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**Background**

Any disturbance affecting the Pharmaceutical Supply Chain (PSC) could affect the efficiency of the health system and disrupt the supply of medicines. The global pharma supply chain had been facing shortages in the supply of pharmaceuticals. Due to PSC shortages many countries adopted actions to mitigate risks of disruptions. Many recommendations have been proposed, such as adopting a plus one diversification approach, increasing safety stock, and nationalizing the medical supply chains.

**Purpose of the scope review**

The objective of this paper is to scope findings, advanced in the academic literature related to criteria to be elected to guide national policy decisions regarding the “Partial Nationalization of Pharmaceutical Supply Chain” under the three main stakeholders’ points of view: Industry; payers (government and health insurance) and patients.

**Research questions**

**The structured questions based on the PCC acronym are described in Questions 1 to 4**

**PCC structured question**

**P Problem: Pharmaceutical Supply Chain (PSC) Shortages and National Populations’ risk of medications’ unavailability**

**C Concept: Framework to help to take a decision on invest in local production of Active Pharmaceutical Ingredients APIs**

**C Context: Pharmaceutical Industry (in any country)**

With input from the team of investigators and collaborators from the University of São Paulo, the following four research questions were formulated:

1. What are the current methods employed in the scientific reference literature for analyzing and deciding on the local manufacture of a product (from any sector)?
2. What are the methods and their criteria for selecting pharmaceuticals and Active Pharmaceutical Ingredients (APIs) for local manufacturing practiced by industry and institutions (in health, pharmaceuticals, drugs, or inputs areas)?
3. What are the criteria used by public health managers in the pharmaceutical sector when deciding to incorporate a product into the health system?
4. What are the methods that use data analysis tools between 1 and 3?

## Methods

This scoping review will be carried out according to the Joanna Briggs Institute proposed methodology for carrying out systematic scope reviews (Levac et al., 2010; Peters et al., 2015). The review report will be conducted according to Preferred Reporting Items for Systematic Reviews guidelines and Meta-Analyzes extension for Scoping Reviews (PRISMA-ScR) for the review report (Tricco et al., 2018)

## Search Strategy

A comprehensive search strategy for identifying published papers that met the inclusion criteria was constructed with support from experienced researchers (WMB; MFO; MCAS). The following structured search strategies were used in database searches and constructed using PubMed MeSH terms and Boolean operators. The following databases were searched: MedLine, Embase, Google Scholar and IEEE Xplore:

**MedLine and Embase:** (Health resource OR Health technology assessment OR HTA OR Health technologies assessment OR Healthcare technologies assessment) AND (Resource allocation OR Resource allocations OR Resource designation OR allocation efficiency OR Resources allocation OR Decision-making OR Decisionmaking OR Health priority OR Priority setting OR Health policies OR Healthcare policy OR Healthcare policies OR Complexity management OR Portfolio management OR Product data management OR production complexity OR criteria) AND (API OR active pharmaceutical ingredients OR active principle OR finished pharmaceutical product OR finished pharmaceutical products OR active substance OR active constituent OR bulk active OR pharma product OR pharmaceutical products OR pharmaceuticals OR orphan drug OR orphan drugs)

**IEEE Xplorer:** (Portfolio OR Resource allocation\* OR production OR criteria OR pipeline OR Manufacture) AND active pharmaceutical ingredients OR active principle finished pharmaceutical product OR finished pharmaceutical products active substance OR active constituent OR bulk active OR pharma product OR pharmaceutical products OR pharmaceuticals)

**Google Scholar:** Health technology assessment Health priority resource allocation “active pharmaceutical ingredients”

## Selection Criteria

Inclusion and exclusion criteria were developed at the outset of the review.

The inclusion criteria were a) primary and secondary studies, b) articles that directly answer the research questions (systematic review) or that help to broadly understand what is known about a phenomenon (scope review). Papers addressing both of the following subjects were included: specific factors that should be considered during deliberations and decision making about the production decision, investment, or reimbursement of pharmaceuticals in a country. Congress abstracts, letters, and editorials, full-text unavailability and studies presenting subjects were excluded.

## Selection of studies

The selection will be carried out with the support of excel spreadsheets.

Two reviewers will independently evaluate each title and abstract of the identified records to make the selection. Disagreements will be resolved by consensus or, when necessary, a third review author will be involved.

The full texts of all papers identified as potentially relevant will be retrieved and eligibility will be assessed against inclusion and exclusion criteria. This process will be carried out by two independent reviewers. Disagreements will be resolved by consensus or, when necessary, a third reviewer will be involved.

A PRISMA flowchart will be included to present research results and the process of screening and eligibility of studies for inclusion.

In the full-text phase will be presented a table listing excluded studies references from this review and the main reason(s) for exclusion.

### **Extraction of study information and graphics**

An extraction spreadsheet will be developed and tested with calibration between the researchers. The extraction will be performed by two reviewers independently. Disagreements will be resolved by consensus and a third reviewer will be engaged if necessary. When data is not available for a category, it will be indicated in the extraction sheet as 'not informed'.

### **Charting, Extracting, and Tabulating the Data**

Key pieces of information from papers selected for inclusion in the scoping study were charted by the researchers using a data charting form (like a data extraction form used in systematic reviews). Charting involved sifting through and sorting information according to key aspects or concepts.

These key aspects or concepts, identified a priori, included the following extracted information recorded: If the article was evaluated: (Yes OR No); Selected or Excluded; Reason for selection or exclusion; Main findings; Conclusion; Classification of each study in opinion research, observational or experimental studies. Methods, approaches, softwares, and variables used (including information sources) to arrive at findings or arguments presented were also extracted, if they were presented.

### **Risk of bias analysis**

The analysis of the risk of bias was based on the assessment of the type of study, classifying them as: opinion, observational, and experimental.