46s per prescription compared to manual checking. This represents a time saving to the NHS of over 150,000 clinician hours each month.
_ In the Top 10 Medical Apps in UK App Store since launch. Currently rated 4.5 out of 5 (as of 29 December 2018).
_ Contributing to the NHS goal of being paperless by 2020.

The BNF app was designed carefully to reflect clinicians' prescribing workflow. It includes a quick search and an intuitive browsing experience designed specifically for clinicians.

The most popular feature is the interaction checker. This enables clinicians to check for interactions between two or more drugs quickly and easily. The process of checking is crucial to patient safety and it was time consuming with the printed products. Whilst shadowing clinicians we observed the '5 finger grip': clinicians were checking back and forth in the book between multiple drugs to check that the drugs could be taken together. The interaction checker allows clinicians to enter two or more drugs and immediately display any relevant interactions that they need to be aware of.

The app enables clinicians to instantly switch between content for adults and children depending on their patient.

In creating the app we specifically examined factors that led to poor adoption of other digital tools in clinical settings. Clinicians did not want to be saddled with having to remember passwords, so the app does not require any authentication credentials. It was also clear that clinicians needed control over when updates occurred, so there could be no unwanted or unexpected disruption when looking after a patient. From a technology standpoint, it was apparent that many hospitals

had poor WiFi, and that pharmacies were often situated in basements, where phone signals were weak. The app is updated every month with the latest clinical content, so doctors, nurses and pharmacists can be sure they are using the very latest information available to treat patients. They can defer updates to a convenient time to ensure they are never without vital drug information. Eliminating factors that normally hamper adoption of technology with the NHS has proved successful.

The App was launched in July 2017. It is now regularly used by over 126,000 clinicians in the NHS. This represents a third of prescribing clinicians within the NHS. It is used to prescribe drugs to over 2 million patients a month and we estimate that it has been used to safely prescribe drugs to over 15 million patients since launch. Adoption continues to grow by about 10,000 users a month.

Clinicians have widely praised the app. It has a rating of 4.5 out of 5 on the iOS App store. Within the first week of launch, the app was ranked number 1 in the Apple app store in the medical category and is still ranked number 5.

The app had a similarly high rating on the Google Play store until there were some technical issues with an update that left some users unable to use the app and resulted in it being unstable. The degree to which they were upset and left negative reviews is perhaps a measure of how much clinicians rely on the app. However, these negative reviews are not reflective of the effectiveness of the design: they were caused by a technical issue on Android.

Although the app is provided free in the UK, it has opened potential new revenue channels for digital BNF products in other countries, in the high street pharmacy sector, and with pharmaceutical companies for drug development. These are currently being explored.

"The BNF app has made a major contribution to modernising information provision in healthcare and contributes to the NHS's ambition to being paper-free by 2020. The app's design is absolutely focussed on the needs of clinicians and has been a great success. It is very intuitive, enabling the user to check drugs and drug interactions quickly and above all accurately," concludes **Karen Baxter, Director of BNF, Royal Pharmaceutical Society.**

Clinicians' Feedback

"Indispensable app for doctors in the UK."

"Finally. My prayers have been answered. Excellent work on this smooth and minimalist version of the BNF and BNFC. I literally can't find any fault…yet!"

"So excited you included a drug interaction checker with the app. One of the most useful, time saving tools to reduce medication errors, and save untold hours of manually checking them. Thank you so much."

"The new app is remarkably easy to use, finding guidance for various infections and problems with just a few touches. The new interactions tool is really elegant too for those times when you just want to double check there are no interactions between two/three drugs."

"This little app is so useful when I'm on shift and come across a new medication. I have found it so easy to navigate around and so far, I have no regrets."