The More We Die, The More We Sell?
A Simple Test of the Home-Market Effect
Online Appendix

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Contents

A Theoretical Appendix

A.1 Multinational Enterprises (Section III.1)

In this appendix, we illustrate how to incorporate multinational production into our basic environment. Following Ramondo and Rodríguez-Clare (2013), suppose that each firm headquartered in country i that sells drugs targeting disease n in country $j \neq i$ can choose the country l in which its production takes place. If $l = i$, then the firm exports, if $l = j$, it engages in horizontal FDI, and if $l \neq i, j$, it engages in platform FDI.

Like in Ramondo and Rodríguez-Clare (2013), we assume that firm-level production functions exhibit constant returns to scale, but we further allow for external economies of scale at the level of the headquarter country for each disease. Formally, at each production site l, we assume that the marginal cost of a firm from country i serving country j is constant and given by

$$c_{ij}^{n}(l) = c(s_i^n/\eta_i^n)\kappa_{ij}^{n}(l), \tag{A.1}$$

where $c(s_i^n/\eta_i^n)$ captures the extent of economies of scale, which depends on the total supply of drugs targeting disease n in country i, and $\kappa_{ij}^{n}(l) = c_{il}^{n}(\tau_{il}^{n})^{tech}(\tau_{lj}^{n})^{ship}$ captures the costs of inputs for firms from country i producing drugs targeting disease n in country l, c_{il}^{n}, the potential frictions associated with replicating Home's technology in country l, $(\tau_{il}^{n})^{tech}$, as well as the trade costs associated with shipping goods from country l to country j, $(\tau_{lj}^{n})^{ship}$. The previous specification allows, for instance, firms from country i to combine imported inputs from their country with local factors of production in country l. In equilibrium, all firms from country i will serve country j from the location l that minimizes their unit costs $c_{ij}^{n}(l)$ across all l and charge an equilibrium price,

$$p_{ij}^{n} = \min_{l}\{c_{ij}^{n}(l)\}. \tag{A.2}$$

Now set $p_i^n \equiv c(s_i^n/\eta_i^n)$ and $\tau_{ij}^{n} = \min_l\{\kappa_{ij}^{n}(l)\}$. By construction, equation (4) holds with $s(\cdot) = c^{-1}(\cdot)$, whereas equation (5) derives from equations (A.1) and (A.2).

A.2 Log-Linearization (Section III.2)

In this appendix, we derive equation (7) by log-linearizing our model around a symmetric equilibrium with $\theta_j^n = 1$ for all j and n; $\eta_i^n = 1$ for all i and n; $\tau_{ii}^{n} = 1$ for all i and n and $\tau_{ij}^{n} = \tau$ for all n and $i \neq j$. We let D, d, and x denote aggregate drug consumption, the per disease expenditure on domestic drugs, and the per disease expenditure on drugs from any other country, respectively, in the symmetric equilibrium. In turn, we let $\lambda = d/(d + (I-1)x)$ denote the share of expenditure on domestic drugs, with I the total number of countries. In the symmetric equilibrium, λ is also equal to the share of revenue on the domestic market. Finally, without loss of generality, we normalize all drug prices, p_i^n, to one in the symmetric equilibrium and we let P_{dis} and P_{agg} denote the common values of P_j^n and P_j across all disease-destination pairs and destinations, respectively.

Up to a first-order approximation, for all n and $i \neq j$, equations (1), (2), and (5) imply

$$\begin{aligned}\ln x_{ij}^n = &\ln x + \ln \theta_j^n - \epsilon^x(\ln p_i^n - \ln P_j^n + \ln P_{dis} + \ln \tau_{ij}^n - \ln \tau) \\ &- \epsilon^D(\ln P_j^n - \ln P_{dis} - \ln P_j + \ln P_{agg}) + \ln D_j - \ln D + \ln p_i^n + \ln \tau_{ij}^n - \ln \tau.\end{aligned} \tag{A.3}$$

with $\epsilon^x \equiv -(d\ln d(z)/d\ln z)_{z=\tau/P_{dis}}$ and $\epsilon^D \equiv -(d\ln D(z)/d\ln z)_{z=P_{dis}/P_{agg}}$. Taking logs and differentiating equation (3) around the symmetric equilibrium, we also get

$$\frac{\partial \ln P_j^n}{\partial \ln p_{ij}^n} = \begin{cases} \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} & \text{, if } i \neq j, \\ \frac{\lambda(1-\epsilon^d)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} & \text{, if } i = j, \end{cases}$$

with $\epsilon^d \equiv -(d\ln d(z)/d\ln z)_{z=1/P_{dis}}$. Up to a first-order approximation, we therefore have

$$\ln P_j^n = \ln P_{dis} + \frac{\lambda(1-\epsilon^d)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\ln p_j^n + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq j}(\ln p_l^n + \ln \tau_{lj}^n - \ln \tau).$$

Combining the previous expression with equation (A.3), we obtain

$$\begin{aligned}\ln x_{ij}^n = &\kappa_j + \ln \theta_j^n + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\ln p_i^n + \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\ln p_j^n \\ &+ \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\ln p_l^n + \ln \tau_{lj}^n) + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\ln \tau_{ij}^n,\end{aligned} \tag{A.4}$$

with

$$\kappa_j \equiv \ln x + (\epsilon^x - \frac{(1-\lambda)(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\epsilon^x-\epsilon^D) - 1)\ln \tau + \epsilon^D(\ln P_j - \ln P_{agg}) + \ln D_j - \ln D.$$

For $i = j$, the same logic implies

$$\begin{aligned}\ln x_{ii}^n = &\tilde{\kappa}_i + \ln \theta_i^n + (1-\epsilon^d + \frac{\lambda(1-\epsilon^d)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\ln p_i^n \\ &+ \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i}(\ln p_l^n + \ln \tau_{li}^n),\end{aligned} \tag{A.5}$$

with

$$\tilde{\kappa}_i \equiv \ln d - \frac{(1-\lambda)(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\epsilon^d-\epsilon^D)\ln \tau + \epsilon^D(\ln P_i - \ln P_{agg}) + \ln D_i - \ln D.$$

Next, let us compute producer prices around a symmetric equilibrium. Up to a first-order approximation, for all i and n, equations (4), (5), and (6) imply

$$(1+\epsilon^s)\ln p_i^n + \ln \eta_i^n = \lambda(\ln x_{ii}^n - \ln d) + \frac{(1-\lambda)}{I-1}\sum_{j\neq i}(\ln x_{ij}^n - \ln x),$$

with $\epsilon^s \equiv (d\ln s(z)/d\ln z)_{z=1}$. Together with equations (A.4) and (A.5), this implies

$$(\epsilon^s+\epsilon^w)\ln p_i^n - \frac{(\epsilon^w-\epsilon^D)}{I-1}\sum_{l\neq i}\ln p_l^n = \lambda\ln\theta_i^n + \frac{(1-\lambda)}{I-1}\sum_{j\neq i}\ln\theta_j^n + \xi_i^n,$$

with

$$\begin{aligned}
\epsilon^w &\equiv \lambda\epsilon^d + (1-\lambda)\epsilon^x - \frac{\lambda^2(1-\epsilon^d)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} - \frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\frac{(1-\lambda)^2}{I-1},\\
\xi_i^n &\equiv \lambda(\tilde{\kappa}_i - \ln d) + \frac{(1-\lambda)}{I-1}\sum_{j\neq i}(\kappa_j - \ln x) - \ln\eta_i^n\\
&\quad + \lambda\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i}\ln\tau_{li}^n + \frac{(1-\lambda)^2}{(I-1)^2}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{j\neq i}\sum_{l\neq i,j}\ln\tau_{lj}^n\\
&\quad + \frac{(1-\lambda)}{I-1}(1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\sum_{j\neq i}\ln\tau_{ij}^n.
\end{aligned}$$

The solution to the previous system is given by

$$\ln p_i^n = \frac{(\lambda - \frac{1-\lambda}{I-1})}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}}\ln\theta_i^n + \frac{\xi_i^n}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}} + \zeta^n, \tag{A.6}$$

with

$$\zeta^n \equiv \frac{(\frac{1-\lambda}{I-1} + \frac{\epsilon^w-\epsilon^D}{(\epsilon^s+\epsilon^D)(I-1)})\sum_j \ln\theta_j^n + \frac{1}{(\epsilon^s+\epsilon^D)}\frac{(\epsilon^w-\epsilon^D)}{I-1}\sum_l \xi_l^n}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}}.$$

Combining equations (A.4) and (A.6), we obtain, for any n and $i \neq j$,

$$\ln x_{ij}^n = \delta_{ij} + \delta^n + \beta_M\ln\theta_j^n + \beta_X\ln\theta_i^n + \varepsilon_{ij}^n,$$

with

$$\delta_{ij} \equiv \frac{(1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\bar{\bar{\xi}}_i + \frac{(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\lambda\bar{\bar{\xi}}_j + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}\bar{\bar{\xi}}_l}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}}$$

$$+ (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\overline{\ln\tau_{ij}}) + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\overline{\ln\tau_{lj}}) + \kappa_j,$$

$$\delta^n \equiv \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\lambda - \frac{1-\lambda}{I-1})(\sum_l \ln\theta_l^n)/(\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}) + (1-\epsilon^D)\zeta^n,$$

$$\beta_M \equiv 1 + \frac{(\epsilon^x-\epsilon^D)(\frac{\lambda(1-\epsilon^d)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} - \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\lambda-\frac{1-\lambda}{I-1})}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}},$$

$$\beta_X \equiv \frac{(1-\epsilon^x)(\lambda-\frac{1-\lambda}{I-1})}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}},$$

$$\varepsilon_{ij}^n \equiv \frac{(1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\xi_i^n - \bar{\bar{\xi}}_i) + \frac{(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\lambda(\xi_j^n - \bar{\bar{\xi}}_j) + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\xi_l^n - \bar{\bar{\xi}}_l)}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}}$$

$$+ \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\ln\tau_{lj}^n - (\overline{\ln\tau_{lj}})) + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\ln\tau_{ij}^n - (\overline{\ln\tau_{ij}})),$$

where $\bar{z} \equiv \frac{1}{\#diseases}\sum_n z^n$ denotes the arithmetic average of a given variable z across all diseases.

A.3 Beyond Perfect Competition (Section III.3)

A.3.1 Monopolistic Competition

For each disease n, profit-maximization by a firm ω from country i selling in country j requires

$$\frac{p_{ij}^n(\omega) - \tau_{ij}^n c_i^n}{p_{ij}^n(\omega)} = \frac{1}{\sigma}. \tag{A.7}$$

Free entry requires

$$\sum_j (p_{ij}^n(\omega) - \tau_{ij}^n c_i^n) d_{ij}^n(\omega) = f_i^n,$$

which can be rearranged as

$$s_i^n(\omega) = \frac{f_i^n}{p_i^n(\omega) - c_i^n}, \tag{A.8}$$

with $s_i^n(\omega) \equiv \sum_j \tau_{ij}^n d_{ij}^n(\omega)$. By definition, we also know that

$$s_i^n = (\int (s_i^n(\omega))^{(\sigma-1)/\sigma} d\omega)^{\sigma/(\sigma-1)}, \tag{A.9}$$

$$p_i^n = (\int (p_i^n(\omega))^{(1-\sigma)} d\omega)^{1/(1-\sigma)}. \tag{A.10}$$

Equations (A.7), (A.8), and (A.9) imply

$$s_i^n = (N_i^n)^{\sigma/(\sigma-1)} f_i^n / ((\mu - 1) c_i^n), \tag{A.11}$$

whereas equations (A.7) and (A.10) imply

$$p_i^n = (N_i^n)^{1/(1-\sigma)} \mu c_i^n. \tag{A.12}$$

Finally, note that equations (A.7), (A.8), and (A.11) imply

$$s_i^n = (N_i^n)^{\sigma/(\sigma-1)} \sum_j \tau_{ij}^n d_{ij}^n(\omega),$$

for any firm ω, whereas equations (13), (A.7), and (A.12) imply

$$d_{ij}^n(\omega) = (N_i^n)^{-\sigma/(\sigma-1)} d_{ij}^n.$$

Equation (6) follows from the two previous expressions.

A.3.2 Variable Markups

The demand for varieties produced by an individual firm, $d_{ij}^n(\omega)$, is given by equations (1), (2), and (13). Under the assumption of an arbitrarily large number of sectors, firms' decisions in any given sector have no effect on the country-specific demand shifters, P_j and D_j. Under the additional assumption that all demand functions are iso-elastic, $D(x) = d(x) = x^{-\epsilon^d}$, we can therefore express the elasticity of demand with respect to a firm's own price as

$$\frac{d \ln d_{ij}^n(\omega)}{d \ln p_{ij}^n(\omega)} = -\sigma + \frac{(\sigma - \epsilon^d)}{N_i^n}.$$

For each disease n, profit-maximization by a firm ω from country i selling in country j now implies

$$\frac{p_{ij}^n(\omega) - \tau_{ij}^n c_i^n}{p_{ij}^n(\omega)} = \frac{1}{\sigma - (\sigma - \epsilon^d)/N_i^n}. \tag{A.13}$$

The free entry condition (A.8) remains unchanged, whereas equations (A.9) and (A.10) still hold with finite sums replacing integrals.

Equations (A.8), (A.9), and (A.13) now imply

$$s_i^n = (N_i^n)^{\sigma/(\sigma-1)} f_i^n / ((\mu(N_i^n) - 1) c_i^n),$$

with $\mu(N_i^n) \equiv \frac{((1-1/N_i^n)\sigma+\epsilon^d/N_i^n)}{(1-1/N_i^n)\sigma+\epsilon^d/N_i^n-1}$, whereas equations (A.10) and (A.13) imply

$$p_i^n = (N_i^n)^{1/(1-\sigma)}\mu(N_i^n)c_i^n.$$

A.3.3 Endogenous Innovation

We first focus on the case in which the monopolist can use R&D to lower its cost, as described in the main text. The first-order conditions associated with profit maximization imply

$$\frac{p_{ij}^n - \tau_{ij}^n c_i^n}{p_{ij}^n} = \frac{1}{\epsilon^d},$$
$$s_i^n = -\eta_i^n f'(c_i^n),$$

with $s_i^n = \sum_j \tau_{ij}^n d_{ij}^n$ the total quantity produced by the monopolist. Combining the two previous expressions, we immediately obtain

$$s_i^n = -\eta_i^n f'((\epsilon^d - 1)p_i^n/\epsilon^d). \tag{A.14}$$

Now suppose that the monopolist, in addition to its R&D costs, needs to pay a fixed cost, f_{ij}^n, to access each destination,

$$\pi_i^n = \sum_j e_{ij}^n[(p_{ij}^n - \tau_{ij}^n c_i^n)d(p_{ij}^n))D(P_j^n/P_j)\theta_j^n D_j - f_{ij}^n] - \eta_i^n f(c_i^n),$$

where $e_{ij}^n \in \{0,1\}$ is a dummy variable that is equal to 1 if the monopolist from country i sells drugs targeting disease n in country j. There is now a new first-order condition,

$$e_{ij}^n = 1 \text{ if and only if } (p_{ij}^n - \tau_{ij}^n c_i^n)d(p_{ij}^n))D(P_j^n/P_j)\theta_j^n D_j - f_{ij}^n \geq 0.$$

But the other two first-order conditions are unchanged. Accordingly, equation (A.14) still holds.

Let us turn to the case in which the monopoly can use R&D to increase the quality of its drugs. Formally, suppose that the profits of the monopolist take the form

$$\pi_i^n = \sum_j (p_{ij}^n - \tau_{ij}^n c)d(p_{ij}^n/(\chi_i^n P_j^n))D(P_j^n/P_j)\theta_j^n D_j - \eta_i^n f(\chi_i^n),$$

where $\eta_i^n f(\chi_i^n)$ denotes the amount of R&D required to have quality, χ_i^n, which we assume to be strictly increasing and convex. This can be rearranged as

$$\pi_i^n = \sum_j (\tilde{p}_{ij}^n \chi_i^n - \tau_{ij}^n c)d(\tilde{p}_{ij}^n/P_j^n)D(P_j^n/P_j)\theta_j^n D_j - \eta_i^n f(\chi_i^n),$$

where $\tilde{p}_{ij}^n \equiv p_{ij}^n/\chi_i^n$ denotes the quality-adjusted price of the monopolist. The first-order conditions associated with this new problem can be expressed as

$$\frac{\tilde{p}_{ij}^n \chi_i^n - \tau_{ij}^n c}{\tilde{p}_{ij}^n \chi_i^n} = \frac{1}{\epsilon^d},$$
$$\tilde{p}_i^n s_i^n = \eta_i^n f'(\chi_i^n).$$

Combining the two previous expressions we now have

$$s_i^n = \eta_i^n f'(\frac{1}{\tilde{p}_i^n}\frac{\epsilon^d c}{\epsilon^d - 1})/\tilde{p}_i^n,$$

which is decreasing in the quality-adjusted price, $\tilde{p}_i^n$, for f strictly increasing and convex.

A.3.4 Price Regulations

We now demonstrate that if we relax the non-arbitrage condition (5) and assume instead that

$$p_{ij}^n = \mu_{ij}^n \tau_{ij}^n c_i^n, \tag{A.15}$$

then equation (7) still holds. We log-linearize our model around a symmetric equilibrium with $\theta_j^n = 1$ for all j and n; $\eta_i^n = 1$ for all i and n; $\mu_{ij}^n = \mu$ for all i, j, and n; and$\tau_{ii}^n = 1$ for all i and n and $\tau_{ij}^n = \tau$ for all n and $i \neq j$. We set $p_i^n \equiv c_i^n$, $\psi_{ij}^n \equiv \mu_{ij}^n \tau_{ij}^n$, and $\psi \equiv \mu\tau$. We follow the exact same steps as in Appendix A.2.

Up to a first-order approximation, for all n and $i \neq j$, equations (1), (2), and (A.15) now imply

$$\begin{aligned} \ln x_{ij}^n = &\ln x + \ln \theta_j^n - \epsilon^x(\ln p_i^n - \ln P_j^n + \ln P_{dis} + \ln \psi_{ij}^n - \ln \psi) \\ &- \epsilon^D(\ln P_j^n - \ln P_{dis} - \ln P_j + \ln P_{agg}) + \ln D_j - \ln D + \ln p_i^n + \ln \psi_{ij}^n - \ln \psi. \end{aligned} \tag{A.16}$$

with $\epsilon^x \equiv -(d\ln d(z)/d\ln z)_{z=\psi/P_{dis}}$ and $\epsilon^D \equiv -(d\ln D(z)/d\ln z)_{z=P_{dis}/P_{agg}}$. Taking logs and differentiating equation (3) around the symmetric equilibrium, we still get

$$\frac{\partial \ln P_j^n}{\partial \ln p_{ij}^n} = \begin{cases} \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} & \text{, if } i \neq j, \\ \frac{\lambda(1-\epsilon^d)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} & \text{, if } i = j, \end{cases}$$

with $\epsilon^d \equiv -(d\ln d(z)/d\ln z)_{z=\mu/P_{dis}}$. Up to a first-order approximation, we therefore have

$$\begin{aligned} \ln P_j^n = \ln P_{dis} + &\frac{\lambda(1-\epsilon^d)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\ln p_j^n + \ln \mu_{jj}^n - \ln \mu) \\ &+ \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq j}(\ln p_l^n + \ln \psi_{lj}^n - \ln \psi). \end{aligned}$$

Combining the previous expression with equation (A.16), we obtain

$$\begin{aligned}\ln x_{ij}^n =& \kappa_j + \ln \theta_j^n + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\ln p_i^n + \\ & \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\ln p_j^n + \ln \mu_{jj}^n) + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\ln p_l^n + \ln \psi_{lj}^n) \\ & + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\ln \psi_{ij}^n,\end{aligned} \tag{A.17}$$

with

$$\begin{aligned}\kappa_j \equiv & \ln x - \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\ln \mu + (\epsilon^x - \frac{(1-\lambda)(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\epsilon^x-\epsilon^D) - 1)\ln \psi \\ & + \epsilon^D(\ln P_j - \ln P_{agg}) + \ln D_j - \ln D.\end{aligned}$$

For $i = j$, the same logic implies

$$\begin{aligned}\ln x_{ii}^n =& \tilde{\kappa}_i + \ln \theta_i^n + (1-\epsilon^d + \frac{\lambda(1-\epsilon^d)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\ln p_i^n + \ln \mu_{ii}^n) \\ & + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i}(\ln p_l^n + \ln \psi_{li}^n),\end{aligned} \tag{A.18}$$

with

$$\begin{aligned}\tilde{\kappa}_i \equiv & \ln d - (1-\epsilon^d + \frac{\lambda(1-\epsilon^d)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\ln \mu \\ & - \frac{(1-\lambda)(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\epsilon^d-\epsilon^D)\ln \psi + \epsilon^D(\ln P_i - \ln P_{agg}) + \ln D_i - \ln D.\end{aligned}$$

Like in Appendix A.2, let us compute producer prices around a symmetric equilibrium. Up to a first-order approximation, for all i and n, equations (4) and (6) imply

$$(1+\epsilon^s)\ln p_i^n + \ln \eta_i^n = \lambda(\ln x_{ii}^n - \ln d) + \frac{(1-\lambda)}{I-1}\sum_{j\neq i}(\ln x_{ij}^n - \ln x),$$

with $\epsilon^s \equiv (d\ln s(z)/d\ln z)_{z=1}$. Together with equations (A.17) and (A.18), this implies

$$(\epsilon^s + \epsilon^w)\ln p_i^n - \frac{(\epsilon^w - \epsilon^D)}{I-1}\sum_{l\neq i}\ln p_l^n = \lambda \ln \theta_i^n + \frac{(1-\lambda)}{I-1}\sum_{j\neq i}\ln \theta_j^n + \xi_i^n,$$

with

$$\epsilon^w \equiv \lambda\epsilon^d + (1-\lambda)\epsilon^x - \frac{\lambda^2(1-\epsilon^d)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} - \frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\frac{(1-\lambda)^2}{I-1},$$

$$\begin{aligned}
\zeta_i^n \equiv\ & \lambda(\tilde{\kappa}_i - \ln d) + \frac{(1-\lambda)}{I-1}\sum_{j\neq i}(\kappa_j - \ln x) - \ln \eta_i^n \\
& + \lambda\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i}\ln\psi_{li}^n + \frac{(1-\lambda)^2}{(I-1)^2}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{j\neq i}\sum_{l\neq i,j}\ln\psi_{lj}^n \\
& + \frac{(1-\lambda)}{I-1}(1-\epsilon^x+\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\sum_{j\neq i}\ln\psi_{ij}^n + \frac{(1-\lambda)}{I-1}(\frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_j(\ln\mu_{jj}^n) \\
& + (\lambda(1-\epsilon^d+\frac{\lambda(1-\epsilon^d)(\epsilon^d-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}) - \frac{(1-\lambda)}{I-1}(\frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\ln\mu_{ii}^n).
\end{aligned}$$

The solution to the previous system still satisfies (A.6). Combining equations (A.6) and (A.17), we obtain, for any n and $i\neq j$,

$$\ln x_{ij}^n = \delta_{ij} + \delta^n + \beta_M \ln\theta_j^n + \beta_X \ln\theta_i^n + \varepsilon_{ij}^n,$$

with

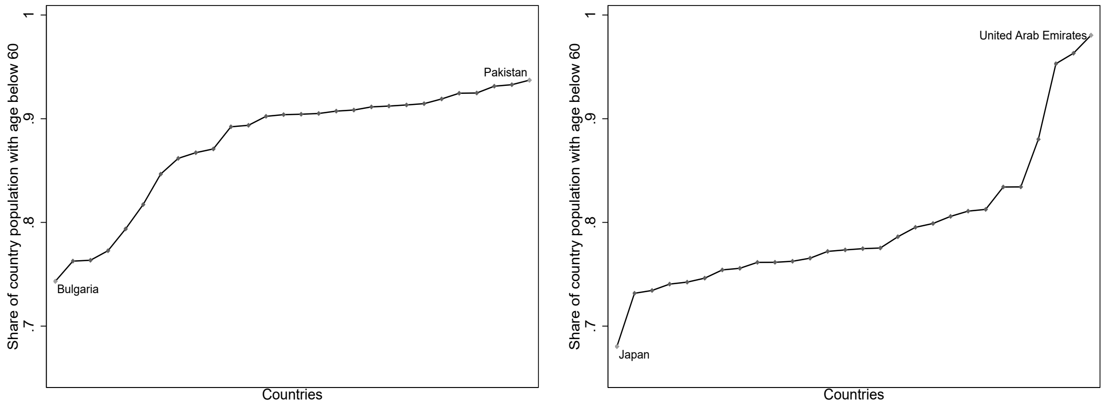
$$\begin{aligned}
\delta_{ij} \equiv\ & \frac{(1-\epsilon^x+\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})\bar{\xi}_i + \frac{(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\lambda\bar{\xi}_j + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}\bar{\xi}_l}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}} \\
& + (1-\epsilon^x+\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\overline{\ln\psi_{ij}}) + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\overline{\ln\psi_{lj}}) \\
& + \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\overline{\ln\mu_{jj}}) + \kappa_j,
\end{aligned}$$

$$\delta^n \equiv \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\lambda-\frac{1-\lambda}{I-1})(\sum_l\ln\theta_l^n)/(\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}) + (1-\epsilon^D)\zeta^n,$$

$$\beta_M \equiv 1 + \frac{(\epsilon^x-\epsilon^D)(\frac{\lambda(1-\epsilon^d)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} - \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\lambda-\frac{1-\lambda}{I-1})}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}},$$

$$\beta_X \equiv \frac{(1-\epsilon^x)(\lambda-\frac{1-\lambda}{I-1})}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}},$$

$$\begin{aligned}
\varepsilon_{ij}^n \equiv\ & \frac{(1-\epsilon^x+\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\zeta_i^n-\bar{\xi}_i) + \frac{(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\lambda(\zeta_j^n-\bar{\xi}_j) + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\zeta_l^n-\bar{\xi}_l)}{\epsilon^s+\epsilon^w+\frac{\epsilon^w-\epsilon^D}{I-1}} \\
& + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq i,j}(\ln\psi_{lj}^n-(\overline{\ln\psi_{lj}})) + (1-\epsilon^x+\frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x})(\ln\psi_{ij}^n-(\overline{\ln\psi_{ij}})) \\
& + \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}(\ln\mu_{jj}^n-\overline{\ln\mu_{jj}}).
\end{aligned}$$



(a) Below median GDP per capita **(b)** Above median GDP per capita

Figure B.1: Population age profiles across countries

A.4 Bilateral Sales (Section VI.1)

In Appendix A.2, we have already shown that

$$\begin{aligned}\ln x_{ij}^n =& \kappa_j + \ln \theta_j^n + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}) \ln p_i^n + \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} \ln p_j^n \\ &+ \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x} \sum_{l\neq i,j} (\ln p_l^n + \ln \tau_{lj}^n) + (1-\epsilon^x + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}) \ln \tau_{ij}^n.\end{aligned}$$

This can be rearranged as

$$\ln x_{ij}^n = \delta_j^n + (1-\epsilon^x)\ln p_i^n + (1-\epsilon^x)\ln \tau_{ij}^n,$$

with $\delta_j^n \equiv \kappa_j + \ln\theta_j^n + \frac{\lambda(1-\epsilon^d)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\ln p_j^n + \frac{1-\lambda}{I-1}\frac{(1-\epsilon^x)(\epsilon^x-\epsilon^D)}{1-\lambda\epsilon^d-(1-\lambda)\epsilon^x}\sum_{l\neq j}(\ln p_l^n + \ln \tau_{lj}^n)$.

B Empirical Appendix

B.1 Rich versus Poor Countries

Figure B.1 documents the difference between the population age profiles of countries above-median levels of GDP per capita ("rich") and below-median levels of GDP per capita ("poor").

B.2 Additional Empirical Results

Table B.1 establishes that predicted disease burden is indeed a strong predictor of a country's actual disease burden, even conditional on country and disease fixed-effects (which we condition on whenever we use the predicted disease burden in our tests of the home-market effect). Column (1) shows that the predictive power of a country's demographic composition, interacted with the demographic disease pattern of a disease, is substantial within a sample of country-disease observations where sales occur in at least one foreign destination country (that is, countries i and diseases n for which $\sum_{j \neq i} x_{ij}^n > 0$). And column (2) establishes the same feature in a sample of purchasing country-disease observations (those countries j and diseases n with $\sum_{i \neq j} x_{ij}^n > 0$).

Table B.1: Predicting Disease Burden Using Demographic Variation

	log (disease burden)	
	(1)	(2)
log (PDB)	1.820	1.545
	(0.370)	(0.290)
Sample of origin countries (i, n such that $\sum_{j \neq i} X_{ij}^n > 0$)	✓	
Sample of destination countries (j, n such that $\sum_{i \neq j} X_{ij}^n > 0$)		✓
Adjusted R^2	0.905	0.910
Observations	2,878	1,750

Notes: For details on construction of variables, sample restrictions see notes to Table 3. Standard errors in parentheses are two-way clustered at country and disease levels. All specifications control for country and disease fixed-effects.

B.3 Benchmarking IMS MIDAS data

This appendix benchmarks our IMS pharmaceutical sales data against two publicly available data sources: the OECD HealthStat database and the Medical Expenditure Panel Survey (MEPS).

B.3.1 Benchmarking to the OECD HealthStat Data

The OECD HealthStat database provides cross-country data on health expenditures.[1] Specifically, we analyze data on "total pharmaceutical sales" for each country, converted

[1] See http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT.

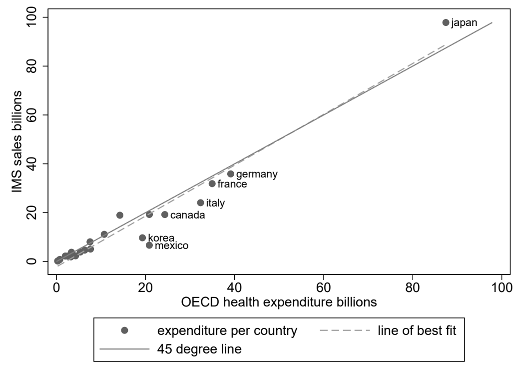


Figure B.2: IMS MIDAS sales compared with OECD expenditures, country-level match

to US dollars using 2012 exchange rates. At the country level, 24 countries appear in both datasets (four countries – Greece, Latvia, Poland, and the US – appear in both datasets but are missing data on this variable). Figure B.2 documents a correlation among these 24 countries of 0.975. Consistent with the idea that the IMS MIDAS data we analyze is widely used as the benchmark data measuring global pharmaceutical sales, in digging into the underlying input data sources for this OECD data series we found that four countries – Canada, Italy, Turkey, and the UK – report IMS statistics to the OECD for this data series. However, excluding these four countries barely changes the estimated correlation (from 0.975 to 0.979).

The OECD data also reports this variable separately by nine aggregate disease (ATC) codes for 23 countries (in addition to Greece, Latvia, Poland, and the US not reporting data for this variable at the country level, France and the UK do not break out sales separately by ATC codes). Figure B.3 documents a correlation at the country-ATC level of 0.891. Again, excluding countries that report IMS statistics to the OECD for this data series barely changes the estimated correlation (from 0.891 to 0.899).

B.3.2 Benchmarking to the MEPS Data

The second dataset that we use to benchmark the IMS MIDAS data is the Medical Expenditure Panel Survey (MEPS). It surveys the civilian, non-institutionalized population of the United States and includes a file dedicated to measuring US expenditures on prescribed medicines.[2] We use the 2012 MEPS data to benchmark our 2012 IMS US sales data. A straight string match on drug names allows us to map ~62% of the sales in the IMS MIDAS data to the MEPS data, and to document a correlation of 0.84 between US

[2]See https://meps.ahrq.gov/data_stats/download_data_files_detail.jsp?cboPufNumber=HC-152A.

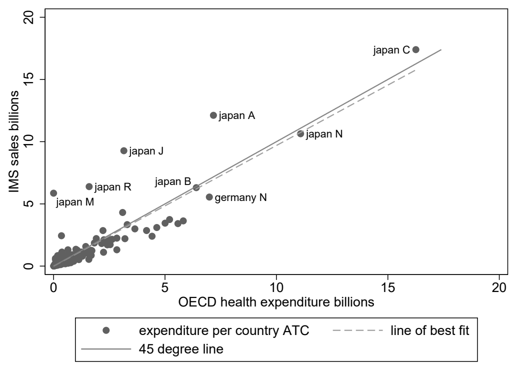


Figure B.3: IMS MIDAS sales Compared with OECD Expenditures, Country-ATC Level Match

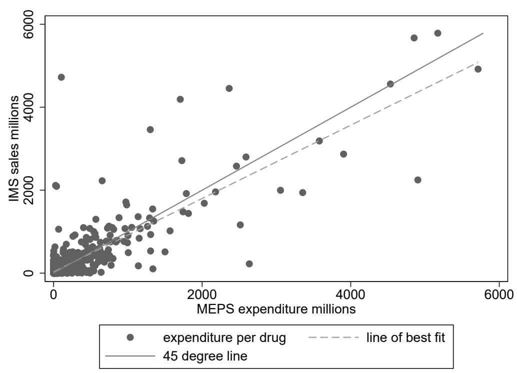


Figure B.4: US IMS MIDAS sales compared with MEPS expenditures

sales recorded in the IMS MIDAS data and US sales recorded in the MEPS data (see Figure B.4). A possible reason for this high, but less than perfect, correlation is that the MEPS data only focuses on prescribed medicines whereas as mentioned earlier, the IMS MIDAS data also has OTC drugs.

B.4 ATC to GBD Mapping

This appendix documents the crosswalk we developed which assigns drugs to diseases. In the IMS MIDAS sales data, each drug is associated with an ATC code, such as one for "other HIV antivirals." These ATC codes were manually mapped to the most relevant disease code in the Global Burden of Disease data by a research assistant, and then checked by a second research assistant. For example, the "other HIV antivirals" ATC code was mapped to the Global Burden of Disease code for "HIV/AIDS."

The full crosswalk is below but two remarks about the table are in order. First, the ATC code description listed in the table is (for brevity) the 4-level ATC code description, but in some cases the corresponding 3-level description (not listed here) is necessary for disambiguation. For example, consider GBD code U085 and corresponding ATC code "n5b1" which is described as "non-barbiturates, plain." The particular meaning of this ATC code is clarified by its 3-level ATC code description which is "hypnotics/sedatives." Second, the presence of a "*" following an ATC description signifies that the 3-level ATC code description was used since the 4-level ATC code did not exist in our records.

GBD code	GBD code description	ATC code	ATC code description
U003	Tuberculosis	j1m0	rifampicin/rifamycin*
U003	Tuberculosis	j4a1	antituberculars, single ingredient
U003	Tuberculosis	j4a2	antituberculars, kits, four or more ingredients
U003	Tuberculosis	j4a3	antituberculars, kits, three ingredients
U003	Tuberculosis	j4a4	antituberculars, kits, two ingredients
U003	Tuberculosis	j4a5	antituberculars, fixed dose, four or more ingredients
U003	Tuberculosis	j4a6	antituberculars, fixed dose, three ingredients
U003	Tuberculosis	j4a7	antituberculars, fixed dose, two ingredients
U003	Tuberculosis	j4a9	antituberculars, others
U008	Other STDs	g2x9	other gynaecologicals
U008	Other STDs	j5b3	herpes antivirals
U009	HIV/AIDS	b2c9	other proteinase inhibitors
U009	HIV/AIDS	j5c1	nucleoside and nucleotide reverse transcriptase inhibitors
U009	HIV/AIDS	j5c2	protease inhibitors
U009	HIV/AIDS	j5c3	non-nucleoside reverse transcriptase inhibitors
U009	HIV/AIDS	j5c4	HIV antivirals, entry inhibitors
U009	HIV/AIDS	j5c9	Other HIV antivirals
U010	Diarrhoeal diseases	a7a0	intestinal anti-infective antidiarrhoeals*
U010	Diarrhoeal diseases	a7b0	intestinal adsorbent antidiarrhoeals*
U010	Diarrhoeal diseases	a7f0	antidiarrhoeal micro-organisms*
U010	Diarrhoeal diseases	a7g0	oral electrolyte replacers*

U010	Diarrhoeal diseases	a7h0	motility inhibitors*
U010	Diarrhoeal diseases	a7x0	all other antidiarrhoeals*
U010	Diarrhoeal diseases	k1a6	paediatric electrolyte solutions
U010	Diarrhoeal diseases	k1a7	ringer's and ringer's lactate solutions
U010	Diarrhoeal diseases	k2b0	starches*
U010	Diarrhoeal diseases	k5a4	glycine
U012	Whooping cough	j6g2	pertussis immunoglobulin
U014	Diphtheria	j6a5	diphtheria sera
U015	Measles	j6h2	measles immunoglobulin
U015	Measles	j7a6	measles vaccines^^[3]
U015	Measles	j7b2	combinations with measles and/or mumps
U016	Tetanus	j6a4	tetanus sera
U016	Tetanus	j6g1	tetanus immunoglobulin
U016	Tetanus	j7a2	tetanus vaccines^^
U016	Tetanus	j7b1	combinations with a tetanus component
U017	Meningitis	j1c2	injectable broad spectrum penicillins
U018	Acute hepatitis B	j5b1	viral hepatitis products
U018	Acute hepatitis B	j6h4	hepatitis immunoglobulin
U018	Acute hepatitis B	j7a3	hepatitis vaccines^^
U020	Malaria	p1d1	anti-malarials, single ingredient
U020	Malaria	p1d2	anti-malarials, multi-ingredient
U024	Schistosomiasis	p1c0	schistosomicides*
U025	Leishmaniasis	p1g0	other anti-parasitic agents*
U028	Leprosy	j4b0	drugs for the treatment of lepra*
U031	Trachoma	s1g3	ocular anti-allergics, multiple action
U037	Other infectious diseases	d1a2	systemic dermatological antifungals
U037	Other infectious diseases	d1a3	topical scalp antifungals
U037	Other infectious diseases	d6a0	topical antibacterials*
U037	Other infectious diseases	d6d1	topical antivirals
U037	Other infectious diseases	d6d9	other topical products used in viral infections

[3] ^^ signifies that the online documentation did not have description for the corresponding ATC code. As a result, these descriptions are extracted from IMS MIDAS data and modified slightly to make them reader friendly.

U037	Other infectious diseases	d7b2	combinations of corticosteroids with antifungals
U037	Other infectious diseases	d7b3	combinations of corticosteroids with antibacterials and antifungals
U037	Other infectious diseases	d8a0	antiseptics and disinfectants*
U037	Other infectious diseases	d8a1	antiseptics and disinfectants, excluding hand products
U037	Other infectious diseases	g1a1	systemic trichomonacides
U037	Other infectious diseases	g1a2	topical trichomonacides
U037	Other infectious diseases	g1a3	combined forms of trichomonacides
U037	Other infectious diseases	g1b0	gynaecological antifungals*
U037	Other infectious diseases	g1c0	gynaecological antibacterials*
U037	Other infectious diseases	g1d0	gynaecological antiseptics*
U037	Other infectious diseases	h2a2	oral corticosteroids, plain
U037	Other infectious diseases	h2b0	systemic corticosteroid combinations*
U037	Other infectious diseases	j1a0	tetracyclines and combinations*
U037	Other infectious diseases	j1b0	chloramphenicol and combinations*
U037	Other infectious diseases	j1d1	oral cephalosporins
U037	Other infectious diseases	j1d2	injectable cephalosporins
U037	Other infectious diseases	j1f0	macrolides and similar types*
U037	Other infectious diseases	j1g1	oral fluoroquinolones
U037	Other infectious diseases	j1g2	injectable fluoroquinolones
U037	Other infectious diseases	j1h1	plain medium and narrow spectrum penicillins
U037	Other infectious diseases	j1h2	penicillin/streptomycin combinations
U037	Other infectious diseases	j1k0	aminoglycosides*
U037	Other infectious diseases	j1l0	carbenicillin and similar types*
U037	Other infectious diseases	j1p1	monobactams
U037	Other infectious diseases	j1p2	penems and carbapenems
U037	Other infectious diseases	j1p3	carbacephems
U037	Other infectious diseases	j1x1	glycopeptide antibacterials
U037	Other infectious diseases	j1x2	polymyxins
U037	Other infectious diseases	j1x9	all other antibacterials
U037	Other infectious diseases	j2a0	systemic agents for fungal infections*

U037	Other infectious diseases	j3a0	systemic sulphonamides*
U037	Other infectious diseases	j5b9	antivirals, others
U037	Other infectious diseases	j6a6	rabies sera
U037	Other infectious diseases	j6a9	other antitoxic sera
U037	Other infectious diseases	j6c0	polyvalent immuno-globulins - intravenous*
U037	Other infectious diseases	j6d1	humoral globulins
U037	Other infectious diseases	j6g9	other antibacterial immunoglobulins
U037	Other infectious diseases	j6h1	mumps immunoglobulin
U037	Other infectious diseases	j6h3	rubella immunoglobulin
U037	Other infectious diseases	j6h5	rabies immunoglobulin
U037	Other infectious diseases	j6h9	other antiviral immunoglobulins
U037	Other infectious diseases	j6j0	other specific immunoglobulins*
U037	Other infectious diseases	j7a1	influenza^^
U037	Other infectious diseases	j7a4	typhoid and paratyphoid vaccines^^
U037	Other infectious diseases	j7a5	rubella vaccines^^
U037	Other infectious diseases	j7a7	pneumococcal vaccines^^
U037	Other infectious diseases	j7a8	meningococcal vaccines^^
U037	Other infectious diseases	j7a9	other single component vaccines^^
U037	Other infectious diseases	j7b3	all other combinations
U037	Other infectious diseases	j7c0	all other vaccines^^
U037	Other infectious diseases	j8b0	anaerobicides*
U037	Other infectious diseases	j8x0	all other anti-infectives*
U037	Other infectious diseases	p1a0	amoebicides*
U037	Other infectious diseases	p1b0	anthelmintics, excluding schistosomicides*
U037	Other infectious diseases	p3a0	ectoparasiticides, including scabicides*
U037	Other infectious diseases	p3b0	insecticides and repellents*
U037	Other infectious diseases	r2a0	throat preparations*
U037	Other infectious diseases	r5a0	cold preparations without anti-infectives*
U037	Other infectious diseases	r5b0	cough/cold preparations with anti-infectives*
U037	Other infectious diseases	r6a0	systemic antihistamines*
U037	Other infectious diseases	s1a0	ophthalmological anti-infectives*

U037	Other infectious diseases	s1c2	ophthalmological NSAIDS and anti-infective combinations
U037	Other infectious diseases	s1c9	other ophthalmological anti-inflammatory and anti-infective combinations
U037	Other infectious diseases	s1d0	ophthalmological antiviral agents*
U037	Other infectious diseases	s1g2	ocular anti-allergics, mast cell stabilisers
U037	Other infectious diseases	v1a0	allergens*
U039	Lower respiratory infections	j5b4	influenza antivirals
U039	Lower respiratory infections	r5c0	expectorants*
U040	Upper respiratory infections	j1c1	oral broad spectrum penicillins
U040	Upper respiratory infections	j5b5	respiratory antivirals excluding influenza products
U040	Upper respiratory infections	r1a7	nasal decongestants
U040	Upper respiratory infections	r5d1	plain antitussives
U040	Upper respiratory infections	r5d2	antitussives in combinations
U040	Upper respiratory infections	r5f0	other cough and cold preparations*
U042	Maternal conditions	a11a1	multivitamins with minerals (prenatal)
U042	Maternal conditions	a11b1	multivitamins without minerals (prenatal)
U042	Maternal conditions	a11x2	vitamin B6 (pyridoxine), plain
U042	Maternal conditions	g2a0	labour inducers*
U042	Maternal conditions	g2e0	labour inhibitors*
U042	Maternal conditions	g2x1	gynaecological antispasmodics
U042	Maternal conditions	t2c0	pregnancy and ovulation tests*
U047	Abortion	g2b0	topical contraceptives*
U047	Abortion	g2b2	mechanical topical contraceptives^^
U056	Vitamin A deficiency	a11c1	vitamin A
U056	Vitamin A deficiency	b2a2	proteinase
U056	Vitamin A deficiency	b2a9	other antifibrinolytics
U057	Iron-deficiency anaemia	b3a1	plain iron
U057	Iron-deficiency anaemia	b3a2	iron combination products
U057	Iron-deficiency anaemia	b3c0	erythropoietin products*
U058	Other nutritional deficiencies	a11a2	multivitamins with minerals (paediatric)

U058	Other nutritional deficiencies	a11b2	multivitamins without minerals (paediatric)
U058	Other nutritional deficiencies	a11d3	vitamin B1 plain
U058	Other nutritional deficiencies	a11e2	vitamin B complex with vitamin C
U058	Other nutritional deficiencies	b3x0	other anti-anaemic products, including folic acid, folinic acid*
U058	Other nutritional deficiencies	k1e5	paediatric amino-acid solutions
U058	Other nutritional deficiencies	k4c0	caloric solutions (<100ml)*
U058	Other nutritional deficiencies	v6a0	slimming preparations*
U058	Other nutritional deficiencies	v6c0	infant formulas*
U073	Prostate cancer	l2a3	cytostatic gonadotrophin-releasing hormone analogues
U073	Prostate cancer	l2b2	cytostatic anti-androgens
U076	Leukaemia	l1x3	antineoplastic mAbs^^
U076	Leukaemia	l3b1	interferons, alpha
U077	Other malignant neoplasms	a4a1	serotonin antagonist antiemetics/antinauseants
U077	Other malignant neoplasms	a4a9	other antiemetics and antinauseants
U077	Other malignant neoplasms	b3b0	liver extracts and combinations with B12*
U077	Other malignant neoplasms	j6e0	polyvalent immuno-globulins - intramuscular*
U077	Other malignant neoplasms	l1x1	adjuvant preparations for cancer therapy
U077	Other malignant neoplasms	l2a9	other cytostatic hormones
U077	Other malignant neoplasms	m5b4	bisphosphonates for tumour-related calcium disorders
U077	Other malignant neoplasms	t2x9	all other diagnostic tests
U077	Other malignant neoplasms	v3d0	detoxifying agents for antineoplastic treatment*
U077	Other malignant neoplasms	v7k0	hair dyes^^
U078	Other neoplasms	a5b0	hepatic protectors, lipotropics*
U078	Other neoplasms	g3e0	androgen with female hormone combinations*
U078	Other neoplasms	g3j0	SERMS (selective oestrogen receptor modulators)*

U078	Other neoplasms	g4c2	BPH alpha-adrenergic antagonists, plain
U078	Other neoplasms	g4c9	BPH products, other
U078	Other neoplasms	k1f1	osmotic therapy
U078	Other neoplasms	l1a0	alkylating agents*
U078	Other neoplasms	l1b0	antimetabolites*
U078	Other neoplasms	l1c0	vinca alkaloids and other plant products*
U078	Other neoplasms	l1d0	antineoplastic antibiotics*
U078	Other neoplasms	l1x2	platinum compounds^^
U078	Other neoplasms	l1x4	a-neo protein kinase inhibitor^^
U078	Other neoplasms	l1x9	all other antineoplastics
U078	Other neoplasms	l2b1	cytostatic anti-oestrogens
U078	Other neoplasms	l2b3	cytostatic aromatase inhibitors
U078	Other neoplasms	l2b9	other cytostatic hormone antagonists
U078	Other neoplasms	l3a9	all other immunostimulating agents excluding interferons
U079	Diabetes mellitus	a10c1	human insulins and analogues, fast-acting
U079	Diabetes mellitus	a10c2	human insulins and analogues, intermediate-acting
U079	Diabetes mellitus	a10c3	human insulins and analogues, intermediate-acting combined with fast-acting
U079	Diabetes mellitus	a10c4	human insulins and analogues, intermediate-acting combined with long-acting
U079	Diabetes mellitus	a10c5	human insulins and analogues, long-acting
U079	Diabetes mellitus	a10d0	animal insulins*
U079	Diabetes mellitus	a10e0	insulin devices*
U079	Diabetes mellitus	a10h0	sulphonylurea antidiabetics*
U079	Diabetes mellitus	a10j1	biguanide antidiabetics, plain
U079	Diabetes mellitus	a10j2	biguanide and sulphonylurea antidiabetic combinations

U079	Diabetes mellitus	a10j9	biguanide antidiabetic combinations, other
U079	Diabetes mellitus	a10k1	glitazone antidiabetics, plain
U079	Diabetes mellitus	a10k2	glitazone and sulphonylurea antidiabetic combinations
U079	Diabetes mellitus	a10k3	glitazone and biguanide antidiabetic combinations
U079	Diabetes mellitus	a10k9	glitazone antidiabetic combinations, other
U079	Diabetes mellitus	a10l0	alpha-glucosidase inhibitor antidiabetics*
U079	Diabetes mellitus	a10m1	glinide antidiabetics, plain
U079	Diabetes mellitus	a10m3	glinide and biguanide antidiabetic combinations
U079	Diabetes mellitus	a10n1	DPP-IV inhibitor antidiabetics, plain
U079	Diabetes mellitus	a10n3	DPP-IV inhibitor and biguanide antidiabetic combinations
U079	Diabetes mellitus	a10n9	DPP-IV inhibitor antidiabetic combinations, other
U079	Diabetes mellitus	a10s0	GLP-1 agonist antidiabetics*
U079	Diabetes mellitus	a10x1	antidiabetic multitherapy combination products
U079	Diabetes mellitus	a10x9	other drugs used in diabetes
U079	Diabetes mellitus	g2d0	prolactin inhibitors*
U079	Diabetes mellitus	h4b0	glucagon*
U079	Diabetes mellitus	t2d1	diabetes tests, urine
U079	Diabetes mellitus	t2d2	diabetes tests, blood
U079	Diabetes mellitus	t2d9	diabetes tests, other
U079	Diabetes mellitus	v7a1	synthetic sweeteners^^
U080	Endocrine, blood, immune disorders	a12b0	potassium products*
U080	Endocrine, blood, immune disorders	a14a1	plain anabolic hormones, systemic
U080	Endocrine, blood, immune disorders	a14a2	anabolic hormone combinations

U080	Endocrine, blood, immune disorders	a14b0	other anabolic agents, systemic*
U080	Endocrine, blood, immune disorders	a16a0	other alimentary tract and metabolism products*
U080	Endocrine, blood, immune disorders	a8a0	antiobesity preparations, excluding dietetics*
U080	Endocrine, blood, immune disorders	a9a0	digestives, including enzymes*
U080	Endocrine, blood, immune disorders	c10a2	fibrates
U080	Endocrine, blood, immune disorders	c10a3	ion-exchange resins
U080	Endocrine, blood, immune disorders	g4e0	erectile dysfunction products*
U080	Endocrine, blood, immune disorders	h1a0	ACTH*
U080	Endocrine, blood, immune disorders	h1c1	gonadotrophin-releasing hormones
U080	Endocrine, blood, immune disorders	h3a0	thyroid preparations*
U080	Endocrine, blood, immune disorders	h3b0	anti-thyroid preparations*
U080	Endocrine, blood, immune disorders	h3c0	iodine therapy*
U080	Endocrine, blood, immune disorders	h4f0	antiparathyroid products*
U080	Endocrine, blood, immune disorders	k4a1	electrolyte solutions (<=20ml)
U080	Endocrine, blood, immune disorders	k4a2	electrolyte solutions (>20ml and <100ml)
U080	Endocrine, blood, immune disorders	k4b1	standard solutions (<=20ml)
U080	Endocrine, blood, immune disorders	k4b2	standard solutions (>20ml and <100ml)

U080	Endocrine, blood, immune disorders	k5a3	citrates
U080	Endocrine, blood, immune disorders	r1b0	systemic nasal preparations*
U082	Unipolar depressive disorders	n6a2	antidepressants, herbal
U082	Unipolar depressive disorders	n6a4	SSRI antidepressants
U082	Unipolar depressive disorders	n6a5	SNRI antidepressants
U082	Unipolar depressive disorders	n6a9	antidepressants, all others
U082	Unipolar depressive disorders	n6c0	psycholeptic-psychoanaleptic combinations*
U083	Bipolar disorder	n6a3	mood stabilisers
U084	Schizophrenia	n5a1	atypical antipsychotics
U084	Schizophrenia	n5a9	conventional antipsychotics
U085	Epilepsy	n3a0	anti-epileptics*
U085	Epilepsy	n5b1	non-barbiturates, plain
U085	Epilepsy	n5b2	non-barbiturates, combinations
U085	Epilepsy	n5b3	barbiturates, plain
U086	Alcohol use disorders	n5c0	tranquillisers*
U086	Alcohol use disorders	n7e0	drugs used in alcohol dependence*
U087	Alzheimer’s disease and other dementias	n6d0	nootropics*
U087	Alzheimer’s disease and other dementias	n7d1	anti-alzheimer products, cholinesterase inhibitors
U087	Alzheimer’s disease and other dementias	n7d9	all other anti-Alzheimer products
U088	Parkinson’s disease	n4a0	anti-parkinson drugs*
U089	Multiple sclerosis	l3b2	interferons, beta
U090	Drug use disorders	n7b0	antismoking products*
U090	Drug use disorders	n7f0	drugs used in opioid dependence*
U095	Migraine	n2b0	non-narcotics and anti-pyretics*

U095	Migraine	n2c1	antimigraine triptans
U095	Migraine	n2c9	all other anti-migraine preparations
U097	Other neuropsychiatric disorders	a11f0	plain vitamin B12*
U097	Other neuropsychiatric disorders	a11x3	vitamin E, plain
U097	Other neuropsychiatric disorders	a3c0	antispasmodic/ataractic combinations*
U097	Other neuropsychiatric disorders	a3d0	antispasmodic/analgesic combinations*
U097	Other neuropsychiatric disorders	a3e0	antispasmodics combined with other products*
U097	Other neuropsychiatric disorders	m3b0	muscle relaxants, centrally acting*
U097	Other neuropsychiatric disorders	n5b4	barbiturates, combinations
U097	Other neuropsychiatric disorders	n5b5	herbal hypnotics/sedatives
U097	Other neuropsychiatric disorders	n6b0	psychostimulants*
U097	Other neuropsychiatric disorders	n6e0	neurotonics and other miscellaneous products*
U097	Other neuropsychiatric disorders	n7c0	antivertigo products*
U097	Other neuropsychiatric disorders	n7x0	all other CNS drugs*
U098	Sense organ diseases	k5a2	saline
U098	Sense organ diseases	r1a1	nasal corticosteroids without anti-infectives
U098	Sense organ diseases	r1a3	nasal corticosteroids with anti-infectives
U098	Sense organ diseases	r1a4	nasal anti-infectives without corticosteroids
U098	Sense organ diseases	r1a6	nasal anti-allergic agents
U098	Sense organ diseases	s1b0	ophthalmological corticosteroids*

U098	Sense organ diseases	s1c1	ophthalmological corticosteroid and anti-infective combinations
U098	Sense organ diseases	s1e1	miotics and antiglaucoma preparations, systemic
U098	Sense organ diseases	s1e2	miotics and antiglaucoma preparations, topical
U098	Sense organ diseases	s1f0	mydriatics and cycloplegics*
U098	Sense organ diseases	s1g1	ocular anti-allergics, antihistamines
U098	Sense organ diseases	s1g5	ocular decongestants, sympathomimetics
U098	Sense organ diseases	s1g6	ocular antiseptics
U098	Sense organ diseases	s1g9	other similar ocular products
U098	Sense organ diseases	s1h0	ophthalmological local anaesthetics*
U098	Sense organ diseases	s1k0	artificial tears and ocular lubricants*
U098	Sense organ diseases	s1l0	preparations for use with contact lenses*
U098	Sense organ diseases	s1m0	eye tonics and eye vitamins*
U098	Sense organ diseases	s1n1	preparations to prevent cataract and anticataractogenics, systemic
U098	Sense organ diseases	s1n2	preparations to prevent cataract and anticataractogenics, topical
U098	Sense organ diseases	s1p0	ocular antineovascularisation products*
U098	Sense organ diseases	s1r0	ophthalmic non-steroidal anti-inflammatories*
U098	Sense organ diseases	s1s1	viscoelastic substances
U098	Sense organ diseases	s1s9	other surgical aids
U098	Sense organ diseases	s1t0	ophthalmological diagnostic agents*
U098	Sense organ diseases	s1x1	other ophthalmologicals, systemic
U098	Sense organ diseases	s1x2	other ophthalmologicals, topical
U098	Sense organ diseases	s2a0	otic anti-infectives*
U098	Sense organ diseases	s2b0	otic corticosteroids*
U098	Sense organ diseases	s2c0	otic corticosteroid/anti-infective combinations*
U098	Sense organ diseases	s2d1	earwax removal products
U098	Sense organ diseases	s2d9	all other otologicals
U098	Sense organ diseases	s3a0	eye/ear anti-infectives*

U098	Sense organ diseases	s3b0	eye/ear corticosteroids*
U098	Sense organ diseases	s3c0	eye/ear corticosteroid/anti-infective combinations*
U098	Sense organ diseases	s3d0	other eye/ear combinations*
U106	Hypertensive heart disease	c11a2	lipid-regulating cardiovascular multitherapy combi-pack combination products
U106	Hypertensive heart disease	c2a1	antihypertensives plain, mainly centrally acting
U106	Hypertensive heart disease	c2a2	antihypertensives plain, mainly peripherally acting
U106	Hypertensive heart disease	c2a3	antihypertensives plain, others
U106	Hypertensive heart disease	c2b1	antihypertensive-diuretic combinations, mainly centrally acting
U106	Hypertensive heart disease	c2b2	antihypertensive-diuretic combinations, mainly peripherally acting
U106	Hypertensive heart disease	c2c0	rauwolfia alkaloids and other antihypertensives of herbal origin*
U106	Hypertensive heart disease	c2d0	rauwolfia alkaloids and other antihypertensives of herbal origin in combination with diuretics*
U106	Hypertensive heart disease	c3a3	thiazides and analogues plain
U106	Hypertensive heart disease	c3a4	potassium-sparing agents with loop diuretic combinations
U106	Hypertensive heart disease	c3a5	potassium-sparing agents with thiazides and/or analogue combinations
U106	Hypertensive heart disease	c7a0	beta-blocking agents, plain*
U106	Hypertensive heart disease	c7b1	combinations with antihypertensives and/or diuretics
U106	Hypertensive heart disease	c8a0	calcium antagonists, plain*
U106	Hypertensive heart disease	c8b1	calcium antagonist combinations with antihypertensives (C2) and/or diuretics (C3)
U106	Hypertensive heart disease	c8b2	calcium antagonist/beta-blocker combinations

U106	Hypertensive heart disease	c8b3	calcium antagonist combinations with all other drugs of group C except C2, C3, C7 and C9.
U106	Hypertensive heart disease	c8b4	calcium antagonist combinations with all other drugs except those of group C
U106	Hypertensive heart disease	c9a0	ACE inhibitors, plain*
U106	Hypertensive heart disease	c9b1	ACE inhibitor combinations with antihypertensives (C2) and/or diuretics (C3)
U106	Hypertensive heart disease	c9b3	ACE inhibitor combinations with calcium antagonists (C8)
U106	Hypertensive heart disease	c9c0	angiotensin-II antagonists, plain*
U106	Hypertensive heart disease	c9d1	angiotensin-II antagonist combinations with antihypertensives (C2) and/or diuretics
U106	Hypertensive heart disease	c9d9	angiotensin-II antagonist combinations with other drugs
U106	Hypertensive heart disease	c9x0	other agents acting on the renin-angiotensin system*
U107	Ischaemic heart disease	a11x1	nicotinamide (vitamin B3), plain
U107	Ischaemic heart disease	b1c3	GP IIb/IIIa (glycoprotein) antagonist platelet aggregation inhibitors
U107	Ischaemic heart disease	b1d0	fibrinolytics*
U107	Ischaemic heart disease	b2c3	inhibitors of fibrinolysis
U107	Ischaemic heart disease	b2d1	factor VIII
U107	Ischaemic heart disease	b2d8	platelet concentrates
U107	Ischaemic heart disease	c10a1	statins (HMG-CoA reductase inhibitors)
U107	Ischaemic heart disease	c10a9	all other cholesterol/triglyceride regulators
U107	Ischaemic heart disease	c10b0	anti-atheroma preparations of natural origin*
U107	Ischaemic heart disease	c10c0	lipid regulators in combination with other lipid regulators*
U107	Ischaemic heart disease	c11a1	lipid regulating cardiovascular multitherapy fixed combination products

U107	Ischaemic heart disease	c1d0	coronary therapy excluding calcium antagonists and nitrites*
U107	Ischaemic heart disease	c1e0	nitrites and nitrates*
U107	Ischaemic heart disease	c1x0	all other cardiac preparations*
U107	Ischaemic heart disease	k2a1	low dextrans
U107	Ischaemic heart disease	k2a2	high dextrans
U108	Stroke	c4a2	calcium antagonists with cerebral activity
U108	Stroke	c7b2	combinations with other drugs of group C
U108	Stroke	c7b3	combinations with all other drugs except those of group C
U110	Other circulatory diseases	b1a0	vitamin K antagonists*
U110	Other circulatory diseases	b1b1	unfractionated heparins
U110	Other circulatory diseases	b1b2	fractionated heparins
U110	Other circulatory diseases	b1b3	heparins for flushing
U110	Other circulatory diseases	b1b9	other heparins
U110	Other circulatory diseases	b1c1	cyclo-oxygenase inhibitor platelet aggregation inhibitors
U110	Other circulatory diseases	b1c2	ADP (adenosine diphosphate) receptor antagonist platelet aggregation inhibitors
U110	Other circulatory diseases	b1c4	platelet cAMP enhancing platelet aggregation inhibitors
U110	Other circulatory diseases	b1c5	platelet aggregation inhibitors, combinations
U110	Other circulatory diseases	b1c9	other platelet aggregation inhibitors
U110	Other circulatory diseases	b1e0	direct thrombin inhibitors*
U110	Other circulatory diseases	b1f0	direct factor XA inhibitors*
U110	Other circulatory diseases	b1x0	other antithrombotic agents*
U110	Other circulatory diseases	b2a1	synthetic antifibrinolytics
U110	Other circulatory diseases	b2b1	vitamin K
U110	Other circulatory diseases	b2b2	protamin sulphate
U110	Other circulatory diseases	b2c1	coagulation inhibitors
U110	Other circulatory diseases	b2c2	inhibitors of the kallikrein-kinin-system
U110	Other circulatory diseases	b2d2	factors II, VII, IX and X

U110	Other circulatory diseases	b2d3	anti-inhibitor-coagulation complex
U110	Other circulatory diseases	b2d4	factor XIII
U110	Other circulatory diseases	b2d5	fibrinogen
U110	Other circulatory diseases	b2d6	fresh frozen plasma and antihaemophilic plasma
U110	Other circulatory diseases	b2d9	other blood fractions
U110	Other circulatory diseases	b2e0	thrombopoietin agonists*
U110	Other circulatory diseases	b2f0	tissue sealing preparations*
U110	Other circulatory diseases	b2g0	systemic haemostatics*
U110	Other circulatory diseases	c1a1	plain cardiac glycosides
U110	Other circulatory diseases	c1a2	cardiac glycoside combinations
U110	Other circulatory diseases	c1b0	anti-arrhythmics*
U110	Other circulatory diseases	c1c1	cardiac stimulants excluding dopaminergic agents
U110	Other circulatory diseases	c1c2	cardiac dopaminergic agents
U110	Other circulatory diseases	c1f0	positive inotropic agents*
U110	Other circulatory diseases	c3a1	potassium-sparing agents plain
U110	Other circulatory diseases	c3a2	loop diuretics plain
U110	Other circulatory diseases	c3a7	vasopressin receptor antagonist diuretics
U110	Other circulatory diseases	c3a9	other diuretics
U110	Other circulatory diseases	c4a1	cerebral and peripheral vasotherapeutics excluding calcium antagonists with cerebal activity
U110	Other circulatory diseases	c5a1	topical anti-haemorrhoidals with corticosteroids
U110	Other circulatory diseases	c5a2	topical anti-haemorrhoidals without corticosteroids
U110	Other circulatory diseases	c5b0	varicose therapy, topical*
U110	Other circulatory diseases	c5c0	varicose therapy, systemic*
U110	Other circulatory diseases	c6a0	other cardiovascular products*
U110	Other circulatory diseases	c9b2	ACE inhibitor/beta-blocker combinations
U110	Other circulatory diseases	c9b9	ACE inhibitor combinations with all other drugs

U110	Other circulatory diseases	c9d2	angiotensin-II antagonist combinations with beta blockers
U110	Other circulatory diseases	c9d3	angiotensin-II antagonist combinations with calcium antagonists
U110	Other circulatory diseases	c9d4	angiotensin-II antagonist combinations with ACE inhibitors
U110	Other circulatory diseases	k3a0	whole blood and plasma fractions*
U110	Other circulatory diseases	k3b1	protein solutions <5,0%
U110	Other circulatory diseases	k3b2	protein solutions 5,0%
U110	Other circulatory diseases	k3b3	protein solutions >5,0%
U110	Other circulatory diseases	k4d0	other injection solutions/infusion additives (<100ml)*
U110	Other circulatory diseases	k5a0	irrigating solutions*
U110	Other circulatory diseases	v3g0	hyperkalaemia/hyperphosphataemia products*
U112	Chronic obstructive pulmonary disease	r1a9	other topical nasal preparations
U112	Chronic obstructive pulmonary disease	r3a3	long-acting B2-stimulants, inhalant
U112	Chronic obstructive pulmonary disease	r3b1	xanthines, inhalant
U112	Chronic obstructive pulmonary disease	r3c1	non-steroidal respiratory anti-inflammatories, inhalant
U112	Chronic obstructive pulmonary disease	r3c2	non-steroidal respiratory anti-inflammatories, systemic
U112	Chronic obstructive pulmonary disease	r3e1	combinations of B2-stimulants with R3C, inhalant
U112	Chronic obstructive pulmonary disease	r3e2	combinations of B2-stimulants with R3C, systemic
U112	Chronic obstructive pulmonary disease	r3f1	combinations of B2-stimulants with corticoids, inhalant
U112	Chronic obstructive pulmonary disease	r3f2	combinations of B2-stimulants with corticoids, systemic
U112	Chronic obstructive pulmonary disease	r3g3	anticholinergics-plain, inhalant

U112	Chronic obstructive pulmonary disease	r3g4	anticholinergic combinations with B2-stimulants, inhalant
U112	Chronic obstructive pulmonary disease	r3x1	all other anti-asthma and COPD products, inhalant
U112	Chronic obstructive pulmonary disease	r3x2	all other anti-asthma and COPD products, systemic
U113	Asthma	r3a2	B2-stimulants, systemic
U113	Asthma	r3a4	short-acting B2-stimulants, inhalant
U113	Asthma	r3b2	xanthines, systemic
U113	Asthma	r3d1	corticoids, inhalant
U113	Asthma	r3d2	corticoids, systemic
U113	Asthma	r3g2	anticholinergics-plain, and combinations with B2-stimulants, systemic
U113	Asthma	r3h2	PDE4 inhibitors for asthma/COPD, systemic
U113	Asthma	r3i0	devices for asthmatic conditions*
U113	Asthma	r3j2	antileukotriene anti-asthmatics, systemic
U114	Other respiratory diseases	l3a1	colony-stimulating factors
U114	Other respiratory diseases	l3b3	interferons, gamma
U114	Other respiratory diseases	l3b9	interferons, non-specified
U114	Other respiratory diseases	r4a0	chest rubs and other inhalants*
U114	Other respiratory diseases	r7a0	respiratory stimulants*
U114	Other respiratory diseases	r7c0	lung surfactants*
U114	Other respiratory diseases	r7x0	all other respiratory system products*
U116	Peptic ulcer disease	a2b2	acid pump inhibitors
U116	Peptic ulcer disease	a2b4	bismuth antiulcerants
U116	Peptic ulcer disease	a2b9	all other antiulcerants
U117	Cirrhosis of the liver	j6d2	cellular globulins
U117	Cirrhosis of the liver	k1g1	solutions for liver therapy
U119	Other digestive diseases	a15a0	appetite stimulants*
U119	Other digestive diseases	a2a1	plain antacids
U119	Other digestive diseases	a2a2	plain antiflatulents and carminatives
U119	Other digestive diseases	a2a3	antacids with antispasmodics

U119	Other digestive diseases	a2a4	antacids with antiflatulents or carminatives
U119	Other digestive diseases	a2a5	antacids with antiflatulents and/or carminatives and antispasmodics
U119	Other digestive diseases	a2a6	antacids with other drugs
U119	Other digestive diseases	a2a7	antiflatulents and/or carminatives with other drugs
U119	Other digestive diseases	a2b1	H2 antagonists
U119	Other digestive diseases	a2b3	prostaglandin antiulcerants
U119	Other digestive diseases	a2c0	other stomach disorder preparations*
U119	Other digestive diseases	a3a0	plain antispasmodics and anticholinergics*
U119	Other digestive diseases	a3f0	gastroprokinetics*
U119	Other digestive diseases	a3g0	gastro-intestinal sensorimotor modulators*
U119	Other digestive diseases	a5a1	choleretics and cholekinetics
U119	Other digestive diseases	a5a2	bile stone therapy
U119	Other digestive diseases	a5c0	cholagogue/lipotropic combinations*
U119	Other digestive diseases	a6a1	faecal softening laxatives
U119	Other digestive diseases	a6a2	stimulant laxatives
U119	Other digestive diseases	a6a3	bulk-forming laxatives
U119	Other digestive diseases	a6a4	enemas
U119	Other digestive diseases	a6a6	osmotic laxatives
U119	Other digestive diseases	a6a7	osmotic laxatives with electrolytes
U119	Other digestive diseases	a6a9	other drugs for constipation
U119	Other digestive diseases	a6b1	osmotic bowel cleansers
U119	Other digestive diseases	a6b2	osmotic bowel cleansers with electrolytes
U119	Other digestive diseases	a6b9	other bowel cleansers
U119	Other digestive diseases	a7e0	intestinal anti-inflammatory agents*
U119	Other digestive diseases	h1c2	antigrowth hormones
U119	Other digestive diseases	h4c0	growth hormones*
U119	Other digestive diseases	k1b1	sodium chloride solutions
U119	Other digestive diseases	k1b2	sodium chloride solutions with carbohydrates

U119	Other digestive diseases	k1b3	carbohydrate solutions (<=10%)
U119	Other digestive diseases	k1c1	solutions with one carbohydrate (>10%)
U119	Other digestive diseases	k1c2	carbohydrate combination solutions (>10%)
U119	Other digestive diseases	k1c3	carbohydrate electrolyte combination solutions (>10%)
U119	Other digestive diseases	k1d1	fat emulsions, plain
U119	Other digestive diseases	k1d2	fat emulsions, combinations
U119	Other digestive diseases	k1e0	amino acid solutions*
U122	Hyperplasia of prostate	g4c3	BPH 5-alpha testosterone reductase inhibitors (5-ARI), plain
U122	Hyperplasia of prostate	g4c4	BPH alpha-antagonists and 5-ARIs, combinations
U122	Hyperplasia of prostate	g4c7	BPH 5-ARIs and/or alpha-antagonists in combination with other substances
U123	Other genitourinary diseases	g2f0	topical sex hormones*
U123	Other genitourinary diseases	g3a1	monophasic preparations with <50mcg oestrogen
U123	Other genitourinary diseases	g3a2	monophasic preparations with >=50mcg oestrogen
U123	Other genitourinary diseases	g3a3	biphasic preparations
U123	Other genitourinary diseases	g3a4	triphasic preparations
U123	Other genitourinary diseases	g3a5	progestogen-only preparations, oral
U123	Other genitourinary diseases	g3a9	other hormonal contraceptives, systemic
U123	Other genitourinary diseases	g3b0	androgens, excluding G3E, G3F*
U123	Other genitourinary diseases	g3c0	oestrogens, excluding G3A, G3E, G3F*
U123	Other genitourinary diseases	g3d0	progestogens, excluding G3A, G3F*
U123	Other genitourinary diseases	g3f0	oestrogen with progestogen combinations, excluding G3A*
U123	Other genitourinary diseases	g3g0	gonadotrophins, including other ovulation stimulants*
U123	Other genitourinary diseases	g3x0	other sex hormones and similar products*
U123	Other genitourinary diseases	g4a1	urinary antibacterials
U123	Other genitourinary diseases	g4a2	urinary non-halogenated quinolones

U123	Other genitourinary diseases	g4a9	other urinary antiseptics
U123	Other genitourinary diseases	g4d4	urinary incontinence products
U123	Other genitourinary diseases	g4d8	urinary incontinence products of natural origin
U123	Other genitourinary diseases	g4x0	all other urological products*
U123	Other genitourinary diseases	h1c3	antigonadotrophin-releasing hormones
U123	Other genitourinary diseases	h4d0	antidiuretic hormones*
U123	Other genitourinary diseases	j1e0	trimethoprim and similar formulations*
U123	Other genitourinary diseases	k6a0	haemodialysis solutions*
U123	Other genitourinary diseases	k6b0	peritoneal dialysis solutions*
U123	Other genitourinary diseases	k6c0	haemofiltration*
U123	Other genitourinary diseases	k7a0	perfusion solution*
U123	Other genitourinary diseases	l2a1	cytostatic oestrogens
U123	Other genitourinary diseases	l2a2	cytostatic progestogens
U123	Other genitourinary diseases	t1a0	low osmolar angio-urography*
U124	Skin diseases	b6c0	other haematological agents*
U124	Skin diseases	d10a0	topical anti-acne preparations*
U124	Skin diseases	d10b0	oral anti-acne preparations*
U124	Skin diseases	d11a0	other dermatological preparations*
U124	Skin diseases	d1a1	topical dermatological antifungals
U124	Skin diseases	d2a0	emollients, protectives*
U124	Skin diseases	d3a1	skin/dermal/epidermal/equivalents
U124	Skin diseases	d4a0	anti-pruritics, including topical antihistamines, anaesthetics, etc*
U124	Skin diseases	d5a0	topical antipsoriasis products*
U124	Skin diseases	d5b0	systemic antipsoriasis products*
U124	Skin diseases	d5x0	other nonsteroidal products for inflammatory skin disorders*
U124	Skin diseases	d7a0	plain topical corticosteroids*
U124	Skin diseases	d7b1	combinations of corticosteroids with antibacterials
U124	Skin diseases	d7b4	other corticosteroid combinations
U124	Skin diseases	l4x0	other immunosuppressants*
U124	Skin diseases	v5a0	antiseptics for non-human use*

U126	Rheumatoid arthritis	l4b0	anti-TNF products*
U126	Rheumatoid arthritis	m1c0	specific anti-rheumatic agents*
U126	Rheumatoid arthritis	m2a0	topical anti-rheumatics and analgesics*
U127	Osteoarthritis	k2c0	gelatin solutions*
U127	Osteoarthritis	m1a1	anti-rheumatics, non-steroidal plain
U127	Osteoarthritis	m1a2	anti-rheumatics, non-steroidal combination
U127	Osteoarthritis	m1a3	coxibs, plain
U127	Osteoarthritis	m1b0	anti-rheumatic corticosteroid combinations*
U128	Gout	m4a0	anti-gout preparations*
U130	Other musculoskeletal disorders	a11c2	vitamin D
U130	Other musculoskeletal disorders	a11c3	combinations of vitamin A with vitamin D
U130	Other musculoskeletal disorders	a12a0	calcium products*
U130	Other musculoskeletal disorders	a12c1	magnesium supplements
U130	Other musculoskeletal disorders	h2a1	injectable corticosteroids, plain
U130	Other musculoskeletal disorders	h2a3	other systemic corticosteroids, plain
U130	Other musculoskeletal disorders	h4a0	calcitonins*
U130	Other musculoskeletal disorders	h4e0	parathyroid hormones and analogues*
U130	Other musculoskeletal disorders	j6f0	polyvalent immunoglobulins - combination modulation - mainly intramuscular*
U130	Other musculoskeletal disorders	m3a0	muscle relaxants, peripherally acting*
U130	Other musculoskeletal disorders	m5b3	bisphosphonates for osteoporosis and related disorders

U130	Other musculoskeletal disorders	m5b9	other bone calcium regulators
U130	Other musculoskeletal disorders	m5x0	all other musculoskeletal products*
U130	Other musculoskeletal disorders	v3h0	anti-inflammatory enzymes*
U143	Oral conditions	a11g1	plain vitamin C (including vitamin C salts)
U143	Oral conditions	a1a0	stomatologicals*
U143	Oral conditions	a1a2	mouth antiseptics and anti-infectives
U143	Oral conditions	a1a3	mouth anti-inflammatories and mouth analgesics for topical use
U143	Oral conditions	a1a4	mouth preparations w/fluorine
U143	Oral conditions	a1a5	all other stomatologicals
U143	Oral conditions	a1b0	mouth antifungals*
U143	Oral conditions	n1b2	anaesthetics local, dental injectables
U151	Poisonings	j6a1	snake-bite sera
U151	Poisonings	j6a2	botulism sera
U151	Poisonings	j6a3	gas gangrene sera

References

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