providing just in time packaging, where the kits are packaged at or around the time the request is received. The just in time packaging may reduce waste by packaging what is requested. For example, waste can be reduced when there is a limited supply of a drug, the clinical trial study does not progress in a particular country, or the clinical trial study does not receive an expected level of patient participation.

[0005] There can be inefficiencies associated with just in time packaging. Clinical trial studies often include one or more active medication or treatment types and a control or placebo treatment type. During the packaging process, each active treatment type and the control treatment type are prepared and packaged in separate packaging runs. Each packaging run may be associated with a packaging room set-up, a packaging room clean-down, and a separate review and release of packaged product for each treatment type. For just in time packaging, where the quantities of kits are relatively small, the time and cost may be substantial. Additionally, the packaging should be performed in a way that does not reveal which kits are associated with which treatment types (*e.g.*, unblind the study by allowing a participant or another individual involved with the study to discover whether a kit is an active treatment or placebo). Accordingly, there is a need to confidentially and efficiently package kits for clinical trial studies.

SUMMARY

[0005a] In an aspect, the present disclosure refers to a method for confidentially producing shipment orders for clinical trials, the method comprising: at a first computer system comprising one or more processors and one or more memories: receiving a plurality of supply orders associated with one or more clinical trials; determining for each of the plurality of supply orders: a clinical trial study, a site location, and a treatment type; assigning a first plurality of supply orders associated with a first clinical trial study to a packaging site based on the site location; associating a first sub-group of the first plurality of supply orders with a first assembly procedure based on the treatment type to create a first assembly order; and associating a second sub-group of the first plurality of supply orders with a second assembly procedure based on the treatment type to create a second assembly order; at a second computer system comprising a

second one or more processors and a second one or more memories: receiving the first assembly order and the second assembly order; and assigning, randomly, a plurality of kit identifiers to the first assembly order and the second assembly order, thereby creating a plurality of blinded kits; and at the first computer system, confidentially producing shipment orders for the first plurality of clinical trials based on the plurality of blinded kits.

[0005b] In an aspect, the present disclosure refers to an electronic system, comprising: one or more processors; a memory; and one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including instructions for: at a first computer system comprising one or more processors and one or more memories: receiving a plurality of supply orders associated with one or more clinical trials; determining for each of the plurality of supply orders: a clinical trial study, a site location, and a treatment type; assigning a first plurality of supply orders associated with a first clinical trial study to a packaging site based on the site location; associating a first sub-group of the first plurality of supply orders with a first assembly procedure based on the treatment type to create a first assembly order; and associating a second sub-group of the first plurality of supply orders with a second assembly procedure based on the treatment type to create a second assembly order; at a second computer system comprising a second one or more processors and a second one or more memories: receiving the first assembly order and the second assembly order; and assigning, randomly, a plurality of kit identifiers to the first assembly order and the second assembly order, thereby creating a plurality of blinded kits; and at the first computer system, confidentially producing shipment orders for the first plurality of clinical trials based on the plurality of blinded kits.

[0005c] In an aspect, the present disclosure refers to a non-transitory computer-readable storage medium storing one or more programs, the one or more programs comprising instructions, which when executed by one or more processors of one or more electronic devices having a display, cause the one or more electronic devices to: at a first computer system comprising one or more processors and one or more memories: receive a plurality of supply orders associated with one or more clinical trials; determine for each of the plurality of supply orders: a clinical trial study, a site location, and a treatment type; assign a first plurality of supply orders associated with a first clinical trial study to a packaging site based on the site location; associate a first sub-group of the first plurality of supply orders with a first assembly procedure based on the treatment type to create a first assembly order; and associate a second sub-group of the first plurality of supply orders with a second assembly procedure based on the treatment type to

create a second assembly order; at a second computer system comprising a second one or more processors and a second one or more memories: receive the first assembly order and the second assembly order; and assign, randomly, a plurality of kit identifiers to the first assembly order and the second assembly order, thereby creating a plurality of blinded kits; and at the first computer system, confidentially produce shipment orders for the first plurality of clinical trials based on the plurality of blinded kits.

[0006] Embodiments of the present disclosure can provide computational systems and methods for efficiently aggregating supply orders. Each supply order may be associated with a destination site associated with a site location that may distribute one or more products or kits to participants in the clinical trial study. In one or more examples, the aggregation of multiple supply orders may be performed to create one or more larger assembly orders, where each assembly order is associated with a particular treatment type (*e.g.*, an active treatment type or a control treatment type). Each assembly order may correspond to a packaging run to prepare kits for one or more clinical trial site locations. Examples of the present disclosure may further dis-aggregate the kits produced in the packaging runs to produce shipment orders based on the original supply orders.

[0007] In one or more examples, embodiments of the present disclosure can improve efficiency to just in time packaging processes, where the clients may be placing supply orders for immediate need at site location in real time. As a result, each supply order may correspond to a relatively small packaging run (*e.g.*, including less than 100 kits) and not to long term

demand (greater than 100 kits). In some examples, the supply order may include quantities of less than five kits. Because each packaging run may be associated with a room set-up, a room clean-down, and a separate review and release of the packaged product, packaging supply orders to meet real time demand may be time consuming and costly. Aggregating supply orders according to embodiments of the present disclosure may lead to improved efficiencies by reducing the time and cost associated with multiple supply runs for a single supply order.

[0008] Moreover, examples of the present disclosure may lead to improved confidentiality in producing shipment orders for blinded studies. In many instances, in order for a clinical trial to be successful, both the participants and individuals running the clinical trial should not know which medication kits correspond to an active treatment type or a control treatment type. Oftentimes, a randomization list is used to map the kits (*e.g.*, kit identifiers) to a treatment type (*e.g.*, active or control). Examples of the present disclosure provide improved methods of maintaining the confidentiality of the randomization list by restricting access to the randomization list. In one or more examples, this is achieved by maintaining the randomization list on a computer system associated with a packaging facility (*e.g.*, the facility that packages the kits). In one or more examples, other portions of the system may not have access to the randomization list.

[0009] Examples of the present disclosure provide methods for confidentially producing shipment orders for clinical trials. In one or more examples, the method comprises at a first computer system comprising one or more processors and one or more memories: receiving a plurality of supply orders associated with one or more clinical trials, determining for each of the plurality of supply orders: a clinical trial study, a site location, and a treatment type, assigning a first plurality of supply orders associated with a first clinical trial study to a packaging site based on the site location. In one or more examples, the method further comprises associating a first sub-group of the first plurality of supply orders with a first assembly procedure based on the treatment type to create a first assembly order, and associating a second sub-group of the first plurality of supply orders with a second assembly procedure based on the treatment type to create a second assembly order. In one or more examples, the method further comprises at a second computer system comprising a second one or more processors and a second one or more memories: receiving the first assembly order and the second assembly order; and assigning, randomly, a plurality of kit identifiers to the first assembly order and the second assembly order, thereby creating a plurality of blinded kits. In one or more examples, the method further