SUSTAINABLE AND MODULAR PACKAGING SYSTEMS FOR CONTAINERS FOR PHARMACEUTICAL USE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Priority is claimed to U.S. Provisional Patent Application No. 63/559,377, filed February 29, 2024, the entire contents of which are hereby incorporated by reference herein.

FIELD OF DISCLOSURE

[0002] The present disclosure generally relates to packaging systems for containers for clinical, medical, or pharmaceutical use, and, more particularly, sustainable and modular systems for packaging containers, such as glass vials, for clinical, medical, or pharmaceutical use.

BACKGROUND

[0003] Containers, such as glass vials, are commonly used in the medical and pharmaceutical field to hold various quantities of medicament. These containers are frequently transported from one site to another, particularly when they are manufactured in one site, filled in another site, and used in yet another site. When transporting the containers from one site to another, they are generally grouped together in packaging systems, such as trays and/or boxes, either manually or by automated means. By way of example, sterilized glass vials containing medicament therein are placed in packaging boxes, which are then sealed. After being transported to their destination, the packaging boxes are opened so that each container can be removed and used thereafter.

[0004] Trays and/or boxes for packaging and transporting containers of medicament, such as glass vials, exist in the industry. However, conventional packaging systems do not provide sufficient protection from lateral impact between each of the containers to prevent damage or breakage of the containers that are commonly made of fragile material, such as glass. Moreover, conventional packaging systems do not protect the containers from top load impact, particularly when the packages are stacked on top of each other, or bottom impact, particularly when the packages are placed on hard surface. Thus, containers transported in these conventional packaging systems are prone to damage or breakage.

[0005] In addition, International Organization of Standardization (ISO) determines standard dimensions and capacities for injectable containers, such as glass vials. By way of example, ISO 8362-1 indicates the standard capacities of injectable vials made of glass. According to ISO 8362-1, 2R vials have a brimful capacity of 4 cc (4 ml), 6R vials have a brimful capacity of 10 cc (10 ml), and 10R vials have a brimful capacity of 13.5 cc (13.5 ml). ISO 8362-1 also indicates the standard dimensions of glass vials. For example, ISO 8362-1 indicates that 2R glass vials have a body with an outer diameter of 16 mm ± 0.15 mm and a height of 35 mm ± 0.5 mm, 6R vials have a body with an outer diameter of 22 mm ± 0.2 mm and a height of 40 mm ± 0.5 mm,

and 10R vials have a body with an outer diameter of 24 mm ± 0.2 mm and a height of 45 mm ± 0.5 mm.

[0006] Because conventional packaging systems are fixed in dimensions and sizes and because ISO 8362-1 establishes the standard dimensions of containers, such as glass vials, conventional packaging systems may only allow one size (e.g., height, outer diameter) of containers to be grouped into respective packages. For example, conventional boxes for packaging glass vials of medicament do not allow ISO 2R and 4cc vials to be grouped together with ISO 6R, ISO 10R, or 10 cc vials in the same box because of the differences in standard dimensions of the vials. Accordingly, conventional packaging systems do not provide the flexibility in use in that it is not suitable for multiple containers of different sizes to be packaged together into one packaging system. This limitation can have a direct consequence on the number of containers that can be packaged into each packaging system. This limitation can also have a direct consequence on the number of packaging systems having to be used to transport a given number of containers and, thus, the cost of transporting the containers from one site to another.

[0007] Furthermore, conventional packaging systems that attempt to provide containers therein with protection from damage generally include foam inserts or plastic trays. The foam inserts and plastic trays prevent containers from contacting each other and, thus, provide protection from lateral impact. However, materials such as foam or plastic are not sustainable and harmful to the environment.

[0008] The present disclosure sets forth systems embodying advantageous alternatives to existing systems for packaging multiple containers for clinical, medical, or pharmaceutical use, and that may address one or more of the challenges or needs mentioned herein, as well as provide other benefits and advantages.

SUMMARY

[0009] One aspect of the present disclosure provides a system for packaging one or more containers. The system may comprise a carton having a storage configuration where the carton is substantially flat, and an assembled configuration. The carton may comprise a bottom box having a first bottom wall, a first sidewall, a second sidewall, a first back wall, and a first front wall when the carton is in the assembled configuration. The carton may also comprise a lid coupled to the bottom box and movable between an open position and a closed position, a first flap extending from the first sidewall of the bottom box, and a second flap extending from the second sidewall of the bottom box. The second sidewall may be opposite the first sidewall and facing the first sidewall, and the first flap and the second flap may define a set of cavities. The system may also comprise an insert configured to be disposed within the bottom box of the carton. The insert may have a storage configuration where the insert is substantially flat and an assembled configuration. The insert may define at least one cavity dimensioned to house at least one container. In the assembled configuration, the insert may comprise a top wall defining

the at least one cavity, a second bottom wall, a second back wall, a second front wall, and a middle wall positioned between the top wall and the second bottom wall.

[0010] In some embodiments, the insert may define a first cavity dimensioned to house a first container and a second cavity dimensioned to house a second container. In some embodiments, a diameter of the first cavity may be smaller than a diameter of the second cavity, and a diameter of the first container may be smaller than a diameter of the second container. In some embodiments, a bottom surface of the at least one container may be configured to abut the middle wall of the insert when the at least one container is housed within the at least one cavity.

[0011] In some embodiments, the carton may further comprise a release tab comprising a portion of at least one of the lid and the bottom box and being defined by a perforated line in at least one of the lid and the bottom box. When the lid is in the closed position, the release tab may be secured to at least one of the lid and the bottom box via the perforation. When the lid is in the open position, the release tab may be separated along the perforated line from at least one of the lid and the bottom box. In some embodiments, the release tab may be a push tab that detaches the release tab from at least one of the lid and the bottom box. In some embodiments, the system may further comprise an adhesive positioned on at least a part of the release tab, and the release tab may include a kiss cut to improve securement between the release tab and the adhesive.

[0012] In some embodiments, when the insert is disposed within the bottom box of the carton, the second bottom wall may be configured to abut the first bottom wall, the second back wall may be configured to abut the first back wall, and the second front wall may be configured to abut the first front wall. In some embodiments, the at least one container may include a drug vial. The drug vial may be one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In other embodiments, the first container may be one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and the second container may be a different one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In some embodiments, the drug vial may be filled or pre-filled with a drug. The drug may comprise tarlatamab. In some embodiments, the carton and the insert may be made of paperboard or a combination of synthetic and natural materials.

[0013] Another aspect of the present disclosure provides a system for packaging a plurality of containers. The system may comprise a carton having a storage configuration where the carton is substantially flat, and an assembled configuration. The carton may comprise a bottom box having a first bottom wall, a first sidewall, a second sidewall, a first back wall, and a first front wall when the carton is in the assembled configuration. The carton may also comprise a lid coupled to the bottom box and movable between an open position and a closed position, a tray coupled to the bottom box and movable between a first position and a second position, a first flap extending from the first sidewall of the bottom box, and a second flap extending from the

second sidewall of the bottom box. The second sidewall may be opposite the first sidewall and face the first sidewall. The system may also comprise an insert configured to be disposed within the bottom box of the carton. The insert may have a storage configuration where the insert is substantially flat and an assembled configuration. The insert may define a plurality of cavities, and each cavity may be dimensioned to house a respective one of a plurality of containers. In the assembled configuration, the insert may comprise a top wall, a second bottom wall, a third sidewall, a fourth sidewall, a second back wall, a second front wall, and a first middle wall positioned between the top wall and the second bottom wall. The top wall and the first middle wall may define the plurality of cavities.

[0014] In some embodiments, the tray may be configured to define a second bottom box disposed within the bottom box when the tray is in the second position. In some embodiments, the insert may further comprise a first pair of opposing flaps coupled to the second front wall and a second pair of opposing flaps coupled to the second back wall. The insert may further comprise a third pair of opposing flaps coupled to the top wall, and the third pair of opposing flaps may be movable between an open position and a closed position. In the closed position, the third pair of opposing flaps may define the third sidewall and the fourth sidewall of the insert.

[0015] In some embodiments, when the insert is disposed within the bottom box of the carton, the second bottom wall may be configured to abut the first bottom wall, the third sidewall may be configured to abut the first sidewall, the fourth sidewall may be configured to abut the second sidewall, the second back wall may be configured to abut the first back wall, and the second front wall may be configured to abut the first front wall. In some embodiments, the insert may further comprise a second middle wall positioned between the first middle wall and the second bottom wall. At least one of the first middle wall or the second middle wall may be configured to abut bottom surfaces of the plurality of containers when the plurality of containers are housed within the plurality of cavities.

[0016] In some embodiments, the insert may further comprise a vertical rib support extending between the second middle wall and the second bottom wall, and the vertical rib support may be configured to maintain a predefined distance between the second middle wall and the second bottom wall. In some embodiments, a number of cavities defined by the top wall may be different from a number of cavities defined by the first middle wall. In other embodiments, a number of cavities defined by the top wall may be equal to a number of cavities defined by the first middle wall. In some embodiments, each of the plurality of cavities may have equal dimensions. In other embodiments, at least one of the plurality of cavities may have different dimensions than a remainder of the plurality of cavities.

[0017] In some embodiments, the carton may further comprise a release tab comprising a portion of at least one of the lid and the bottom box and may be defined by a perforated line in at least one of the lid and the bottom box. When the lid is in the closed position, the release tab may be secured to at least one of the lid and the bottom box via the perforation. When the lid is

in the open position, the release tab may be separated along the perforated line from at least one of the lid and the bottom box. In some embodiments, the release tab may be a push tab that detaches the release tab from at least one of the lid and the bottom box. In some embodiments, the system may further comprise an adhesive positioned on at least a part of the release tab, and the release tab may include a kiss cut to improve securement between the release tab and the adhesive.

[0018] In some embodiments, at least one of the plurality of containers may include a drug vial. The drug vial may be one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In some embodiments, the plurality of containers may include a first drug vial and a second drug vial. The first drug vial may be one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and the second drug vial may be a different one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In some embodiments, the drug vial may be filled or pre-filled with a drug, and the drug may comprise tarlatamab. In some embodiments, the carton and the insert may be made of paperboard or a combination of synthetic and natural materials.

[0019] Another aspect of the present disclosure provides a system for packaging a plurality of containers. The system may comprise a carton having a storage configuration where the carton is substantially flat, and an assembled configuration. The carton may comprise a plurality of sidewalls, a top wall, a bottom wall, a first flap extending from a first sidewall of the plurality of sidewalls, and a second flap extending from a second sidewall of the plurality of sidewalls, the second sidewall being opposite the first sidewall and facing the first sidewall. The first flap and the second flap define a first set of cavities. The system also comprises an insert configured to be disposed within the carton, and the insert has a storage configuration where the insert is substantially flat and an assembled configuration. In the assembled configuration, the insert comprises a first layer, a second layer positioned at a first distance below the first layer, and a third layer positioned at a second distance below the second layer. The first layer comprises at least one hole configured to house a container and a first set of flaps extending from opposite sides of the first layer, and the second layer is configured to support a bottom surface of the container and comprises a second set of flaps extending from opposite sides of the second layer. The first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down.

[0020] In some embodiments, in the assembled configuration, the carton may comprise four side walls, the top wall, and the bottom wall, and at least the four side walls and the bottom wall may define a second cavity inside the carton. The second cavity inside the carton may be configured to accommodate the insert. In the assembled configuration, the insert may comprise two opposite side walls connecting the first layer, the second layer, and the third layer. In some embodiments, when the insert is in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer may be configured to fold down to define

two additional side walls of the insert. In some embodiments, when the insert is in the assembled configuration and disposed within the carton, an inner surface of the first set of flaps of the first layer may be configured to abut an outer surface of the second set of flaps of the second layer, and an outer surface of the first set of flaps of the first layer may be configured to abut an inner surface of two side walls of the four side walls of the carton.

[0021] In some embodiments, the first set of cavities may comprise substantially rectangular air cavities, and the first set of cavities may be configured to provide a distance between the top wall of the carton and a top surface of the container to protect the container from top load. In the assembled configuration, the insert may comprise two opposite side walls connecting the first layer, the second layer, and the third layer, and, in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer may be configured to fold down to define two additional side walls of the insert. In some embodiments, the first layer, the second layer, the third layer, the two opposite side walls connecting the first layer, the second layer, and the third layer, and the two additional side walls of the insert may be formed integrally.

[0022] In some embodiments, the second layer of the insert may be raised the second distance from the third layer of the insert when the insert is disposed within the carton such that the bottom surface of the container is raised the second distance from the bottom wall of the carton. In some embodiments, the plurality of sidewalls, the top wall, the bottom wall, the first flap, and the second flap of the carton may be formed integrally. In some embodiments, the container may be a vial, and the vial may be one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.

[0023] Another aspect of the present disclosure provides a system for packaging a plurality of containers. The system may comprise a carton having a storage configuration where the carton is substantially flat, and an assembled configuration. The carton may comprise a plurality of sidewalls, a top wall, a bottom wall, a first flap extending from a first sidewall of the plurality of sidewalls, and a second flap extending from a second sidewall of the plurality of sidewalls, the second sidewall being opposite the first sidewall and facing the first sidewall. The first flap and the second flap define a first set of cavities. The system also comprises an insert configured to be disposed within the carton, and the insert has a storage configuration where the insert is substantially flat and an assembled configuration. In the assembled configuration, the insert comprises a first layer, a second layer positioned at a first distance below the first layer, a third layer positioned at a second distance below the second layer, and a fourth layer positioned at a third distance below the third layer. The first layer comprises a first set of holes configured to accommodate a plurality of containers, and each of the first set of holes is configured to accommodate a first portion of a respective container of the plurality of containers. The first layer also comprises a first set of flaps extending from opposite sides of the first layer. The second layer comprises a second set of holes configured to accommodate the plurality of containers, and each of the second set of holes is configured to accommodate a second portion of the

respective container of the plurality of containers. The second layer also comprises a second set of flaps extending from opposite sides of the second layer. The third layer is configured to support a bottom surface of the plurality of containers, and the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down.

[0024] In some embodiments, the insert may further comprise a vertical rib support extending between the third layer and the fourth layer. The vertical rib support may be configured to maintain the third distance between the third layer and the fourth layer. In other embodiments, the first set of holes in the first layer and the second set of holes in the second layer may be vertically aligned. In the assembled configuration, the carton may comprise four sidewalls, the top wall, and the bottom wall, and at least the four side walls and the bottom wall may define a second cavity inside the carton. The second cavity inside the carton may be configured to accommodate the insert.

[0025] In some embodiments, in the assembled configuration, the insert may comprise two opposite sidewalls connecting the first layer, the second layer, the third layer, and the fourth layer. When the insert is in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer may be configured to fold down to define two additional sidewalls of the insert. In some embodiments, when the insert is in the assembled configuration and disposed within the carton, an inner surface of the first set of flaps of the first layer may be configured to abut an outer surface of the second set of flaps of the second layer, and an outer surface of the first set of flaps of the first layer may be configured to abut an inner surface of two side walls of the four side walls of the carton.

[0026] In some embodiments, the first set of cavities may comprise substantially rectangular air cavities, and the first set of cavities may be configured to provide a distance between the top wall of the carton and a top surface of the plurality of containers to protect the plurality of containers from top load. In the assembled configuration, the insert may comprise two opposite sidewalls connecting the first layer, the second layer, the third layer, and the fourth layer, and, in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer may be configured to fold down to define two additional sidewalls of the insert.

[0027] In some embodiments, the first layer, the second layer, third layer, the fourth layer, the two opposite sidewalls connecting the first layer, the second layer, the third layer, and the fourth layer, and the two additional sidewalls of the insert may be formed integrally. In other embodiments, the third layer of the insert may be raised the third distance from the fourth layer of the insert when the insert is disposed within the carton such that the bottom surface of the plurality of containers is raised the third distance from the bottom wall of the carton. In some embodiments, the plurality of sidewalls, the top wall, the bottom wall, the first flap, and the second flap of the carton may be formed integrally.

[0028] Additional features of the present disclosure will become apparent to those skilled in the art upon consideration of the embodiments exemplifying the best mode of carrying out the disclosure as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] It is believed that the disclosure will be more fully understood from the following description taken in conjunction with the accompanying drawings. Some of the drawings may have been simplified by the omission of selected elements for the purpose of more clearly showing other elements. Such omissions of elements in some drawings are not necessarily indicative of the presence or absence of particular elements in any of the exemplary embodiments, except as may be explicitly delineated in the corresponding written description. Also, none of the drawings is necessarily to scale.

[0030] Fig. 1A illustrates an exemplary system for packaging a container, in accordance with various embodiments of the present disclosure.

[0031] Fig. 1B illustrates another view of the exemplary system of Fig. 1A, in accordance with various embodiments of the present disclosure.

[0032] Fig. 1C illustrates another view of the exemplary system of Fig. 1A, in accordance with various embodiments of the present disclosure.

[0033] Fig. 1D illustrates another view of the exemplary system of Fig. 1A, in accordance with various embodiments of the present disclosure.

[0034] Fig. 2A illustrates an exemplary carton of the exemplary system of Fig. 1A, in accordance with various embodiments of the present disclosure.

[0035] Fig. 2B illustrates a top view of the exemplary carton of Fig. 2A, in accordance with various embodiments of the present disclosure.

[0036] Fig. 2C illustrates the exemplary carton of Fig. 2A with an exemplary insert, in accordance with various embodiments of the present disclosure.

[0037] Fig. 2D illustrates a top view of the exemplary carton of Fig. 2A and the exemplary insert of Fig. 2C, in accordance with various embodiments of the present disclosure.

[0038] Fig. 2E illustrates a bottom view of the exemplary carton of Fig. 2A and the exemplary insert of Fig. 2C, in accordance with various embodiments of the present disclosure.

[0039] Fig. 3A illustrates another view of the exemplary insert of Fig. 2C, in accordance with various embodiments of the present disclosure.

[0040] Fig. 3B illustrates a side view of the exemplary insert of Fig. 3A, in accordance with various embodiments of the present disclosure.

[0041] Fig. 3C illustrates another side view of the exemplary insert of Fig. 3A, in accordance with various embodiments of the present disclosure.

[0042] Fig. 3D illustrates another side view of the exemplary insert of Fig. 3A, in accordance with various embodiments of the present disclosure.

[0043] Fig. 4A illustrates a plan view of a die cut of an exemplary carton of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0044] Fig. 4B illustrates a plan view of a die cut of an exemplary insert of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0045] Fig. 5A illustrates the exemplary carton of Fig. 4A and the exemplary insert of Fig. 4B in their storage configurations, in accordance with various embodiments of the present disclosure.

[0046] Fig. 5B illustrates the exemplary carton and the exemplary insert of Fig. 5A in their assembled configurations, in accordance with various embodiments of the present disclosure.

[0047] Fig. 5C illustrates an exemplary system for packaging a plurality of containers in its assembled configuration with the exemplary carton and the exemplary insert of Fig. 5B, in accordance with various embodiments of the present disclosure.

[0048] Fig. 5D illustrates another view of the exemplary system of Fig. 5C, in accordance with various embodiments of the present disclosure.

[0049] Fig. 5E illustrates another view of the exemplary system of Fig. 5C, in accordance with various embodiments of the present disclosure.

[0050] Fig. 5F illustrates another view of the exemplary system of Fig. 5C, in accordance with various embodiments of the present disclosure.

[0051] Fig. 6A illustrates the exemplary carton of Fig. 5A in its storage configuration, in accordance with various embodiments of the present disclosure.

[0052] Fig. 6B illustrates the exemplary carton of Fig. 5A in its assembled configuration, in accordance with various embodiments of the present disclosure.

[0053] Fig. 6C illustrates another view of the exemplary carton of Fig. 5A in its assembled configuration, in accordance with various embodiments of the present disclosure.

[0054] Fig. 7A illustrates the exemplary insert of Fig. 5A in its storage configuration, in accordance with various embodiments of the present disclosure.

[0055] Fig. 7B illustrates a side view of the exemplary insert of Fig. 5A in its assembled configuration, in accordance with various embodiments of the present disclosure.

[0056] Fig. 7C illustrates another side view of the exemplary insert of Fig. 5A in its assembled configuration, in accordance with various embodiments of the present disclosure.

[0057] Fig. 7D illustrates another side view of the exemplary insert of Fig. 5A in its assembled configuration, in accordance with various embodiments of the present disclosure.

[0058] Fig. 8 illustrates a side plan view of the exemplary insert of Fig. 5A in its assembled configuration, in accordance with various embodiments of the present disclosure.

[0059] Fig. 9A illustrates a plan view of a die cut of an exemplary carton of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0060] Fig. 9B illustrates a plan view of a die cut of an exemplary insert of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0061] Fig. 10A illustrates the exemplary carton of Fig. 9A and the exemplary insert of Fig. 9B in their assembled configurations, in accordance with various embodiments of the present disclosure.

[0062] Fig. 10B illustrates an exemplary system for packaging a plurality of containers in its assembled configuration with the exemplary carton and the exemplary insert of Fig. 10A, in accordance with various embodiments of the present disclosure.

[0063] Fig. 10C illustrates a perspective view of the exemplary system of Fig. 10A, in accordance with various embodiments of the present disclosure.

[0064] Fig. 10D illustrates another view of the exemplary system of Fig. 10A, in accordance with various embodiments of the present disclosure.

[0065] Fig. 11 illustrates a side view of the exemplary insert of Fig. 10A, in accordance with various embodiments of the present disclosure.

[0066] Fig. 12A illustrates a plan view of a die cut of an exemplary carton of an exemplary system for packaging a container, in accordance with various embodiments of the present disclosure.

[0067] Fig. 12B illustrates a plan view of a die cut of an exemplary insert of an exemplary system for packaging a container, in accordance with various embodiments of the present disclosure.

[0068] Fig. 13A illustrates a perspective view of an exemplary system for packaging a container with the exemplary carton of Fig. 12A in an assembled configuration and the exemplary insert of Fig. 12B in an assembled configuration, in accordance with various embodiments of the present disclosure.

[0069] Fig. 13B illustrates a cross-sectional view of the exemplary system of Fig. 13A, in accordance with various embodiments of the present disclosure.

[0070] Fig. 13C illustrates a perspective view of the exemplary insert of Fig. 12B in the assembled configuration, in accordance with various embodiments of the present disclosure.

[0071] Fig. 14A illustrates a plan view of a die cut of an exemplary carton of an exemplary system for packaging at least one container, in accordance with various embodiments of the present disclosure.

[0072] Fig. 14B illustrates a plan view of a die cut of an exemplary insert of an exemplary system for packaging at least one container, in accordance with various embodiments of the present disclosure.

[0073] Fig. 15A illustrates a perspective view of an exemplary system for packaging at least one container with the exemplary carton of Fig. 14A in an assembled configuration and the exemplary insert of Fig. 14B in an assembled configuration, in accordance with various embodiments of the present disclosure.

[0074] Fig. 15B illustrates a cross-sectional view of the exemplary system of Fig. 15A, in accordance with various embodiments of the present disclosure.

[0075] Fig. 16A illustrates a plan view of a die cut of an exemplary carton of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0076] Fig. 16B illustrates a plan view of a die cut of an exemplary insert of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0077] Fig. 17A illustrates a perspective view of the exemplary carton of Fig. 16A in an assembled configuration with an exemplary tray in a first position, in accordance with various embodiments of the present disclosure.

[0078] Fig. 17B illustrates a perspective view of the exemplary carton of Fig. 17A with the exemplary tray in a second position, in accordance with various embodiments of the present disclosure.

[0079] Fig. 18A illustrates a perspective view of the exemplary insert of Fig. 16B in an assembled configuration, in accordance with various embodiments of the present disclosure.

[0080] Fig. 18B illustrates a side view of the exemplary insert of Fig. 18A, in accordance with various embodiments of the present disclosure.

[0081] Fig. 18C illustrates another side view of the exemplary insert of Fig. 18A, in accordance with various embodiments of the present disclosure.

[0082] Fig. 18D illustrates another side view of the exemplary insert of Fig. 18A, in accordance with various embodiments of the present disclosure.

[0083] Fig. 19A illustrates a plan view of a die cut of an exemplary carton of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0084] Fig. 19B illustrates a plan view of a die cut of an exemplary insert of an exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure.

[0085] Fig. 20A illustrates a perspective view of the exemplary carton of Fig. 19A in an assembled configuration with an exemplary tray in a first position, in accordance with various embodiments of the present disclosure.

[0086] Fig. 20B illustrates a perspective view of the exemplary carton of Fig. 20A with the exemplary tray in a second position, in accordance with various embodiments of the present disclosure.

[0087] Fig. 21A illustrates a perspective view of the exemplary insert of Fig. 19B in an assembled configuration, in accordance with various embodiments of the present disclosure.

[0088] Fig. 21B illustrates a side view of the exemplary insert of Fig. 21A, in accordance with various embodiments of the present disclosure.

[0089] Fig. 21C illustrates another side view of the exemplary insert of Fig. 21A, in accordance with various embodiments of the present disclosure.

[0090] Fig. 21D illustrates another side view of the exemplary insert of Fig. 21A, in accordance with various embodiments of the present disclosure.

DETAILED DESCRIPTION

[0091] The present disclosure generally relates to systems for packaging one or more containers for clinical, medical, or pharmaceutical use. The containers disclosed herein may include but are not limited to vials, such as glass vials, for holding medicament. By way of example, the containers may include glass vials that are adaptable for cc vials and that are configured to hold medicament, such as drug products in lyophilized form or liquid form. The containers may have standard capacities and dimensions as specified by ISO 8362-1. The systems disclosed herein may comprise a carton and an insert. The carton and/or the insert may comprise features configured to protect the containers packaged within the system from physical damage or breakage in all three dimensions (e.g., protect the containers from impact in the x, y, and z axes). The carton and/or the insert may be shipped in a storage configuration and may be folded into an assembled configuration from a storage configuration during assembly. Accordingly, many cartons and inserts may be stacked on top of each other in their storage configurations, thereby decreasing their profile and storage footprint while increasing efficiency and cost in shipping the systems disclosed herein and storing the systems in warehouses. During assembly, the insert may also be placed inside the carton to form the systems disclosed. The carton and the insert may be manufactured using sustainable materials that can be completely recyclable, which is beneficial to the environment compared to conventional packaging systems made of plastic trays or foam inserts. Moreover, inserts in the systems disclosed herein may be interchangeable. Accordingly, the carton may be configured to accommodate an insert for holding up to six containers, by way of example, and an insert for holding up to twelve containers, by way of example. Therefore, the systems disclosed herein may be modular in that they may be able to accommodate various numbers of containers depending on the insert placed inside the carton. These and other advantages and benefits will be apparent to one of ordinary skill in the art reviewing the present disclosure.

[0092] As used herein, the term “carton” may refer to the carton of the system for packaging one or more containers. The term “container” may refer to any component that may be housed, disposed, and/or accommodated within a packaging, such as vials, syringes, pre-filled syringes, or the like. The term “drug,” as used herein, can be used interchangeably with other similar terms and can be used to refer to any type of medicament or therapeutic material including

traditional and non-traditional pharmaceuticals, nutraceuticals, supplements, biologics, biologically active agents and compositions, large molecules, biosimilars, bioequivalents, therapeutic antibodies, polypeptides, proteins, small molecules and generics. Non-therapeutic injectable materials are also encompassed. The drug may be in liquid form, a lyophilized form, or in a reconstituted from lyophilized form.

[0093] As discussed above, conventional systems for packaging one or more containers do not provide the flexibility in use in that they are not suitable for accommodating multiple containers of different sizes to be packaged together into one packaging system. This limitation can have a direct consequence on the number of containers that can be packaged into each packaging system. This limitation can also have a direct consequence on the number of packaging systems having to be used to transport a given number of containers and, thus, the cost of transporting the containers from one site to another. Furthermore, conventional packaging systems that attempt to protect the containers packaged therein from damage generally include foam inserts or plastic trays. The foam inserts and plastic trays prevent containers from contacting each other and, thus, provide protection from lateral impact. However, materials such as foam or plastic are not sustainable and harmful to the environment. Moreover, conventional packaging systems do not protect the containers packaged therein from top load or bottom load. For example, when conventional packaging systems are stacked on top of each other or placed on hard surfaces, there is no way for the conventional packaging systems to protect the containers therein from top load, bottom load, and vertical impact.

[0094] Therefore, there is a need for an improved system for packaging one or more containers, such as glass vials, that protects container(s) from vertical and lateral impact. There is also a need for an improved system for packaging one or more containers that is not only manufactured using sustainable, environment-friendly material, but also modular such that one packaging system can be configured to accommodate and transport multiple container sizes and multiple container counts.

[0095] Referring now to Figs. 1A-1D, an exemplary system 200 for packaging a container 208 is shown in accordance with various embodiments of the present disclosure. As will be discussed in more detail below, system 200 may comprise a carton 202 (also interchangeably referred to as a “carton”) and an insert 204 configured to be placed inside the carton 202. Insert 204 may comprise a hole 206 configured to accommodate a container 208 therein. By way of example, the hole 206 may be die cut in the insert 204 and the hole 206 may be die cut at a center point of the insert 204 such that the hole 206 is spaced away from the sides of the insert 204. By positioning the hole 206 away from all sides of the insert 204, the insert 204 of the system 200 may prevent the container 208 therein from contacting the sides of the system 200 during packaging or transport. Additionally, the hole 206 may be sized to accommodate multiple sizes of containers 208. For example, the hole 206 may be sized to accommodate one or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials.

[0096] In some embodiments, the carton 202 and the insert 204 may be manufactured and formed separately. The carton 202 and the insert 204 may be manufactured using sustainable materials that can be recycled completely. By way of example, the carton 202 and the insert 204 may be made from paperboard material or other Forest Stewardship Council (FSC)-certified material. In other embodiments, the carton 202 and the insert 204 may be manufactured and formed integrally. In some embodiments, as shown in Figs. 1A-1C, the carton 202 may comprise a plurality of sidewalls 213, a top wall 214, a bottom wall 216 (shown in Fig. 2E), and a back flap 215 extending from the top wall 214. The carton 202 may further comprise a first flap 207a, extending from a first sidewall 213a of a plurality of sidewalls 213, and a second flap 207b, extending from a second sidewall 213b opposite the first sidewall 213a and facing the first sidewall 213a. The first flap 207a and the second flap 207b may define a first set of cavities 209, as illustrated in Figs. 1B and 1C. In some embodiments, the first set of cavities 209 may comprise substantially rectangular air cavities. In other embodiments, the first set of cavities 209 may comprise triangular, circular, or elliptical air cavities. The first set of cavities 209 may be configured to protect the container 208 from top load impact. By way of example, when the flaps 207a, 207b are folded down, as shown in Fig. 1C, the first set of cavities 209 may provide air cushioning such that, when there is a top load placed on top of the carton 202, the space created within the first set of cavities 209 may be configured to cushion the container 208 and protect the container 208 from any vertical impact or damage. In some embodiments, the sidewalls 213, the top wall 214, the bottom wall 216, the back flap 215, the first flap 207a, and the second flap 207b may be formed integrally.

[0097] Figs. 2A-2E illustrate the carton 202 and the insert 204 of the system 200 of Figs. 1A-1D in more detail. In particular, Figs. 2A-2E illustrate how the carton 202 is folded from a storage configuration to an assembled configuration prior to placing the insert 204 inside the carton 202. As discussed above with reference to Figs. 1A-1D, the carton 202 may comprise a plurality of sidewalls 213, a top wall 214, a bottom wall 216 (shown in Fig. 2E), and a back flap 215 extending from the top wall 214. Prior to assembly, the carton 202 may be in a storage configuration. For example, when the carton 202 is first shipped or stored in a particular warehouse and before the carton 202 is assembled to hold one or more containers therein, the carton 202 may be in a storage configuration. Accordingly, because the carton 202 can be shipped or stored in a storage configuration, multiple cartons 202 can be easily stacked on top of each other for efficient shipment and warehousing.

[0098] During assembly, the carton 202 may be folded from a storage configuration to an assembled configuration. For example, the carton 202 may comprise one or more perforations, scores, or cuts along the edges of the sidewalls 213, the top wall 214, the bottom wall 216, a first flap 207a, a second flap 207b, and/or back flap 215 so that the carton 202 can be easily folded from a storage configuration to an assembled configuration. Fig. 2A illustrates the carton 202 in a storage configuration before the carton 202 is folded to an assembled configuration.

Figs. 2B-2E illustrates the carton 202 when the carton 202 is folded from a storage configuration to an assembled configuration. As shown in Figs. 2B-2E, for example, when in the assembled configuration, the carton 202 may comprise a rectangular carton comprising four sidewalls 213, top wall 214, and bottom wall 216. In the assembled configuration, at least the sidewalls 213 and the bottom wall 216 of the carton 202 may define a cavity 217 inside the carton 202. The cavity 217 may be configured to accommodate the insert 204 during assembly. As will be discussed in more detail below, the insert 204 may also be folded from a storage configuration to an assembled configuration prior to placing the insert 204 inside the cavity 217 of the carton 202.

[0099] As discussed above, the carton 202 may further comprise a first flap 207a, extending from a first sidewall 213a of a plurality of sidewalls 213, and a second flap 207b, extending from a second sidewall 213b opposite the first sidewall 213a and facing the first sidewall 213a. During assembly, the first flap 207a and the second flap 207b may be folded down (as shown in Fig. 2B). When folded down, the first and second flaps 207a, 207b may define a first set of cavities 209 that may be configured to protect a container therein, such as container 208, from top load impact. By way of example, when the first and second flaps 207a, 207b are folded down, as shown in Fig. 2B, the first set of cavities 209 may provide air cushioning such that, when there is a top load placed on the top wall 214 of the carton 202, the space created within the first set of cavities 209 may be configured to cushion and protect any container therein from any vertical impact or damage. Additionally, the back flap 215 extending from the top wall 214 of the carton 202 may be folded (as shown in Fig. 2B) such that the back flap 215 tucks into a front sidewall of the plurality of sidewalls 213 to close and secure the system 200 (as shown in Fig. 1D). In some embodiments, the bottom wall 216 of the carton 202 may be pre-configured to allow for automatic assembly. For example, as shown in Fig. 2E, the bottom wall 216 of the carton 202 may be pre-configured such that when the carton 202 is folded from a storage configuration to an assembled configuration, the bottom wall 216 may automatically straighten out into a flat surface to define the bottom surface of the carton 202.

[0100] Figs. 3A-3D illustrate the insert 204 configured to be placed inside the carton 202 of Figs. 1A-1D and 2A-2E. As illustrated in Fig. 3A, prior to assembling the insert 204 and placing the insert 204 inside the carton 202, the insert 204 may be in a storage configuration. For example, when the insert 204 is first shipped or stored in a particular warehouse, the insert 204 may be in a storage configuration. Accordingly, because the insert 204 can be shipped or stored in a storage configuration, multiple inserts 204 can be easily stacked on top of each other for efficient shipment and warehousing. During assembly, similar to the carton 202, the insert 204 can be folded from a storage configuration to an assembled configuration. Figs. 3B-3D illustrate the insert 204 that is folded from a storage configuration to an assembled configuration.

[0101] As shown in Figs. 3B-3D, once the insert 204 is folded to an assembled configuration, the insert may comprise at least two opposite sidewalls 219, a first layer 211, a second layer

212, and a third layer 218. As shown in at least Figs. 3B and 3D, the two sidewalls 219 may connect the first layer 211, the second layer 212, and the third layer 218. The first layer 211 may define the top surface of the insert 204 and may comprise a die cut hole 206 configured to accommodate at least a portion of a container 208, such as a glass vial. Accordingly, the hole 206 may be configured to laterally stabilize the container 208 therein. As discussed above, the hole 206 may be sized to accommodate one or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. Moreover, the hole 206 is spaced a distance away from the edges of the first layer 211 such that, when the container 208 is placed within the hole 206 of the insert 204, the container 208 will not contact any sides of the insert 204 and any sidewalls 213 of the carton 202. The second layer 212 may be positioned a first distance below the first layer 211 and may be configured to support a bottom surface of the container 208. The third layer 218 may define the bottom surface of the insert 204. As seen in Figs. 3B and 3D, the second layer 212 is also positioned a second distance above the third layer 218 such that, when the container 208 is placed within the insert 204, the bottom surface of the container 208 is raised the second distance from the bottom surface of the insert 204 and the bottom wall 216 of the carton 202. Accordingly, because the bottom surface of the container 208 is raised from the bottom wall 216 of the carton by the insert 204 and supported by the second layer 212, the system 200 may be configured to protect the container 208 from bottom load impact. In some embodiments, the first distance and the second distance may be the same. That is, in some embodiments, the first layer 211 and the second layer 212 may be distanced the same distance away from the second layer 212 and the third layer 218, respectively. In other embodiments, the first distance and the second distance may be different. For example, the second layer 212 may be distanced farther away from the third layer 217 than from the first layer 211.

[0102] In some embodiments, as shown in Figs. 3A-3D, the first layer 211 of the insert 204 may comprise a first set of flaps 210a extending from opposite sides of the first layer 211, and the second layer 212 may comprise a second set of flaps 210b extending from opposite sides the second layer 212. The first set of flaps 210a and the second set of flaps 210b may be configured to fold down (as shown in Figs. 3B and 3C) to define two additional sidewalls of the insert 204. When folded down, the first set of flaps 210a and the second set of flaps 210b may be configured to provide additional rigidity to the insert 204 such that the insert 204 can maintain its rectangular shape when folded to its assembled configuration. Additionally, when folded down, an inner surface of the first set of flaps 210a of the first layer 211 may be configured to abut an outer surface of the second set of flaps 210b of the second layer 212. In some embodiments, the sidewalls 219, the first layer 211, the second layer 212, the third layer 218, the first set of flaps 210a, and the second set of flaps 210b may be formed integrally using sustainable materials that can be recycled completely, such as paperboard material or other FSC-certified material. Similar to the carton 202, the insert 204 may comprise one or more perforations, scores, or cuts along the edges of the first layer 211, the second layer 212, the

third layer 218, the first set of flaps 210a, and the second set of flaps 210b so that the insert 204 can be easily folded from a storage configuration to an assembled configuration.

[0103] As discussed above, the insert 204 may be configured to be placed inside the carton 202 during assembly (as shown in Figs. 1A and 1B). After the carton 202 is folded to its assembled configuration and the insert 204 is also folded to its assembled configuration, the insert 204 may be configured to be placed inside the cavity 217 (shown in Fig. 2D) of the carton 202. When placed inside the cavity 217 of the carton 202, an inner surface of the first set of flaps 210a of the first layer 211 may be configured to abut an outer surface of the second set of flaps 210b of the second layer 212, and an outer surface of the first set of flaps 210a of the first layer 211 may be configured to abut an inner surface of two opposite sidewalls 213 of the carton 204. Referring back to Figs. 1A and 1B, once the insert 204 is placed inside the carton 202, and the container 208 is placed within the hole 206 of the insert 204, the first flap 207a and the second flap 207b may be folded down, and the first set of cavities 209 may be configured to protect the container 208 from top load impact. Additionally, the back flap 215 extending from the top wall 214 of the carton 202 may be tucked into a front sidewall of the plurality of sidewalls 213 to close and secure the system 200 (as shown in Fig. 1D). Accordingly, when fully assembled and packaged, the hole 206 of the insert 204 may be configured to secure the container 208 in an upright position and protect the container 208 from later impact, the first set of cavities 209 defined by the first flap 207a and the second flap 207b may protect the container 208 from top load impact, and the second layer 212 that is raised from the bottom surface of the insert 204 and the bottom wall 216 of the carton 202 may protect the container 208 from bottom load impact.

[0104] In some embodiments, the hole 206 in the insert 204 may be configured and sized to accommodate a neck of the container 208, such as a neck of a glass vial. Additionally, or alternatively, the hole 206 may be configured and sized to accommodate a body of the container 208, such as a body of a glass vial. In some embodiments, the size of the container 208 may be indicated by ISO 8362-1. For example, if the container 208 is a glass vial, ISO 8362-1 may indicate the standard capacity of the container 208, the standard height of the container 208, and/or the standard outer diameter of the body of the container 208. Accordingly, in some embodiments, the hole 206 may be sized to accommodate the container 208 based on the standard dimensions indicated by ISO 8362-1.

[0105] Figs. 1A-1D and 2A-2E illustrate a rectangular carton 202 comprising four sidewalls 213, a top wall 214, and a bottom wall 216. Figs. 3A-3D also illustrate a rectangular insert 204 comprising four sidewalls and configured to fit inside the cavity 217 of the carton 202. However, the carton 202 and/or the insert 204 are not limited to rectangular shapes. For example, the carton 202 may comprise a cylindrical shape or any other geometric shapes, and the insert 204 may be shaped to fit inside a cavity in the carton 202.

[0106] Referring now to Figs. 5A-5F, an exemplary system 300 for packaging a plurality of containers 208 is shown in accordance with various embodiments of the present disclosure. System 300 may comprise a carton 302 and an insert 304 configured to be placed inside the carton 302. Insert 304 may comprise a plurality of holes 306 configured to accommodate a plurality of containers 308 therein. In Fig. 5A, the insert 304 comprises six holes 306, each configured to accommodate a respective container 308. However, the insert 304 may comprise any number of holes 306, such as two, three, four, five, seven, eight, nine, ten, twelve, fifteen, twenty, twenty-five, or thirty holes. Holes 306 may be die cut in the insert 304 and the holes 306 may be die cut such that each hole is spaced equidistantly from each other. Additionally, the holes 306 may be die cut such that the holes 306 are spaced away from the sidewalls of the insert 304 and the sidewalls of the carton 302. By spacing the holes 306 away from each other and also away from all sides of the insert 204 and the carton 302, the system 300 may prevent the containers 308 therein from contacting the sides of the system 300 during packaging or transport and, thus, protect the containers 308 from lateral impact. The holes 306 may also be configured to laterally stabilize each individual container 308 packaged therein. Additionally, the holes 306 may be sized to accommodate multiple sizes of containers 308. For example, the holes 306 may be sized to accommodate one or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. In some embodiments, the holes 306 may all be identical in size and shape. In other embodiments, some of the holes 306 may vary in size such that the insert 304 can accommodate containers 308 of various sizes.

[0107] In some embodiments, the carton 302 and the insert 304 may be manufactured and formed separately. The carton 302 and the insert 304 may be manufactured using sustainable materials that can be recycled completely, such as paperboard material or other FSC-certified material. In other embodiments, the carton 302 and the insert 304 may be manufactured and formed integrally. In some embodiments, as shown in Fig. 6B, the carton 302 may comprise a plurality of sidewalls 313, a top wall 314, a bottom wall 316 (similar to bottom wall 216 of Fig. 2E), and a back flap 315 extending from the top wall 314. Referring back to Figs. 5A-5E, the carton 302 may further comprise a first flap 307a, extending from a first sidewall 313a of a plurality of sidewalls 313, and a second flap 307b, extending from a second sidewall 313b opposite the first sidewall 313a and facing the first sidewall 313a. The first flap 307a and the second flap 307b may define a first set of cavities 309, as illustrated in Figs. 5D and 5E. In some embodiments, the first set of cavities 309 may comprise rectangular air cavities. In other embodiments, the first set of cavities 309 may comprise triangular, circular, or elliptical air cavities. The first set of cavities 309 may be configured to protect the containers 308 therein from top load impact. By way of example, when the flaps 307a, 307b are folded down, as shown in Fig. 5E, the first set of cavities 309 may provide air cushioning such that, when there is a top load placed on top of the carton 302, the space created within the first set of cavities 309 may be configured to cushion the containers 308 therein and protect the container 308 from any

vertical impact or damage. In some embodiments, the sidewalls 313, the top wall 314, the bottom wall 316, the back flap 315, the first flap 307a, and the second flap 307b may be formed integrally.

[0108] Figs. 6A-6C, 7A-7D, and 8 illustrate the carton 302 and the insert 304 of the system 300 of Figs. 5A-5F in more detail. In particular, Figs. 6A-6C illustrate how the carton 302 is folded from a storage configuration to an assembled configuration prior to placing the insert 304 inside the carton 302. As seen in Figs. 6A-6C, the carton 302 may comprise a plurality of sidewalls 313, a top wall 314, a bottom wall 316, and a back flap 316 extending from the top wall 314. Prior to assembly, the carton 302 may be in a storage configuration, as shown in Fig. 6A. For example, when the carton 302 is first shipped or stored in a particular warehouse and before the carton 302 is assembled to hold one or more containers 308 therein, the carton 302 may be in a storage configuration. Accordingly, because the carton 302 can be shipped or stored in a storage configuration, multiple cartons 302 can be easily stacked on top of each other for efficient shipment and warehousing.

[0109] During assembly, the carton 302 may be folded from a storage configuration to an assembled configuration. For example, the carton 302 may comprise one or more perforations, scores, or cuts along the edges of the sidewalls 313, the top wall 314, the bottom wall 316, a first flap 307a, a second flap 307b, and/or back flap 315 so that the carton 302 can be easily folded from a storage configuration to an assembled configuration. Fig. 6A illustrates the carton 302 in a storage configuration before the carton 302 is folded to an assembled configuration. Fig. 6B illustrates the carton 302 when the carton 302 is folded from a storage configuration to an assembled configuration. As shown in Fig. 6B, when in the assembled configuration, the carton 302 may comprise a rectangular carton comprising four sidewalls 313, top wall 314, and bottom wall 316. In the assembled configuration, at least the sidewalls 313 and the bottom wall 316 of the carton 302 may define a cavity 317 inside the carton 302. The cavity 317 may be configured to accommodate the insert 304 during assembly. As will be discussed in more detail below, the insert 304 may also be folded from a storage configuration to an assembled configuration prior to placing the insert 304 inside the cavity 317 of the carton 302.

[0110] As shown in Figs. 5A-5F and 6A-6C, the carton 302 may further comprise a first flap 307a, extending from a first sidewall 313a of a plurality of sidewalls 313, and a second flap 307b, extending from a second sidewall 313b. During assembly, the first flap 307a and the second flap 307b may be folded down (as shown in Figs. 5D, 5E, and 6B). When folded down, the first and second flaps 307a, 307b may define a first set of cavities 309 (shown in Figs. 5D and 5E) that may be configured to protect the containers 308 therein from top load impact. For example, when the first and second flaps 307a, 307b are folded down, as shown in Fig. 5E, the first set of cavities 309 may provide air cushioning such that, when there is a top load placed on the top wall 314 of the carton 302, the space created within the first set of cavities 309 may be configured to cushion and protect the containers 308 therein from any vertical impact or

damage. Additionally, the back flap 315 (shown in Figs. 5C and 6B) extending from the top wall 314 of the carton 302 may be folded down such that the back flap 315 tucks into a front sidewall of the plurality of sidewalls 313 to close and secure the system 300 (as shown in Figs. 5F and 6C). In some embodiments, the bottom wall 316 of the carton 302 may be pre-configured to allow for automatic assembly. For example, similar to the bottom wall 216 shown in Fig. 3E, the bottom wall 316 of the carton 302 may be pre-configured such that when the carton 302 is folded from a storage configuration to an assembled configuration, the bottom wall 316 may automatically straighten out into a flat surface to define the bottom surface of the carton 302.

[0111] Figs. 7A-7D and 8 illustrate the insert 304 configured to be placed inside the carton 302 of Figs. 5A-5F and 6A-6C. As illustrated in Fig. 7A, prior to assembling the insert 304 and placing the insert 304 inside the carton 302, the insert 304 may be in a storage configuration. For example, similar to the carton 302, when the insert 304 is first shipped or stored in a particular warehouse, the insert 304 may be in a storage configuration. Accordingly, because the insert 304 can be shipped or stored in a storage configuration, multiple inserts 304 can be easily stacked on top of each other for efficient shipment and warehousing. During assembly, similar to the carton 302, the insert 304 can be folded from a storage configuration to an assembled configuration. Figs. 7B-7D and 8 illustrate the insert 304 that is folded from a storage configuration to an assembled configuration.

[0112] As shown in Figs. 7B-7D and 8, once the insert 304 is folded to an assembled configuration, the insert may comprise at least two opposite sidewalls 319, a first layer 311, a second layer 312, a third layer 318, and a fourth layer 320. As shown in at least Figs. 7B, 7C, and 8, the two sidewalls 319 may connect the first layer 311, the second layer 312, the third layer 318, and the fourth layer 320. The first layer 311 may define the top surface of the insert 304 and may comprise die cut holes 306 configured to accommodate at least a portion of a plurality of container 308, such as glass vials. The holes 306 may be sized to accommodate one or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. Moreover, the holes 306 may be spaced away from each other and away from the edges of the first layer 311 such that, when the containers 308 are placed within respective holes 306 of the insert 304, the containers 308 will not contact each other, nor any sides of the insert 304, nor any sidewalls 313 of the carton 302. The second layer 312 may be positioned a first distance below the first layer 311 and may also comprise die cut holes 306 configured to accommodate at least a portion of the plurality of containers 308, such as glass vials. The holes 306 in the second layer 312 may be vertically aligned with the holes 306 in the first layer 311 such that when the containers 308 are placed within respective holes 306, each container 308 will fit through the respective hole 306 in the first layer 311 as well as the respective hole 306 in the second layer 312. The third layer 318 may be positioned a second distance below the second layer 312 and may be configured to support a bottom surface of each container 308. The fourth layer 320 may

be positioned a third distance below the third layer 318 and may define the bottom surface of the insert 304.

[0113] As seen in Fig. 8, the third layer 318 is also positioned a third distance above the fourth layer 320 such that, when the containers 308 are placed within the insert 304, the bottom surfaces of the containers 308 are raised the third distance from the bottom surface of the insert 304 and the bottom wall 316 of the carton 302. Accordingly, because the bottom surfaces of the containers 308 are raised from the bottom wall 316 of the carton 302 by the insert 304 and supported by the third layer 318, the system 300 may be configured to protect the containers 308 from bottom load impact. In some embodiments, the first distance, the second distance, and the third distance may be the same such that the first layer 311, the second layer 312, the third layer 318, and the fourth layer 320 are all spaced equidistant from each other. In other embodiments, the first distance may be different from at least one of the second distance or the third distance. For example, the distance between the third layer 318 and the fourth layer 320 may be greater than the distance between the third layer 318 and the second layer 312.

[0114] In some embodiments, the insert 304 may further comprise a vertical rib support 321 extending between the third layer 318 and the fourth layer 320, as shown in Fig. 8. The vertical rib support 321 may be formed integrally with the insert 304. The vertical rib support 321 may be configured to maintain the third distance between the third layer 318 and the fourth layer 320 such that the containers 308 are consistently raised from the bottom wall 316 of the carton 302 and supported by the third layer 318 of the insert 304. Accordingly, the vertical rib support 321 may ensure that the containers 308 are protected from bottom load impact. Additionally, the vertical rib support 321 may be configured to help the third layer 318 in supporting the weight of the containers 308.

[0115] Referring back to Figs. 7B and 7C, the first layer 311 of the insert 304 may comprise a first set of flaps 310a extending from opposite sides of the first layer 311, and the second layer 312 may comprise a second set of flaps 310b extending from opposite sides the second layer 312. The first set of flaps 310a and the second set of flaps 310b may be configured to fold down (as shown in Figs. 7C and 7D) to define two additional sidewalls of the insert 304. When folded down, the first set of flaps 310a and the second set of flaps 310b may be configured to provide additional rigidity to the insert 304 such that the insert 304 can maintain its rectangular shape when folded to its assembled configuration. Additionally, when folded down, an inner surface of the first set of flaps 310a of the first layer 311 may be configured to abut an outer surface of the second set of flaps 310b of the second layer 312. In some embodiments, the sidewalls 319, the first layer 311, the second layer 312, the third layer 318, the fourth layer 320, the first set of flaps 310a, and the second set of flaps 310b may be formed integrally using sustainable materials that can be recycled completely, such as paperboard material or other FSC-certified material.

[0116] In some embodiments, the insert 304 may be configured to be placed inside the carton 302 during assembly (as shown in Figs. 5C-5E). After the carton 302 is folded to its assembled

configuration and the insert 304 is also folded to its assembled configuration, the insert 304 may be configured to be placed inside the cavity 317 (shown in Fig. 6B) of the carton 302. When placed inside the cavity 317 of the carton 302, an inner surface of the first set of flaps 310a of the first layer 311 may be configured to abut an outer surface of the second set of flaps 310b of the second layer 312, and an outer surface of the first set of flaps 310a of the first layer 311 may be configured to abut an inner surface of two opposite sidewalls 313 of the carton 304. Once the insert 304 is placed inside the carton 302, and the containers 308 are placed within the respective holes 306 of the insert 304, the first flap 307a and the second flap 307b may be folded down (as shown in Figs. 5D and 5E), and the first set of cavities 309 may be configured to protect the containers 308 therein from top load impact. Additionally, the back flap 315 extending from the top wall 314 of the carton 302 may be tucked into a front sidewall of the plurality of sidewalls 313 to close and secure the system 300 (as shown in Fig. 5F). Accordingly, when fully assembled and packaged, the holes 306 in the first layer 311 and the second layer 312 of the insert 304 may be configured to secure the containers 308 in an upright position and protect the containers 308 from later impact, the first set of cavities 309 defined by the first flap 307a and the second flap 307b may protect the containers 308 from top load impact, and the third layer 318 that is raised from the bottom surface of the insert 304 and the bottom wall 316 of the carton 302 may protect the containers 308 from bottom load impact. Similar to the carton 302, the insert 304 may comprise one or more perforations, scores, or cuts along the edges of the first layer 311, the second layer 312, the third layer 318, the fourth layer 320, the first set of flaps 310a, and the second set of flaps 310b so that the insert 304 can be easily folded from a storage configuration to an assembled configuration.

[0117] In some embodiments, the holes 306 in the insert 304 may be configured and sized to accommodate a neck of each respective container 308, such as a neck of a glass vial. Additionally, or alternatively, the holes 306 may be configured and sized to accommodate a body of each respective container 308, such as a body of a glass vial. By way of example, Fig. 8 illustrates a hole 306 in the first layer 311 of the insert 304 accommodating a first portion of the body of the container 308, and a hole 306 in the second layer 312 of the insert 304 accommodating a second portion of the body of the container 308 below the first portion. However, in other embodiments, the holes 306 in the first layer 311 of the insert 304 may be configured to accommodate the necks of the containers 308, while the holes 306 in the second layer 312 of the insert 304 may be configured to accommodate the bodies of the containers 308. The holes 306 in the first layer 311 and the second layer 312 of the insert 304 may be configured to secure the containers 308 in their upright positions and protect the containers 308 from later impact or shifting. Although system 300 of Figs. 5A-5F, 6A-6C, 7A-7D, and 8 comprise six holes 306 in each of the first layer 311 and the second layer 312 of the insert 304 such that the insert 304 can accommodate up to six containers 308 therein, it is not limited to six holes 306. For example, as will be discussed in more detail below, inserts may comprise any

number of die cut holes, such as two, three, four, five, seven, eight, nine, ten, twelve, fifteen, twenty, twenty-five, or thirty holes, so that systems can accommodate various numbers of containers 308 therein.

[0118] In some embodiments, the size of the containers 308 may be indicated by ISO 8362-1. For example, if the containers 308 are glass vials, ISO 8362-1 may indicate the standard capacities of the containers 308, the standard heights of the containers 308, and/or the standard outer diameters of the bodies of the containers 308. Accordingly, in some embodiments, the holes 306 may be sized to accommodate the containers 308 based on the standard dimensions indicated by ISO 8362-1. Additionally, or alternatively, the containers 308 packaged inside the system 300 may comprise glass vials, such as ISO 2R vials and 4 cc vials, ISO 6R vials, and/or ISO 10R and 10 cc vials. In some embodiments, the holes 306 in each insert 304 may be sized and configured to accommodate only one size of containers 308, such as one of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. In other embodiments, the holes 306 in each insert 304 may be sized and configured to be able to accommodate multiple sizes of containers 308, such as two or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. In yet another embodiment, the insert 304 may be made separately from the carton 302 and the insert may be interchangeably placed inside the carton 302. Accordingly, one insert 304 with holes 306 sized to accommodate ISO 6R vials can be placed inside the carton 302 and can also be replaced with a different insert 304 with holes 306 sized to accommodate ISO 10R vials. Therefore, one carton 302 can be interchangeably used to package multiple sizes of containers 308, depending on the insert 304 placed therein.

[0119] Figs. 5A-5F and 6A-6C illustrate a rectangular carton 302 comprising four sidewalls 313, a top wall 314, and a bottom wall 316. Figs. 7A-7D also illustrate a rectangular insert 304 comprising four sidewalls and configured to fit inside the cavity 317 of the carton 302. However, the carton 302 and/or the insert 304 are not limited to rectangular shapes. For example, the carton 302 may comprise a cylindrical shape or any other geometric shapes, and the insert 304 may be shaped to fit inside a cavity in the carton 302.

[0120] Fig. 4A illustrates a plan view of a die cut of the carton 302, and Fig. 4B illustrates a plan view of a die cut of the insert 304, in accordance with various embodiments of the present disclosure. The carton 302 and the insert 304 may be made from a unitary material. For example, the carton 302 and the insert 304 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the carton 302 and the insert 304 may be made of a combination of natural and synthetic materials. In other embodiments, the carton 302 and/or the insert 304 may be made from several pieces glued or otherwise secured together.

[0121] As seen in Fig. 4A, the carton 302 includes a plurality of fold lines 330 diving the carton 302 into a plurality of walls and flaps. Fig. 4A illustrates the carton 302 in its storage configuration where the carton 302 is substantially flat. The carton 302 can be folded into an assembled configuration. For example, when each of the plurality of fold lines 330 is folded, the

carton 302 can be folded into the assembled configuration so as to form a box-shaped carton, as shown in Figs. 5B-5F, 6B, and 6C.

[0122] As shown in Fig. 4A, the flaps 316a-d can be secured together to form the bottom wall 316 of the carton 302. The carton 302 can be folded along each of the fold lines 330, as shown in Fig. 4A, and the flap 326 can be secured to the inner surface of the second sidewall 313b by glue, adhesive, or any other method of securing two surfaces together to form a box-shaped carton 302. Moreover, the flap 325a can be secured to the inner surface of flap 307a, and the flap 325b can be secured to the inner surface of flap 307b by glue, adhesive, or any other method of securing two surfaces together to form the first and second flaps 307a, 307b that define the first set of cavities 309, as shown in Figs. 5D and 5E, for example.

[0123] Similarly, the insert 304 includes a plurality of fold lines 331 diving the insert 304 into a plurality of walls and flaps. Fig. 4B illustrates the insert 304 in its storage configuration where the insert 304 is substantially flat. The insert 304 can be folded into an assembled configuration. For example, when each of the plurality of fold lines 331 is folded, the insert 304 can be folded into the assembled configuration so as to form the assembled insert 304, as shown in Fig. 8. The insert 304 can be folded along each of the fold lines 331, the flap 327 can be secured to the inner surface of one of the sidewalls 319, and the flap 328 can be secured to the inner surface of the other of the sidewalls 319 (as shown in Fig. 8) to form the assembled insert 304. The flaps 327, 328 can be secured to the inner surfaces of the opposite sidewalls 319 by glue, adhesive, or other methods of securing two surfaces together to form the assembled insert 304.

[0124] Referring now to Figs. 10A-10D and 11, another exemplary system 400 for packaging a plurality of containers 408 is shown, in accordance with various embodiments of the present disclosure. Similar to the system 300 discussed above, system 400 may comprise a carton 402 and an insert 404 configured to be placed inside the carton 402. It is understood that the components of system 400 are similar in detail to the components of system 300 discussed above. For the sake of brevity, the components of system 400 will not be discussed in substantial detail.

[0125] As shown in Figs. 10A and 10B, insert 404 may comprise a plurality of holes 406 configured to accommodate a plurality of containers 408 therein. The insert 404 may comprise twelve holes 406, each configured to accommodate a respective container 408. In other embodiments, the insert 404 may comprise any number of holes 406, such as fifteen, sixteen, twenty, twenty-five, or thirty holes. Similar to holes 306 of system 300, holes 406 of system 400 are die cut and spaced away from each other and away from the sidewalls of the insert 404 and the sidewalls of the carton 402 to protect the containers 308 therein from lateral impact. The holes 406 may also be configured to laterally stabilize each individual container 408 packaged therein. Additionally, the holes 406 may be sized to accommodate multiple sizes of containers 408. For example, the holes 406 may be sized to accommodate one or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials.

[0126] In some embodiments, the carton 402 and the insert 404 may be manufactured using sustainable materials that can be recycled completely, such as paperboard material or other FSC-certified material. As shown in Figs. 10A-10D, the carton 402 may comprise a rectangular carton having a plurality of sidewalls 413, a top wall 414, a bottom wall 416 (similar to bottom wall 216 of system 200 and bottom wall 316 of system 300), and a back flap 415 extending from the top wall 414. The carton 402 may further comprise a first flap 407a, extending from a first sidewall 413a of a plurality of sidewalls 414, and a second flap 407b, extending from a second sidewall 413b opposite the first sidewall 413a and facing the first sidewall 413a. The first flap 407a and the second flap 407b may define a first set of cavities 409. In some embodiments, the first set of cavities 409 may comprise rectangular air cavities, and, when folded down (as shown in Fig. 10C), the first set of cavities 409 may be configured to protect the containers 408 therein from top load impact. The back flap 415 may be folded down as well such that the back flap 415 tucks into a front sidewall of the plurality of sidewalls 413 to close and secure the system 400 (as shown in Fig. 10D). In some embodiments, the sidewalls 413, the top wall 414, the bottom wall 416, the back flap 415, the first flap 407a, and the second flap 407b may be formed integrally. In some embodiments, similar to the bottom wall 216 of system 200 and bottom wall 316 of system 300, the bottom wall 416 may be pre-configured such that when the carton 402 is folded from a storage configuration to an assembled configuration, the bottom wall 416 may automatically straighten out into a flat surface to define the bottom surface of the carton 402.

[0127] Although not shown in Figs. 10A-10D, system 400 may be folded from a storage configuration to an assembled configuration, similar to system 200 and system 300 discussed above. Accordingly, prior to assembly, both the carton 402 and the insert 404 of system 400 may be shipped and stored in a storage configuration. During assembly, the carton 402 and the insert 404 may be folded from a storage configuration to an assembled configuration. Figs. 10A-10D illustrate the system 400 when both the carton 402 and the insert 404 are folded to an assembled configuration. As shown in Fig. 10A, in the assembled configuration, the carton 402 may comprise a cavity 417 defined by at least the sidewalls 413 and the bottom wall 416. The cavity 417 may be configured to accommodate the insert 404, as shown in Fig. 10B.

[0128] Fig. 11 illustrates a side view of the insert 404 configured to be placed inside the carton 402. As discussed above, the insert 404 may be folded from a storage configuration to an assembled configuration during assembly. As shown in Fig. 11, once the insert 404 is folded to an assembled configuration, the insert may comprise at least two opposite sidewalls 419, a first layer 411, a second layer 412, a third layer 418, and a fourth layer 420. The two sidewalls 419 may connect the first layer 411, the second layer 412, the third layer 418, and the fourth layer 420. The first layer 411 may define the top surface of the insert 404 and may comprise die cut holes 406 configured to accommodate at least a portion of a plurality of container 408, such as glass vials. The second layer 412 may be positioned a first distance below the first layer 411 and may also comprise die cut holes 406 configured to accommodate at least a portion of the

plurality of containers 408, such as glass vials. The holes 406 in the second layer 412 may be vertically aligned with the holes 406 in the first layer 411 such that when the containers 408 are placed within respective holes 406, each container 408 will fit through the respective hole 406 in the first layer 411 as well as the respective hole 406 in the second layer 412. The third layer 418 may be positioned a second distance below the second layer 412 and may be configured to support a bottom surface of each container 408. The fourth layer 420 may be positioned a third distance below the third layer 418 and may define the bottom surface of the insert 404. The third layer 318 may be positioned a third distance above the fourth layer 420 to protect the containers 408 therein from bottom load impact. In some embodiments, the first distance, the second distance, and the third distance may be the same such that the first layer 411, the second layer 412, the third layer 418, and the fourth layer 420 are all spaced equidistant from each other. In other embodiments, the first distance may be different from at least one of the second distance or the third distance. For example, the distance between the third layer 418 and the fourth layer 420 may be greater than the distance between the third layer 418 and the second layer 412.

[0129] As illustrated in Fig. 11, the insert 404 may further comprise a vertical rib support 421 extending between the third layer 418 and the fourth layer 420. The vertical rib support 421 may be formed integrally with the insert 404 and may be configured to maintain the third distance between the third layer 418 and the fourth layer 420. The vertical rib support 421 may ensure that the containers 408 are protected from bottom load impact and may be configured to help the third layer 418 in supporting the weight of the containers 408. In some embodiments, the first layer 411 of the insert 404 may comprise a first set of flaps 410a extending from opposite sides of the first layer 411, and the second layer 412 may comprise a second set of flaps 410b extending from opposite sides the second layer 412. The first set of flaps 410a and the second set of flaps 410b may be configured to fold down to define two additional sidewalls of the insert 404. When folded down, the first set of flaps 410a and the second set of flaps 410b may be configured to provide additional rigidity to the insert 404 such that the insert 404 can maintain its rectangular shape when folded to its assembled configuration. Additionally, when folded down, an inner surface of the first set of flaps 410a of the first layer 411 may be configured to abut an outer surface of the second set of flaps 410b of the second layer 412. In some embodiments, the sidewalls 419, the first layer 411, the second layer 412, the third layer 418, the fourth layer 420, the first set of flaps 410a, and the second set of flaps 410b may be formed integrally using sustainable materials that can be recycled completely, such as paperboard material or other FSC-certified material.

[0130] Fig. 11 illustrates a hole 406 in the first layer 411 of the insert 404 accommodating a first portion of the body of the container 408, and a hole 406 in the second layer 412 of the insert 404 accommodating a second portion of the body of the container 408 below the first portion. However, in other embodiments, the holes 406 in the first layer 411 of the insert 404 may be configured to accommodate the necks of the containers 408, while the holes 406 in the second

layer 412 of the insert 404 may be configured to accommodate the bodies of the containers 408. The holes 406 may be configured to secure the containers 408 in their upright positions and protect the containers 408 from later impact or shifting.

[0131] In some embodiments, the size of the containers 408 may be indicated by ISO 8362-1. For example, when the containers 408 are glass vials, ISO 8362-1 may indicate the standard capacities of the containers 408, the standard heights of the containers 408, and/or the standard outer diameters of the bodies of the containers 408. The containers 408 packaged inside the system 400 may comprise glass vials, such as ISO 2R vials and 4 cc vials, ISO 6R vials, and/or ISO 10R and 10 cc vials. In some embodiments, the holes 406 in each insert 404 may be sized and configured to accommodate only one size of containers 408, such as one of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. In other embodiments, the holes 406 may be sized and configured to be able to accommodate multiple sizes of containers 408, such as two or more of ISO 2R vials and 4 cc vials, ISO 6R vials, and ISO 10R and 10 cc vials. In yet another embodiment, the insert 404 may be made separately from the carton 402 and the insert may be interchangeably placed inside the carton 402. Accordingly, one insert 404 with holes 406 sized to accommodate ISO 6R vials can be placed inside the carton 402 and can also be replaced with a different insert 404 with holes 406 sized to accommodate ISO 10R vials. Therefore, one carton 402 can be interchangeably used to package multiple sizes of containers 408, depending on the insert 404 placed therein.

[0132] Fig. 9A illustrates a plan view of a die cut of the carton 402, and Fig. 9B illustrates a plan view of a die cut of the insert 404, in accordance with various embodiments of the present disclosure. The carton 402 and the insert 404 may be made from a unitary material. For example, the carton 402 and the insert 404 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the carton 402 and the insert 404 may be made of a combination of natural and synthetic materials. In other embodiments, the carton 402 and/or the insert 404 may be made from several pieces glued or otherwise secured together.

[0133] As seen in Fig. 9A, the carton 402 includes a plurality of fold lines 430 diving the carton 402 into a plurality of walls and flaps. Fig. 9A illustrates the carton 402 in its storage configuration where the carton 402 is substantially flat. The carton 402 can be folded into an assembled configuration. For example, when each of the plurality of fold lines 430 is folded, the carton 402 can be folded into the assembled configuration so as to form a box-shaped carton, as shown in Figs. 10A-10D.

[0134] As shown in Fig. 9A, the flaps 416a-d can be secured together to form the bottom wall 416 of the carton 402. The carton 402 can be folded along each of the fold lines 430, as shown in Fig. 9A, and the flap 426 can be secured to the inner surface of the second sidewall 413b by glue, adhesive, or any other method of securing two surfaces together to form a box-shaped carton 402. Moreover, the flap 425a can be secured to the inner surface of flap 407a, and the flap 425b can be secured to the inner surface of flap 407b by glue, adhesive, or any other

method of securing two surfaces together to form the first and second flaps 407a, 407b that define the first set of cavities 409, as shown in Fig. 10C, for example.

[0135] Similarly, the insert 404 includes a plurality of fold lines 431 diving the insert 404 into a plurality of walls and flaps. Fig. 9B illustrates the insert 404 in its storage configuration where the insert 404 is substantially flat. The insert 404 can be folded into an assembled configuration. For example, when each of the plurality of fold lines 431 is folded, the insert 404 can be folded into the assembled configuration so as to form the assembled insert 404, as shown in Fig. 11. The insert 404 can be folded along each of the fold lines 431, the flap 427 can be secured to the inner surface of one of the sidewalls 419, and the flap 428 can be secured to the inner surface of the other of the sidewalls 419 (as shown in Fig. 11) to form the assembled insert 404. The flaps 427, 428 can be secured to the inner surfaces of the opposite sidewalls 419 by glue, adhesive, or other methods of securing two surfaces together to form the assembled insert 404.

[0136] Fig. 12A is a plan view of a die cut of a carton 502 for another exemplary system for packaging a container, in accordance with various embodiments of the present disclosure. The carton 502 may be made from a unitary material. For example, the carton 502 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the carton 502 may be made of a combination of natural and synthetic materials. In other embodiments, the carton 502 can be made from several pieces glued or otherwise secured together. The carton 502 includes a plurality of fold lines 530, dividing the carton 502 into a plurality of walls and flaps. Fig. 12A illustrates the carton 502 in a storage configuration where the carton 502 is substantially or completely flat. The carton 502 is erectable or foldable from a storage configuration where the carton 502 is substantially flat (shown in Fig. 12A) to an assembled configuration (shown in Fig. 13A). For example, when each of the plurality of fold lines 530 is folded, the carton 502 is erectable into the assembled configuration so as to form a box-shaped carton, as shown in Fig. 13A.

[0137] Referring to Figs. 12A, 13A, and 13B, the carton 502 includes a bottom box 503 (shown in Fig. 13A) having a first bottom wall 516 (shown in Fig. 13B) made from several flaps 516a-d (shown in Fig. 12A), a first sidewall 513b, a second sidewall 513d, a first back wall 513a, and a first front wall 513c. The flaps 516a-d can be secured to each other via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons to form the first bottom wall 516 when the carton 502 is assembled. The first back wall 513a includes a flap 526 that can be glued, for example, to an inner surface of the second sidewall 513d to form the bottom box 503. In some embodiments, the first back wall 513a can be secured to the second sidewall 513d via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons. As a result, the first sidewall 513b, the second sidewall 513d, the first back wall 513a, the first front wall 513c, and the first bottom wall 516 are all secured together to form the bottom box 503.

[0138] Furthermore, the carton 502 includes a lid 514, hingedly connected or coupled to the first back wall 513a. In some embodiments, the lid 514 is an overlid that is movable between an open position and a closed position and includes a flap 515. When the carton 502 is assembled, the lid 514 can be moved from an open position where the internal cavity of the bottom box 503 is accessible to a closed position where the internal cavity of the bottom box 503 is not accessible. Additionally, the flap 515 of the lid 514 can be folded and tucked behind the first front wall 513c to secure the carton 502 in a closed position and prevent accidental opening of the carton 502.

[0139] Moreover, the carton 502 may include a first flap 507a and a second flap 507b extending from the first sidewall 513b and the second sidewall 513d, respectively, of the bottom box 503. As shown in Figs. 12A and 13A, the second sidewall 513d is positioned opposite the first sidewall 513b and faces the first sidewall 513b. In other words, the first sidewall 513b and the second sidewall 513d are opposing walls of the bottom box 503. The first flap 507a may include a tab 525a at an end thereof, and the second flap 507b may also include a tab 525b at an end thereof. When the carton 502 is folded along the plurality of fold lines 530 into the assembled configuration, the tabs 525a and 525b can be secured to the inner surfaces of the first sidewall 513b and the second sidewall 513d, respectively, such that the first flap 507a and the second flap 507b define a set of cavities 509 (shown in Fig. 13A). In some embodiments, the tabs 525a and 525b can be glued to the inner surfaces of the first sidewall 513b and the second sidewall 513d, respectively. In other embodiments, the tabs 525a and 525b can be secured to the inner surfaces of the first sidewall 513b and the second sidewall 513d, respectively, via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons. When the carton 502 is assembled, the set of cavities 509 defined by the first flap 507a and the second flap 507b may comprise rectangular air cavities. In some embodiments, the set of cavities 509 may be configured to protect one or more container disposed within the bottom box 503 from top load impact.

[0140] In some embodiments, the bottom box 503 of the carton 502 includes a release tab 562. As shown in Fig. 12A, for example, the first front wall 513c includes a perforated line 560 about a release tab 562 adjacent a bottom edge 564 of the first front wall 513c. The release tab 562 is enclosed by a perforated line 560 and the bottom edge 564. The release tab 562 includes a first kiss cut 566. In some embodiments, an adhesive, such as an adhesive label, may be positioned on at least a portion of the release tab 562. The first kiss cut 566 may improve securement between the release tab 562 and the adhesive. The perforated line 560 allows the release tab 562 to be detached from the first front wall 513c when sufficient force is applied to the release tab 562. As shown in Fig. 12A, the release tab 562 is partially rectangular with a rounded side, however, the release tab 562 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0141] Additionally, or alternatively, as shown in Fig. 12A, the lid 514 of the bottom box 503 may also include a perforated line 580 about a release tab 582 adjacent an edge 584 between the lid 514 and the flap 515 of the lid. The release tab 582 is enclosed by the perforated line 580 and the edge 584. The perforated line 580 allows the release tab 582 to be detached from the lid 514 when sufficient force is applied to the release tab 582. As shown in Fig. 12A, the release tab 582 is partially rectangular with a rounded side, however, the release tab 582 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0142] In some embodiments, when the carton 502 is folded into the assembled configuration and the lid 540 is placed over the bottom box 503, the position of the release tab 582 on the lid 514 may align with the position of the release tab 562 on the first front wall 513c of the bottom box 503 such that the release tabs 582 and 562 are positioned perpendicular to each other. The edge 584 and the edge 564 that partially define the release tabs 582 and 562, respectively, may align with each other and be positioned adjacent to each other. In some embodiments, the release tab 582 and/or the release tab 562 may be a push tab that detaches the release tab from the lid 514 and/or the first front wall 513c of the bottom box 503. In some embodiments, an adhesive, such as an adhesive label, may be positioned on the release tab 582 and/or the release tab 562. Accordingly, the release tab 582 and/or the release tab 562 may include a kiss cut 568, 566 to improve securement between the release tab and the adhesive.

[0143] The release tab 582 and the release tab 562 may be partially circumscribed by perforated lines 580 and 560, respectively. The perforated lines 580 and 560 may each consist of a series of cuts. The kiss cuts 568 and 566 may each be a partial cut through the release tabs 582 and 562, respectively, that improve the bonding between the release tabs 582, 562 and a tamper evident seal by increasing the surface area the tamper evident seal can adhere to. The tamper evident seal can, for example, be an adhesive seal such as an adhesive or closure label to seal the carton 502. For example, an adhesive can be placed over the kiss cut 568 on the lid 514 and the kiss cut 566 on the first front wall 513c of the bottom box 503 to seal the carton 502 in a closed position. The adhesive may act as a tamper evident seal. That is, any attempt to pull the adhesive off the carton 502 will result in a visible damage to the carton 502 and/or the adhesive. For example, when the lid 514 is in the closed position and the carton 502 is sealed, the release tab 582 and the release tab 562 may be secured to the lid 514 and the first front wall 513c, respectively. When a person attempts to pull the adhesive off the carton 502 and the lid 514 is in the open position, one or both of the release tabs 582 and 562 may be separated along the respective perforated line(s) 580, 560 from the lid 514 and/or the first front wall 513c. In some embodiments, when a person attempts to pull the adhesive off the carton 502, one of the release tabs 582 and 562 may be separated along a respective one of the perforated lines 580, 560 from one of the lid 514 and the first front wall 513c and may be secured to the other one of the lid 514 and the first front wall 513c via the adhesive.

[0144] Fig. 12B is a plan view of a die cut of an insert 504 configured to be disposed within the bottom box 503 of the carton 502, in accordance with various embodiments of the present disclosure. The insert 504 may be made from a unitary material. For example, the insert 504 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the insert 504 may be made of a combination of natural and synthetic materials. In other embodiments, the insert 504 can be made from several pieces glued or otherwise secured together. As shown in Fig. 12B, the insert 504 includes a plurality of fold lines 531, dividing the insert 504 into a plurality of walls 510a-g. Fig. 12B illustrates the insert 504 in a flat configuration. Similar to the carton 502, the insert 504 is erectable from a storage configuration where the insert 504 is substantially flat (shown in Fig. 12B) to an assembled configuration (shown in Fig. 13C). For example, when each of the plurality of fold lines 531 is folded, the insert 504 is erectable into the assembled configuration shown in Fig. 13C.

[0145] As shown in Figs. 12B, 13B, and 13C, the insert 504 includes a top wall 510b, a second bottom wall 510d, a second front wall 510c, a second back wall 510a, and a middle wall 510f positioned between the top wall 510b and the second bottom wall 510d. Once each of the walls 510a-g are folded, the wall 510e can be secured to the inner surface of the second back wall 510a, and the wall 510g can be secured to the inner surface of the second front wall 510c to secure the insert 504 in the assembled configuration. In some embodiments, the walls 510e, 510g can be glued to the inner surfaces of the second back wall 510a and the second front wall 510c, respectively. In other embodiments, the walls 510e, 510g can be secured to the inner surfaces of the second back wall 510a and the second front wall 510c, respectively, via interlocking slits, other adhesives, or other known methods of assembling boxes and inserts.

[0146] When the insert 504 is folded from its storage configuration where the insert 504 is substantially flat into its assembled configuration, the insert 504 may be configured to be disposed within the cavity 505 of the bottom box 503 of the carton 502, as shown in Fig. 13B. When the insert 504 is disposed within the cavity 505 of the bottom box 503 of the carton 502, the second bottom wall 510d is configured to abut the first bottom wall 516, the second back wall 510a is configured to abut the first back wall 513a, and the second front wall 510c is configured to abut the first front wall 513c. In some embodiments, the insert 504 may be removably disposed within the cavity 505 of the bottom box 503. In other embodiments, the insert 504 may be secured to the cavity 505 of the bottom box 503 via glue, other adhesives, or other known methods of assembling boxes, cartons, and trays.

[0147] The top wall 510b of the insert 504 may define a cavity 506 dimensioned, sized, and configured to house a container, such as container 508. When the container 508 is disposed within the cavity 506 of the insert 504, the bottom surface 508a of the container 508 may abut the middle wall 510f of the insert 504. Accordingly, the middle wall 510f of the insert 504 may be configured to support the container 508 within the insert 504. In some embodiments, the cavity 506 may be dimensioned, sized, and configured to accommodate a neck of the container 508,

such as a neck of a glass vial. Additionally, or alternatively, as shown in Fig. 13B, the cavity 506 may be dimensioned, sized, and configured to accommodate a body of the container 508, such as a body of a glass vial. In some embodiments, the size of the container 508 may be indicated by ISO 8362-1. For example, the container 508 may include a drug vial, and the drug vial may be one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In some embodiments, the drug vial may be filled or pre-filled with a drug. The drug may comprise, for example, tarlatamab (AMG 757) or another product containing a half-life extended (HLE) anti- delta-like ligand 3 (DLL3) x anti-CD3 bispecific T cell engager construct.

[0148] In some embodiments, when the insert 504 is disposed within the bottom box 503 of the carton 502, one or more leaflets 540 (shown in Figs. 13A and 13B) may be disposed within the cavity 505 of the bottom box 503. One or more leaflets 540 may include, for example, a user manual, an instruction manual, a patient information leaflet, consumer medicine information, or any other document that provides information about a drug or medication contained inside the container 508 or delivery of such drug or medication.

[0149] Fig. 14A is a plan view of a die cut of a carton 602 for another exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure. The carton 602 may be made from a unitary material. For example, the carton 602 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the carton 602 may be made of a combination of natural and synthetic materials. In other embodiments, the carton 602 can be made from several pieces glued or otherwise secured together. The carton 602 includes a plurality of fold lines 630, dividing the carton 602 into a plurality of walls and flaps. Fig. 14A illustrates the carton 602 in a storage configuration where the carton 602 is substantially or completely flat. The carton 602 is erectable or foldable from a storage configuration where the carton 602 is substantially flat (shown in Fig. 14A) to an assembled configuration (shown in Fig. 15A). For example, when each of the plurality of fold lines 630 is folded, the carton 602 is erectable into the assembled configuration so as to form a box-shaped carton, as shown in Fig. 15A.

[0150] Referring to Figs. 14A, 15A, 15B, the carton 602 includes a bottom box 603 (shown in Fig. 15A) having a first bottom wall 616 made from several flaps 616a-d, a first sidewall 613b, a second sidewall 613d, a first back wall 613a, and a first front wall 613c. The flaps 616a-d can be secured to each other via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons to form the first bottom wall 616 when the carton 602 is assembled. The first back wall 613a includes a flap 626 that can be glued, for example, to an inner surface of the second sidewall 613d to form the bottom box 603. In some embodiments, the first back wall 613a can be secured to the second sidewall 613d via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons. As a result, the first sidewall 613b, the second sidewall 613d, the first back wall 613a, the first front wall 613c, and the first bottom wall 616 are all secured together to form the bottom box 603.

[0151] Furthermore, the carton 602 includes a lid 614, hingedly connected or coupled to the first back wall 613a. In some embodiments, the lid 614 is an overlid that is movable between an open position and a closed position and includes a flap 615. When the carton 602 is assembled, the lid 614 can be moved from an open position where the internal cavity of the bottom box 603 is accessible to a closed position where the internal cavity of the bottom box 603 is not accessible. Additionally, the flap 615 of the lid 614 can be folded and tucked behind the first front wall 613c to secure the carton 602 in a closed position and prevent accidental opening of the carton 602.

[0152] Moreover, the carton 602 may include a first flap 607a and a second flap 607b extending from the first sidewall 613b and the second sidewall 613d, respectively, of the bottom box 603. The second sidewall 613d is positioned opposite the first sidewall 613b and faces the first sidewall 613b. In other words, the first sidewall 613b and the second sidewall 613d are opposing walls of the bottom box 603. The first flap 607a may include a tab 625a at an end thereof, and the second flap 607b may also include a tab 625b at an end thereof. When the carton 602 is folded along the plurality of fold lines 630 into the assembled configuration, the tabs 625a and 625b can be secured to the inner surfaces of the first sidewall 613b and the second sidewall 613d, respectively, such that the first flap 607a and the second flap 607b define a set of cavities 609 (shown in Fig. 15A). In some embodiments, the tabs 625a and 625b can be glued to the inner surfaces of the first sidewall 613b and the second sidewall 613d, respectively. In other embodiments, the tabs 625a and 625b can be secured to the inner surfaces of the first sidewall 613b and the second sidewall 613d, respectively, via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons. When the carton 602 is assembled, the set of cavities 609 defined by the first flap 607a and the second flap 607b may comprise rectangular air cavities. In some embodiments, the set of cavities 609 may be configured to protect one or more container disposed within the bottom box 603 from top load impact.

[0153] In some embodiments, the bottom box 603 of the carton 602 includes a release tab 662. As shown in Fig. 14A, for example, the first front wall 613c includes a perforated line 660 about a release tab 662 adjacent a bottom edge 664 of the first front wall 613c. The release tab 662 is enclosed by a perforated line 660 and the bottom edge 664. The release tab 662 includes a first kiss cut 666. In some embodiments, an adhesive, such as an adhesive label, may be positioned on at least a portion of the release tab 662. The first kiss cut 666 may improve securement between the release tab 662 and the adhesive. The perforated line 660 allows the release tab 662 to be detached from the first front wall 613c when sufficient force is applied to the release tab 662. As shown in Fig. 14A, the release tab 662 is partially rectangular with a rounded side, however, the release tab 662 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0154] Additionally, or alternatively, as shown in Fig. 14A, the lid 614 of the bottom box 603 may also include a perforated line 680 about a release tab 682 adjacent an edge 684 between

the lid 614 and the flap 615 of the lid. The release tab 682 is enclosed by the perforated line 680 and the edge 684. The perforated line 680 allows the release tab 682 to be detached from the lid 614 when sufficient force is applied to the release tab 682. As shown in Fig. 14A, the release tab 682 is partially rectangular with a rounded side, however, the release tab 682 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0155] In some embodiments, when the carton 602 is folded into the assembled configuration and the lid 640 is placed over the bottom box 603, the position of the release tab 682 on the lid 614 may align with the position of the release tab 662 on the first front wall 613c of the bottom box 603 such that the release tabs 682 and 662 are positioned perpendicular to each other. The edge 684 and the edge 664 that partially define the release tabs 682 and 662, respectively, may align with each other and be positioned adjacent to each other. In some embodiments, the release tab 682 and/or the release tab 662 may be a push tab that detaches the release tab from the lid 614 and/or the first front wall 613c of the bottom box 603. In some embodiments, an adhesive, such as an adhesive label, may be positioned on the release tab 682 and/or the release tab 662. Accordingly, the release tab 682 and/or the release tab 662 may include a kiss cut 668, 666 to improve securement between the release tab and the adhesive.

[0156] The release tab 682 and the release tab 662 may be partially circumscribed by perforated lines 680 and 660, respectively. The perforated lines 680 and 660 may each consist of a series of cuts. The kiss cuts 668 and 666 may each be a partial cut through the release tabs 682 and 662, respectively, that improve the bonding between the release tabs 682, 662 and a tamper evident seal by increasing the surface area the tamper evident seal can adhere to. The tamper evident seal can, for example, be an adhesive seal such as an adhesive or closure label to seal the carton 602. For example, an adhesive can be placed over the kiss cut 668 on the lid 614 and the kiss cut 666 on the first front wall 613c of the bottom box 603 to seal the carton 602 in a closed position. The adhesive may act as a tamper evident seal. That is, any attempt to pull the adhesive off the carton 602 will result in a visible damage to the carton 602 and/or the adhesive. For example, when the lid 614 is in the closed position and the carton 602 is sealed, the release tab 682 and the release tab 662 may be secured to the lid 614 and the first front wall 613c, respectively. When a person attempts to pull the adhesive off the carton 602 and the lid 614 is in the open position, one or both of the release tab 682 and 662 may be separated along the respective perforated line(s) 680, 660 from the lid 614 and/or the first front wall 613c. In some embodiments, when a person attempts to pull the adhesive off the carton 602, one of the release tabs 682 and 662 may be separated along a respective one of the perforated lines 680, 660 from one of the lid 614 and the first front wall 613c and may be secured to the other one of the lid 614 and the first front wall 613c via the adhesive.

[0157] Fig. 14B is a plan view of a die cut of an insert 604 configured to be disposed within the bottom box 603 of the carton 602, in accordance with various embodiments of the present disclosure. The insert 604 may be made from a unitary material. For example, the insert 604

may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the insert 604 may be made of a combination of natural and synthetic materials. In other embodiments, the insert 604 can be made from several pieces glued or otherwise secured together. As shown in Fig. 14B, the insert 604 includes a plurality of fold lines 631, dividing the insert 604 into a plurality of walls 610a-h. Fig. 14B illustrates the insert 604 in a flat configuration. Similar to the carton 602, the insert 604 is erectable from a storage configuration where the insert 604 is substantially flat (shown in Fig. 14B) to an assembled configuration (shown in Fig. 15B). For example, when each of the plurality of fold lines 631 is folded, the insert 604 is erectable into the assembled configuration shown in Fig. 15B.

[0158] The insert 604 includes a top wall 610b, a second bottom wall 610d, a second front wall 610c, a second back wall 610a, a first middle wall 610f positioned between the top wall 610b and the second bottom wall 610d, and a second middle wall 610h positioned between the top wall 610b and the second bottom wall 610d. The height of the first middle wall 610f and the height of the second middle wall 610h may be offset. For example, when assembled, the first middle wall 610f may be positioned higher than the second middle wall 610h. Once each of the walls 610a-h are folded, the wall 610e can be secured to the inner surface of the second back wall 610a, and the wall 610g can be secured to the inner surface of the second front wall 610c to secure the insert 604 in the assembled configuration. In some embodiments, the walls 610e, 610g can be glued to the inner surfaces of the second back wall 610a and the second front wall 610c, respectively. In other embodiments, the walls 610e, 610g can be secured to the inner surfaces of the second back wall 610a and the second front wall 610c, respectively, via interlocking slits, other adhesives, or other known methods of assembling boxes and inserts.

[0159] When the insert 604 is folded from its storage configuration where the insert 604 is substantially flat into its assembled configuration, the insert 604 may be configured to be disposed within the cavity 605 of the bottom box 603 of the carton 602, as shown in Fig. 15B. When the insert 604 is disposed within the cavity 605 of the bottom box 603 of the carton 602, the second bottom wall 610d is configured to abut the first bottom wall 616, the second back wall 610a is configured to abut the first back wall 613a, and the second front wall 610c is configured to abut the first front wall 613c. In some embodiments, the insert 604 may be removably disposed within the cavity 605 of the bottom box 603. In other embodiments, the insert 604 may be secured to the cavity 605 of the bottom box 603 via glue, other adhesives, or other known methods of assembling boxes, cartons, and trays.

[0160] The top wall 610b of the insert 604 may define a first cavity 606a dimensioned, sized, and configured to house a first container, such as container 608a, and a second cavity 606b dimensioned, sized, and configured to house a second container, such as container 608b. When the first and second containers 608a, 608b are disposed within the first and second cavities 606a, 606b, respectively, the bottom surface of the first container 608a may abut the first middle wall 610f and the bottom surface of the second container 608b may abut the second middle wall

610h. Accordingly, the first and second middle walls 610f, 610h of the insert 604 may be configured to support the first and second containers 608a, 608b, respectively, within the insert 604.

[0161] As shown in Fig. 14B, the diameter of the first cavity 606a may be smaller than the diameter of the second cavity 606b to accommodate containers of different sizes within a single packaging. For example, the diameter of the first container 608a may be smaller than the diameter of the second container 608b. The first container 608a may be one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and the second container 608b may be another one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In one embodiment, for instance, the first container 608a may be an ISO 20R vial, and the second container 608b may be an ISO 50R vial. Because the dimensions (e.g., diameters, heights, etc.) of the first and second containers 608a, 608b may be different, the heights of the first middle wall 610f and the second middle wall 610h may be offset, as discussed above. For instance, the first middle wall 610f may be positioned higher in the insert 604 than the second middle wall 610h. Accordingly, even though the height of the first container 608a may be shorter than the height of the second container 608b, the first and second containers 608a, 608b may still be positioned at the same or similar height within the insert 604 because the first middle wall 610f and the second middle wall 610h supporting the first and second containers 608a, 608b, respectively, are offset.

[0162] In some embodiments, the cavities 606a, 606b may each be dimensioned, sized, and configured to accommodate a neck of the containers 608a, 608b, respectively. Additionally, or alternatively, as shown in Figs. 15A and 15B, the cavities 606a, 606b may each be dimensioned, sized, and configured to accommodate a body of the containers 608a, 608b, respectively. In some embodiments, the first container 608a and the second container 608b may include drug vials that are filled or pre-filled with a drug. The drug may comprise, for example, tarlatamab (AMG 757) or another product containing a half-life extended (HLE) anti- delta-like ligand 3 (DLL3) x anti-CD3 bispecific T cell engager construct. In some embodiments, the first container 608a and the second container 608b may include drug vials that are filled or pre-filled with different drugs.

[0163] In some embodiments, when the insert 604 is disposed within the bottom box 603 of the carton 602, one or more leaflets 640 (shown in Fig. 15A) may be disposed within the cavity 605 (shown in Fig. 15B) of the bottom box 603. One or more leaflets 640 may include, for example, a user manual, an instruction manual, a patient information leaflet, consumer medicine information, or any other document that provides information about drugs or medications contained inside the containers 608a, 608b or delivery of such drugs or medications.

[0164] Fig. 16A is a plan view of a die cut of a carton 702 for another exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure. The carton 702 may be made from a unitary material. For example, the carton 702

may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the carton 702 may be made of a combination of natural and synthetic materials. In other embodiments, the carton 702 can be made from several pieces glued or otherwise secured together. The carton 702 includes a plurality of fold lines 730, dividing the carton 702 into a plurality of walls and flaps. Fig. 16A illustrates the carton 702 in a storage configuration where the carton 702 is substantially or completely flat. The carton 702 is erectable or foldable from a storage configuration where the carton 702 is substantially flat (shown in Fig. 16A) to an assembled configuration (shown in Figs. 17A and 17B). For example, when each of the plurality of fold lines 730 is folded, the carton 702 is erectable into the assembled configuration so as to form a box-shaped carton, as shown in Figs. 17A and 17B.

[0165] Referring to Figs. 16A, 17A, and 17B, the carton 702 includes a bottom box 703 (shown in Figs. 17A and 17B) having a first bottom wall 716 made from several flaps 716a-d, a first sidewall 713b, a second sidewall 713d, a first back wall 713a, and a first front wall 713c. The flaps 716a-d can be secured to each other via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons to form the first bottom wall 716 when the carton 702 is assembled. The first back wall 713a includes a flap 726 that can be glued, for example, to an inner surface of the second sidewall 713d to form the bottom box 703. In some embodiments, the first back wall 713a can be secured to the second sidewall 713d via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons. As a result, the first sidewall 713b, the second sidewall 713d, the first back wall 713a, the first front wall 713c, and the first bottom wall 716 are all secured together to form the bottom box 703.

[0166] Furthermore, the carton 702 includes a lid 714, hingedly connected or coupled to the first back wall 713a. In some embodiments, the lid 714 is an overlid that is movable between an open position and a closed position and includes a flap 715. When the carton 702 is assembled, the lid 714 can be moved from an open position where the internal cavity of the bottom box 703 is accessible to a closed position where the internal cavity of the bottom box 703 is not accessible. Additionally, the flap 715 of the lid 714 can be folded and tucked behind the first front wall 713c to secure the carton 702 in a closed position and prevent accidental opening of the carton 702.

[0167] Moreover, the carton 702 may include a first flap 707a and a second flap 707b extending from the first sidewall 713b and the second sidewall 713d, respectively, of the bottom box 703. The second sidewall 713d is positioned opposite the first sidewall 713b and faces the first sidewall 713b. In other words, the first sidewall 713b and the second sidewall 713d are opposing walls of the bottom box 703.

[0168] In some embodiments, the bottom box 703 of the carton 702 includes a release tab 762. As shown in Fig. 16A, for example, the first front wall 713c includes a perforated line 760 about a release tab 762 adjacent a bottom edge 764 of the first front wall 713c. The release tab 762 is enclosed by a perforated line 760 and the bottom edge 764. The release tab 762 includes

a first kiss cut 766. In some embodiments, an adhesive, such as an adhesive label, may be positioned on at least a portion of the release tab 762. The first kiss cut 766 may improve securement between the release tab 762 and the adhesive. The perforated line 760 allows the release tab 762 to be detached from the first front wall 713c when sufficient force is applied to the release tab 762. As shown in Fig. 16A, the release tab 762 is partially rectangular with a rounded side, however, the release tab 762 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0169] Additionally, or alternatively, as shown in Fig. 16A, the lid 714 of the bottom box 703 may also include a perforated line 780 about a release tab 782 adjacent an edge 784 between the lid 714 and the flap 715 of the lid. The release tab 782 is enclosed by the perforated line 780 and the edge 784. The perforated line 780 allows the release tab 782 to be detached from the lid 714 when sufficient force is applied to the release tab 782. As shown in Fig. 16A, the release tab 782 is partially rectangular with a rounded side, however, the release tab 782 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0170] In some embodiments, when the carton 702 is folded into the assembled configuration and the lid 740 is placed over the bottom box 703, the position of the release tab 782 on the lid 714 may align with the position of the release tab 762 on the first front wall 713c of the bottom box 703 such that the release tabs 782 and 762 are positioned perpendicular to each other. The edge 784 and the edge 764 that partially define the release tabs 782 and 762, respectively, may align with each other and be positioned adjacent to each other. In some embodiments, the release tab 782 and/or the release tab 762 may be a push tab that detaches the release tab from the lid 714 and/or the first front wall 713c of the bottom box 703. In some embodiments, an adhesive, such as an adhesive label, may be positioned on the release tab 782 and/or the release tab 762. Accordingly, the release tab 782 and/or the release tab 762 may include a kiss cut 768, 766 to improve securement between the release tab and the adhesive.

[0171] The release tab 782 and the release tab 762 may be partially circumscribed by perforated lines 780 and 760, respectively. The perforated lines 780 and 760 may each consist of a series of cuts. The kiss cuts 768 and 766 may each be a partial cut through the release tabs 782 and 762, respectively, that improve the bonding between the release tabs 782, 762 and a tamper evident seal by increasing the surface area the tamper evident seal can adhere to. The tamper evident seal can, for example, be an adhesive seal such as an adhesive or closure label to seal the carton 702. For example, an adhesive can be placed over the kiss cut 768 on the lid 714 and the kiss cut 766 on the first front wall 713c of the bottom box 703 to seal the carton 702 in a closed position. The adhesive may act as a tamper evident seal. That is, any attempt to pull the adhesive off the carton 702 will result in a visible damage to the carton 702 and/or the adhesive. For example, when the lid 714 is in the closed position and the carton 602 is sealed, the release tab 782 and the release tab 762 may be secured to the lid 714 and the first front wall 713c, respectively. When a person attempts to pull the adhesive off the carton 702 and the lid

714 is in the open position, one or both of the release tabs 782 and 762 may be separated along the respective perforated line(s) 780, 760 from the lid 714 and/ or the first front wall 713c. In some embodiments, when a person attempts to pull the adhesive off the carton 702, one of the release tabs 782 and 762 may be separated along a respective one of the perforated lines 780, 760 from one of the lid 714 and the first front wall 713c and may be secured to the other one of the lid 714 and the first front wall 713c via the adhesive.

[0172] In some embodiments, the carton 702 may also comprise a tray 791 hingedly coupled to the bottom box 703 and movable between a first position and a second position. As shown in Figs. 16A, 17A, and 17B, the tray 791 may comprise a plurality of sidewalls 791a-d and may be hingedly coupled to the first front wall 713c via sidewall 791c. Fig. 17A illustrates the tray 791 is the first (open) position where a cavity 705 of the bottom box 703 is accessible, and Fig. 17B illustrates the tray 791 is the second (closed) position where the cavity 705 of the bottom box 703 is no longer accessible. When the tray 791 is in the second (closed) position, the plurality of sidewalls 791a-d may be folded up along the plurality of fold lines 730 to define a second bottom box disposed within the bottom box 703. The tray 791 may define a second bottom box configured to house or accommodate one or more objects, such as one or more leaflets. By way of example, the tray 791 may be configured to house or accommodate a user manual, an instruction manual, a patient information leaflet, consumer medicine information, or any other document that provides information about drugs or medications contained inside one or more containers packaged within the carton 702 or delivery of such drugs or medications.

[0173] In some embodiments, the tray 791 may include a perforated line 790 about a release tab 792 adjacent an edge 794 of the tray 791. The release tab 792 is enclosed by a perforated line 790 and the bottom edge 794. The perforated line 790 may consist of a series of cuts. The perforated line 790 allows the release tab 792 to be detached from the tray 791 when sufficient force is applied to the release tab 792. Accordingly, the release tab 792 may be detached from the tray 791 so that the tray 791 can be lifted to access the cavity 705 of the bottom box 703, as shown in Fig. 17A. As shown in Fig. 16A, the release tab 792 is partially rectangular with a rounded side, however, the release tab 792 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0174] Fig. 16B is a plan view of a die cut of an insert 704 configured to be disposed within the cavity 705 of the bottom box 703 of the carton 702, in accordance with various embodiments of the present disclosure. The insert 704 may be made from a unitary material. For example, the insert 704 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the insert 704 may be made of a combination of natural and synthetic materials. In other embodiments, the insert 704 can be made from several pieces glued or otherwise secured together. As shown in Fig. 16B, the insert 704 includes a plurality of fold lines 731, dividing the insert 704 into a plurality of walls 710a-i. Fig. 16B illustrates the insert 704 in a flat configuration. Similar to the carton 702, the insert 704 is erectable from a storage configuration

where the insert 704 is substantially flat (shown in Fig. 16B) to an assembled configuration (shown in Fig. 18A-18D). For example, when each of the plurality of fold lines 731 is folded, the insert 704 is erectable into the assembled configuration shown in Figs. 18A-18D.

[0175] The insert 704 includes a top wall 710b, a second bottom wall 710d, a second front wall 710c, a second back wall 710a, a first middle wall 710f positioned between the top wall 710b and the second bottom wall 710d, and a second middle wall 710h positioned between the first middle wall 710f and the second bottom wall 710d. When assembled, the first middle wall 710f may be positioned higher than the second middle wall 710h, as shown in Fig. 18B. Once each of the walls are folded along the fold lines 731, the wall 710e can be secured to the inner surface of the second back wall 710a, the wall 710g can be secured to the inner surface of the second front wall 710c, and the wall 710i can be secured to the inner surface of the wall 710e to secure the insert 704 in the assembled configuration. In some embodiments, the walls 710e, 710g, and 710i can be glued to the inner surfaces of the second back wall 710a, the second front wall 710c, and the wall 710e, respectively. In other embodiments, the walls 710e, 710g, and 710i can be secured to the inner surfaces of the second back wall 710a, the second front wall 710c, and the wall 710e, respectively, via interlocking slits, other adhesives, or other known methods of assembling boxes and inserts.

[0176] As shown in Fig. 16B, the insert 704 may comprise a first pair of opposing flaps 710n coupled to the second front wall 710c and a second pair of opposing flaps 710m coupled to the second back wall 710a. Moreover, the top wall 710b may comprise a third pair of opposing flaps 710j hingedly coupled to the top wall 710b. The third pair of opposing flaps 710j may be movable between an open position and a closed position. For example, the third pair of opposing flaps 710j can be folded along the fold lines 731 from the open position to the closed position. The third pair of opposing flaps 710j may each include a flap 710k.

[0177] As a part of the assembly process, the first pair of opposing flaps 710n and the second pair of opposing flaps 710m can be folded along the fold lines 731, and the third pair of opposing flaps 710j can be folded along the fold lines 731 to cover the first pair of opposing flaps 710n and the second pair of opposing flaps 710m. In the closed position, the third pair of opposing flaps 710j may define the third and fourth sidewalls of the insert 704. Afterwards, the flaps 710k can be folded and tucked within the second bottom wall 710d (as shown in Fig. 18D) to secure the insert 704 in the closed position, as shown in at least Figs. 18A and 18D.

[0178] When the insert 704 is folded from its storage configuration where the insert 704 is substantially flat into its assembled configuration, the insert 704 may be disposed within the cavity 705 of the bottom box 703 of the carton 702, as shown in Fig. 17A. When the insert 704 is disposed within the cavity 705 of the bottom box 703 of the carton 702, the second bottom wall 710d is configured to abut the first bottom wall 716, the second back wall 710a is configured to abut the first back wall 713a, and the second front wall 710c is configured to abut the first front wall 713c. In some embodiments, the insert 704 may be removably disposed within the cavity

705 of the bottom box 703. In other embodiments, the insert 704 may be secured to the cavity 705 of the bottom box 703 via glue, other adhesives, or other known methods of assembling boxes, cartons, and trays. Once the insert 704 is disposed within the cavity 705, the tray 791 may be moved from the first position to the second position (shown in Fig. 17B) such that the tray 791 sits on top of the insert 704 and covers the insert 704.

[0179] The top wall 710b of the insert 704 may define a plurality of cavities 706a-c, each dimensioned, sized, and configured to house a respective container. In addition, the first middle wall 710f may define a plurality of cavities 706d-e. In some embodiments, the number of cavities defined by the top wall 710b may be different from the number of cavities defined by the first middle wall 710f. For example, as shown in Fig. 16B, the top wall 710b may define three cavities 706a-c, while the first middle wall 710f may define two cavities 706d-e. In other embodiments, the number of cavities defined by the top wall 710b may be equal to the number of cavities defined by the first middle wall 710f. In some embodiments, each of the plurality of cavities 706a-e may have the same dimensions (e.g., diameters) and, thus, may be dimensioned, sized, and configured to house containers with the same dimensions (e.g., diameters, heights, etc.). In other embodiments, at least one of the plurality of cavities 706a-e may have different dimensions, such as a different diameter, than the remainer of the plurality of cavities 706a-e. By way of example, cavities 706a, 706b, 706d, and 706e may have the same diameters and, thus, may each be sized, dimensioned, and configured to house an ISO 2R vial, while the cavity 706c may have a greater diameter than the cavities 706a, 706b, 706d, and 706e and, thus, be sized, dimensioned, and configured to house an ISO 6R vial.

[0180] In some embodiments, the positions of the cavities 706d, 706e in the first middle wall 710f may vertically align with the positions of the cavities 706a, 706b in the top wall 710b, respectively, when the insert 704 is in the assembled configuration. Accordingly, when containers are disposed within the cavities 706a, 706b, each of the containers will fit through the cavities 706a, 706b in the top wall 710b as well as the respective cavities 706d, 706e in the first middle wall 710f. When containers are disposed within the cavities 706a, 706b in the top wall 710b and the respective cavities 706d, 706e in the first middle wall 710f, the bottom surfaces of the containers may abut the second middle wall 710h. When a container is disposed within the cavity 706c in the top wall, the bottom surface of the container may abut the first middle wall 710f. Accordingly, at least one of the first middle wall 710f or the second middle wall 710h may be configured to abut the bottom surfaces of the containers and support the containers when the containers are housed within the insert 704.

[0181] In some embodiments, the insert 704 may further comprise a vertical rib support 721 extending between the second middle wall 710h and the second bottom wall 710d, as shown in Fig. 18C. The vertical rib support 721 may be formed integrally with the insert 704. The vertical rib support 721 may be configured to maintain a predefined distance between the second middle wall 710h and the second bottom wall 710d such that the containers housed within the insert

704 are consistently raised from the second bottom wall 710d of the insert 704 and supported by at least one of the first middle wall 710f or the second middle wall 710h of the insert 704. Accordingly, the vertical rib support 721 may ensure that the containers housed within the insert 704 are protected from bottom load impact. Additionally, the vertical rib support 721 may be configured to help at least the second middle wall 710h in supporting the weight of the containers.

[0182] In some embodiments, the second middle wall 710h may comprise a set of flaps 710p extending from opposite sides of the second middle wall 710h, as shown in Fig. 16B. Once the insert 704 is folded into the assembled configuration, the flaps 710p can be folded up or down (as shown in Figs. 18B and 18C). When folded up or down, the flaps 710p may be configured to provide additional rigidity to the insert 704 such that the insert 704 can maintain its box shape when folded to its assembled configuration.

[0183] As discussed above, the diameters of the cavities 706a-e may be different, in some embodiments, to accommodate containers of different sizes within a single insert and a single packaging. For example, the diameter of the cavities 706a, 706b, 706d, and 706e may be smaller than the diameter of the cavity 706c, and, thus, the diameter of the first set of containers housed within the cavities 706a, 706b, 706d, and 706e may be smaller than the diameter of the second container housed within the cavity 706c. The first set of containers may, for example, be one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and the second container may be another one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In one embodiment, for instance, the first set of containers may be an ISO 2R vial, and the second container may be an ISO 6R vial. Because the dimensions (e.g., diameters, heights, etc.) of the containers may be different, the heights of the first middle wall 710f and the second middle wall 710h may be offset, as discussed above. For instance, the first middle wall 710f may be positioned higher in the insert 704 than the second middle wall 710h. Accordingly, even though the height of the first set of containers housed within the cavities 706a, 706b, 706d, and 706e may be greater than the height of the second container housed within the cavity 706c, all of the containers may still be positioned at the same or similar height within the insert 704 because the first middle wall 710f and the second middle wall 710h supporting the containers are offset.

[0184] In some embodiments, the cavities 706a-e may each be dimensioned, sized, and configured to accommodate a neck of the containers housed within the insert 704. In other embodiments, the cavities 706a-e may each be dimensioned, sized, and configured to accommodate a body of the containers housed within the insert 704. In yet another embodiment, some of the cavities 706a-e may be dimensioned, sized, and configured to accommodate the neck of the containers, while others of the cavities 706a-e may be dimensioned, sized, and configured to accommodate the body of the containers. In some embodiments, the containers housed within the insert 704 may include drug vials that are filled

or pre-filled with a drug. The drug may comprise, for example, tarlatamab (AMG 757) or another product containing a half-life extended (HLE) anti- delta-like ligand 3 (DLL3) x anti-CD3 bispecific T cell engager construct. In some embodiments, at least one of the containers housed within the insert 704 may be a drug vial that is filled or pre-filled with a drug that is different from the drug contained in the remainder of the containers.

[0185] Fig. 19A is a plan view of a die cut of a carton 802 for another exemplary system for packaging a plurality of containers, in accordance with various embodiments of the present disclosure. The carton 802 may be made from a unitary material. For example, the carton 802 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the carton 802 may be made of a combination of natural and synthetic materials. In other embodiments, the carton 802 can be made from several pieces glued or otherwise secured together. The carton 802 includes a plurality of fold lines 830, dividing the carton 802 into a plurality of walls and flaps. Fig. 19A illustrates the carton 802 in a storage configuration where the carton 802 is substantially or completely flat. The carton 802 is erectable or foldable from a storage configuration where the carton 802 is substantially flat (shown in Fig. 19A) to an assembled configuration (shown in Figs. 20A and 20B). For example, when each of the plurality of fold lines 830 is folded, the carton 802 is erectable into the assembled configuration so as to form a box-shaped carton, as shown in Figs. 20A and 20B.

[0186] Referring to Figs. 19A, 20A, and 20B, the carton 802 includes a bottom box 803 (shown in Figs. 20A and 20B) having a first bottom wall 816 made from several flaps 816a-d, a first sidewall 813b, a second sidewall 813d, a first back wall 813a, and a first front wall 813c. The flaps 816a-d can be secured to each other via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons to form the first bottom wall 816 when the carton 802 is assembled. The first back wall 813a includes a flap 826 that can be glued, for example, to an inner surface of the second sidewall 813d to form the bottom box 803. In some embodiments, the first back wall 813a can be secured to the second sidewall 813d via interlocking slits, other adhesives, or other known methods of assembling boxes and cartons. As a result, the first sidewall 813b, the second sidewall 813d, the first back wall 813a, the first front wall 813c, and the first bottom wall 816 are all secured together to form the bottom box 803.

[0187] Furthermore, the carton 802 includes a lid 814, hingedly connected or coupled to the first back wall 813a. In some embodiments, the lid 814 is an overlid that is movable between an open position and a closed position and includes a flap 815. When the carton 802 is assembled, the lid 814 can be moved from an open position where the internal cavity 805 of the bottom box 803 is accessible to a closed position where the internal cavity 805 of the bottom box 803 is not accessible. Additionally, the flap 815 of the lid 814 can be folded and tucked behind the first front wall 813c to secure the carton 802 in a closed position and prevent accidental opening of the carton 802.

[0188] Moreover, the carton 802 may include a first flap 807a and a second flap 807b extending from the first sidewall 813b and the second sidewall 813d, respectively, of the bottom box 803. The second sidewall 813d is positioned opposite the first sidewall 813b and faces the first sidewall 813b. In other words, the first sidewall 813b and the second sidewall 813d are opposing walls of the bottom box 803.

[0189] In some embodiments, the bottom box 803 of the carton 802 includes a release tab 862. As shown in Fig. 19A, for example, the first front wall 813c includes a perforated line 860 about a release tab 862 adjacent a bottom edge 864 of the first front wall 813c. The release tab 862 is enclosed by a perforated line 860 and the bottom edge 864. The release tab 862 includes a first kiss cut 866. In some embodiments, an adhesive, such as an adhesive label, may be positioned on at least a portion of the release tab 862. The first kiss cut 866 may improve securement between the release tab 862 and the adhesive. The perforated line 860 allows the release tab 862 to be detached from the first front wall 813c when sufficient force is applied to the release tab 862. As shown in Fig. 19A, the release tab 862 is partially rectangular with a rounded side, however, the release tab 862 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0190] Additionally, or alternatively, as shown in Fig. 19A, the lid 814 of the bottom box 803 may also include a perforated line 880 about a release tab 882 adjacent an edge 884 between the lid 814 and the flap 815 of the lid. The release tab 882 is enclosed by the perforated line 880 and the edge 884. The perforated line 880 allows the release tab 882 to be detached from the lid 814 when sufficient force is applied to the release tab 882. As shown in Fig. 19A, the release tab 882 is partially rectangular with a rounded side, however, the release tab 882 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0191] In some embodiments, when the carton 802 is folded into the assembled configuration and the lid 840 is placed over the bottom box 803, the position of the release tab 882 on the lid 814 may align with the position of the release tab 862 on the first front wall 813c of the bottom box 803 such that the release tabs 882 and 862 are positioned perpendicular to each other. The edge 884 and the edge 864 that partially define the release tabs 882 and 862, respectively, may align with each other and be positioned adjacent to each other. In some embodiments, the release tab 882 and/or the release tab 862 may be a push tab that detaches the release tab from the lid 814 and/or the first front wall 813c of the bottom box 803. In some embodiments, an adhesive, such as an adhesive label, may be positioned on the release tab 882 and/or the release tab 862. Accordingly, the release tab 882 and/or the release tab 862 may include a kiss cut 868, 866 to improve securement between the release tab and the adhesive.

[0192] The release tab 882 and the release tab 862 may be partially circumscribed by perforated lines 880 and 860, respectively. The perforated lines 880 and 860 may each consist of a series of cuts. The kiss cuts 868 and 866 may each be a partial cut through the release tabs 882 and 862, respectively, that improve the bonding between the release tabs 882, 862 and a

tamper evident seal by increasing the surface area the tamper evident seal can adhere to. The tamper evident seal can, for example, be an adhesive seal such as an adhesive or closure label to seal the carton 802. For example, an adhesive can be placed over the kiss cut 868 on the lid 814 and the kiss cut 866 on the first front wall 813c of the bottom box 803 to seal the carton 802 in a closed position. The adhesive may act as a tamper evident seal. That is, any attempt to pull the adhesive off the carton 802 will result in a visible damage to the carton 802 and/or the adhesive. For example, when the lid 814 is in the closed position and the carton 802 is sealed, the release tab 882 and the release tab 862 may be secured to the lid 814 and the first front wall 813c, respectively. When a person attempts to pull the adhesive off the carton 802 and the lid 814 is in the open position, one or both of the release tabs 882 and 862 may be separated along the respective perforated line(s) 880, 860 from the lid 814 and/ or the first front wall 813c. In some embodiments, when a person attempts to pull the adhesive off the carton 802, one of the release tabs 882 and 862 may be separated along a respective one of the perforated lines 880, 860 from one of the lid 814 and the first front wall 813c and may be secured to the other one of the lid 814 and the first front wall 813c via the adhesive.

[0193] In some embodiments, the carton 802 may also comprise a tray 891 hingedly coupled to the bottom box 803 and movable between a first position and a second position. As shown in Figs. 19A, 20A, and 20B, the tray 891 may comprise a plurality of sidewalls 891a-d and may be hingedly coupled to the first front wall 813c via sidewall 891c. Fig. 20A illustrates the tray 891 is the first (open) position where a cavity 805 of the bottom box 803 is accessible, and Fig. 20B illustrates the tray 891 is the second (closed) position where the cavity 805 of the bottom box 803 is no longer accessible. When the tray 891 is in the second (closed) position, the plurality of sidewalls 891a-d may be folded up along the plurality of fold lines 830 to define a second bottom box disposed within the bottom box 803. The tray 891 may define a second bottom box configured to house or accommodate one or more objects, such as one or more leaflets. By way of example, the tray 891 may be configured to house or accommodate a user manual, an instruction manual, a patient information leaflet, consumer medicine information, or any other document that provides information about drugs or medications contained inside one or more containers packaged within the carton 802 or delivery of such drugs or medications.

[0194] In some embodiments, the tray 891 may include a perforated line 890 about a release tab 892 adjacent an edge 894 of the tray 891. The release tab 892 is enclosed by a perforated line 890 and the bottom edge 894. The perforated line 890 may consist of a series of cuts. The perforated line 890 allows the release tab 892 to be detached from the tray 891 when sufficient force is applied to the release tab 892. Accordingly, the release tab 892 may be detached from the tray 891 so that the tray 891 can be lifted to access the cavity 805 of the bottom box 803, as shown in Fig. 20A. As shown in Fig. 19A, the release tab 892 is partially rectangular with a rounded side, however, the release tab 892 could be any of a variety of shapes including semi-circular, triangular, quadrilateral, pentagonal, etc.

[0195] Fig. 19B is a plan view of a die cut of an insert 804 configured to be disposed within the cavity 805 of the bottom box 803 of the carton 802, in accordance with various embodiments of the present disclosure. The insert 804 may be made from a unitary material. For example, the insert 804 may be made of a paperboard, cardboard, matboard, or similar materials. In some embodiments, the insert 804 may be made of a combination of natural and synthetic materials. In other embodiments, the insert 804 can be made from several pieces glued or otherwise secured together. As shown in Fig. 19B, the insert 804 includes a plurality of fold lines 831, dividing the insert 804 into a plurality of walls 810a-i. Fig. 19B illustrates the insert 804 in a flat configuration. Similar to the carton 802, the insert 804 is erectable from a storage configuration where the insert 804 is substantially flat (shown in Fig. 19B) to an assembled configuration (shown in Fig. 21A-21D). For example, when each of the plurality of fold lines 831 is folded, the insert 804 is erectable into the assembled configuration shown in Figs. 21A-21D.

[0196] The insert 804 includes a top wall 810b, a second bottom wall 810d, a second front wall 810c, a second back wall 810a, a first middle wall 810f positioned between the top wall 810b and the second bottom wall 810d, and a second middle wall 810h positioned between the first middle wall 810f and the second bottom wall 810d. When assembled, the first middle wall 810f may be positioned higher than the second middle wall 810h, as shown in Fig. 21B. Once each of the walls are folded along the fold lines 831, the wall 810e can be secured to the inner surface of the second back wall 810a, the wall 810g can be secured to the inner surface of the second front wall 810c, and the wall 810i can be secured to the inner surface of the wall 810e to secure the insert 804 in the assembled configuration. In some embodiments, the walls 810e, 810g, and 810i can be glued to the inner surfaces of the second back wall 810a, the second front wall 810c, and the wall 810e, respectively. In other embodiments, the walls 810e, 810g, and 810i can be secured to the inner surfaces of the second back wall 810a, the second front wall 810c, and the wall 810e, respectively, via interlocking slits, other adhesives, or other known methods of assembling boxes and inserts.

[0197] As shown in Fig. 19B, the insert 804 may comprise a first pair of opposing flaps 810n coupled to the second front wall 810c and a second pair of opposing flaps 810m coupled to the second back wall 810a. Moreover, the top wall 810b may comprise a third pair of opposing flaps 810j hingedly coupled to the top wall 810b. The third pair of opposing flaps 810j may be movable between an open position and a closed position. For example, the third pair of opposing flaps 810j can be folded along the fold lines 831 from the open position to the closed position. The third pair of opposing flaps 810j may each include a flap 810k.

[0198] As a part of the assembly process, the first pair of opposing flaps 810n and the second pair of opposing flaps 810m can be folded along the fold lines 831, and the third pair of opposing flaps 810j can be folded along the fold lines 831 to cover the first pair of opposing flaps 810n and the second pair of opposing flaps 810m. In the closed position, the third pair of opposing flaps 810j may define the third and fourth sidewalls of the insert 804. Afterwards, the flaps 810k

can be folded and tucked within the second bottom wall 810d (as shown in Fig. 21D) to secure the insert 804 in the closed position, as shown in at least Figs. 21A and 21D.

[0199] When the insert 804 is folded from its storage configuration where the insert 804 is substantially flat into its assembled configuration, the insert 804 may be disposed within the cavity 805 of the bottom box 803 of the carton 802, as shown in Fig. 20A. When the insert 804 is disposed within the cavity 805 of the bottom box 803 of the carton 802, the second bottom wall 810d is configured to abut the first bottom wall 816, the second back wall 810a is configured to abut the first back wall 813a, and the second front wall 810c is configured to abut the first front wall 813c. In some embodiments, the insert 804 may be removably disposed within the cavity 805 of the bottom box 803. In other embodiments, the insert 804 may be secured to the cavity 805 of the bottom box 803 via glue, other adhesives, or other known methods of assembling boxes, cartons, and trays. Once the insert 804 is disposed within the cavity 805, the tray 891 may be moved from the first position to the second position (shown in Fig. 20B) such that the tray 891 sits on top of the insert 804 and covers the insert 804.

[0200] The top wall 810b of the insert 804 may define a plurality of cavities 806a-c, each dimensioned, sized, and configured to house a respective container. In addition, the first middle wall 810f may define a plurality of cavities 806d-f. In some embodiments, the number of cavities defined by the top wall 810b may be different from the number of cavities defined by the first middle wall 810f. In some embodiments, the number of cavities defined by the top wall 810b may be equal to the number of cavities defined by the first middle wall 810f. For example, as shown in Fig. 19B, the top wall 810b may define three cavities 806a-c, and the first middle wall 810f may also define three cavities 806d-f. In some embodiments, each of the plurality of cavities 806a-f may have the same dimensions (e.g., diameters) and, thus, may be dimensioned, sized, and configured to house containers with the same dimensions (e.g., diameters, heights, etc.). In other embodiments, at least one of the plurality of cavities 806a-f may have different dimensions, such as a different diameter, than the remainer of the plurality of cavities 806a-f. As shown in Fig. 19B, for example, the cavities 806a, 806b, 806d, and 806e may be dimensioned, sized, and configured to house containers with the same dimensions, while the cavities 806c and 806f may be dimensioned, sized, and configured to house containers with dimensions that are different than the containers accommodated within the cavities 806a, 806b, 806d, and 806e. By way of example, cavities 806a, 806b, 806d, and 806e may have the same diameters and, thus, may each be sized, dimensioned, and configured to house an ISO 2R vial, while the cavities 806c and 806f may have a greater diameter than the cavities 806a, 806b, 806d, and 806e and, thus, be sized, dimensioned, and configured to house an ISO 6R vial. In some embodiments, some of the cavities may have additional cut-outs to allow the cavities to accommodate containers of various dimensions. For example, as shown in Figs. 19B and 21A, the cavities 806c and 806f may each have additional cut-outs 806c' and 806f', respectively. The cut-outs 806c' and 806f' allows flexibility in the cavities 806c and 806f

such that the cavities 806c and 806f are shaped, sized, dimensioned, and configured to accommodate containers of various dimensions.

[0201] In some embodiments, the positions of the cavities 806d, 806e, 806f in the first middle wall 810f may vertically align with the positions of the cavities 806a, 806b, 806c in the top wall 810b, respectively, when the insert 804 is in the assembled configuration. Accordingly, when containers are disposed within the cavities 806a, 806b, 806c, each of the containers will fit through the cavities 806a, 806b, 806c in the top wall 810b as well as the respective cavities 806d, 806e, 806f in the first middle wall 810f. When containers are disposed within the cavities 806a, 806b, 806c in the top wall 810b and the respective cavities 806d, 806e, 806f in the first middle wall 810f, the bottom surfaces of at least one of the containers may abut the second middle wall 810h. Accordingly, the second middle wall 810h may be configured to abut the bottom surfaces of at least one of the containers and support the container(s) when the container(s) are housed within the insert 804. Although Fig. 19B illustrates the cavities 806a, 806b, 806d, and 806e as circular cavities, the cavities 806a-f could be any of a variety of shapes including semi-circular, rectangular, triangular, quadrilateral, pentagonal, etc. In some embodiments, the cavities 806a-f may all have the same shape. In other embodiments, the cavities 806a-f may have different shapes.

[0202] In some embodiments, the insert 804 may further comprise a vertical rib support 821 extending between the second middle wall 810h and the second bottom wall 810d, as shown in Fig. 21C. The vertical rib support 821 may be formed integrally with the insert 804. The vertical rib support 821 may be configured to maintain a predefined distance between the second middle wall 810h and the second bottom wall 810d such that the containers housed within the insert 804 are consistently raised from the second bottom wall 810d of the insert 804 and supported by at least one of the first middle wall 810f or the second middle wall 810h of the insert 804. Accordingly, the vertical rib support 821 may ensure that the containers housed within the insert 804 are protected from bottom load impact. Additionally, the vertical rib support 821 may be configured to help at least the second middle wall 810h in supporting the weight of the containers.

[0203] In some embodiments, the second middle wall 810h may comprise a set of flaps 810p extending from opposite sides of the second middle wall 810h, as shown in Fig. 19B. Once the insert 804 is folded into the assembled configuration, the flaps 810p can be folded up or down (as shown in Figs. 21B and 21C). When folded up or down, the flaps 810p may be configured to provide additional rigidity to the insert 804 such that the insert 804 can maintain its box shape when folded to its assembled configuration.

[0204] As discussed above, the diameters of the cavities 806a-e may be different, in some embodiments, to accommodate containers of different sizes within a single insert and a single packaging. For example, the diameter of the cavities 806a, 806b, 806d, and 806e may be smaller than the diameter of the cavity 806c, and, thus, the diameter of the first set of containers

housed within the cavities 806a, 806b, 806d, and 806e may be smaller than the diameter of the second container housed within the cavity 806c. The first set of containers may, for example, be one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and the second container may be another one of an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial. In one embodiment, for instance, the first set of containers may be an ISO 2R vial, and the second container may be an ISO 6R vial. Because the dimensions (e.g., diameters, heights, etc.) of the containers may be different, the heights of the first middle wall 810f and the second middle wall 810h may be offset, as discussed above. For instance, the first middle wall 810f may be positioned higher in the insert 804 than the second middle wall 810h. Accordingly, even though the height of the first set of containers housed within the cavities 806a, 806b, 806d, and 806e may be greater than the height of the second container housed within the cavity 806c, all of the containers may still be positioned at the same or similar height within the insert 804 because the first middle wall 810f and the second middle wall 810h supporting the containers are offset.

[0205] In some embodiments, the cavities 806a-e may each be dimensioned, sized, and configured to accommodate a neck of the containers housed within the insert 804. In other embodiments, the cavities 806a-e may each be dimensioned, sized, and configured to accommodate a body of the containers housed within the insert 804. In yet another embodiment, some of the cavities 806a-e may be dimensioned, sized, and configured to accommodate the neck of the containers, while others of the cavities 806a-e may be dimensioned, sized, and configured to accommodate the body of the containers. In some embodiments, the containers housed within the insert 804 may include drug vials that are filled or pre-filled with a drug. The drug may comprise, for example, tarlatamab (AMG 757) or another product containing a half-life extended (HLE) anti- delta-like ligand 3 (DLL3) x anti-CD3 bispecific T cell engager construct. In some embodiments, at least one of the containers housed within the insert 804 may be a drug vial that is filled or pre-filled with a drug that is different from the drug contained in the remainder of the containers.

[0206] The presently disclosed systems for packaging one or more containers are not limited to the specific types or numbers of containers explicitly described herein. For example, the packaging systems according to the present disclosure may be designed and/or manufactured to accommodate any desired number of containers and any desired combination of containers, including standard glass vials specified in ISO 8362-1, non-standard glass vials, and/or non-standard, non-glass containers.

[0207] All features described herein, including in the specification, claims, abstract, and drawings, and all the steps in any method or process described herein, may be combined in any combination, except combinations where one or more of the features and/or steps are mutually exclusive.

[0208] The above description describes various systems for packaging containers for clinical, pharmaceutical, or medical use. The systems described herein can comprise or be used with a drug including but not limited to those drugs identified below as well as their generic and biosimilar counterparts. The term drug, as used herein, can be used interchangeably with other similar terms and can be used to refer to any type of medicament or therapeutic material including traditional and non-traditional pharmaceuticals, nutraceuticals, supplements, biologics, biologically active agents and compositions, large molecules, biosimilars, bioequivalents, therapeutic antibodies, polypeptides, proteins, small molecules and generics. Non-therapeutic injectable materials are also encompassed. The drug may be in liquid form, a lyophilized form, or in a reconstituted from lyophilized form. The following example list of drugs should not be considered as all-inclusive or limiting.

[0209] In some embodiments, the containers may be filled with colony stimulating factors, such as granulocyte colony-stimulating factor (G-CSF). Such G-CSF agents include but are not limited to Neulasta® (pegfilgrastim, pegylated filgastrim, pegylated G-CSF, pegylated hu-Met-G-CSF) and Neupogen® (filgrastim, G-CSF, hu-MetG-CSF), UDENYCA® (pegfilgrastim-cbqv), Ziextenzo® (LA-EP2006; pegfilgrastim-bmez), or FULPHILA (pegfilgrastim-bmez).

[0210] In some embodiments, the containers described herein may contain an erythropoiesis stimulating agent (ESA), which may be in liquid or lyophilized form. An ESA is any molecule that stimulates erythropoiesis. In some embodiments, an ESA is an erythropoiesis stimulating protein. As used herein, "erythropoiesis stimulating protein" means any protein that directly or indirectly causes activation of the erythropoietin receptor, for example, by binding to and causing dimerization of the receptor. Erythropoiesis stimulating proteins include erythropoietin and variants, analogs, or derivatives thereof that bind to and activate erythropoietin receptor; antibodies that bind to erythropoietin receptor and activate the receptor; or peptides that bind to and activate erythropoietin receptor. Erythropoiesis stimulating proteins include, but are not limited to, Epogen® (epoetin alfa), Aranesp® (darbepoetin alfa), Dynepo® (epoetin delta), Mircera® (methyoxy polyethylene glycol-epoetin beta), Hematide®, MRK-2578, INS-22, Retacrit® (epoetin zeta), Neorecormon® (epoetin beta), Silapo® (epoetin zeta), Binocrit® (epoetin alfa), epoetin alfa Hexal, Abseamed® (epoetin alfa), Ratioepo® (epoetin theta), Eporatio® (epoetin theta), Biopoin® (epoetin theta), epoetin alfa, epoetin beta, epoetin iota, epoetin omega, epoetin delta, epoetin zeta, epoetin theta, and epoetin delta, pegylated erythropoietin, carbamylated erythropoietin, as well as the molecules or variants or analogs thereof.

[0211] Among particular illustrative proteins are the specific proteins set forth below, including fusions, fragments, analogs, variants or derivatives thereof: OPGL specific antibodies, peptibodies, related proteins, and the like (also referred to as RANKL specific antibodies, peptibodies and the like), including fully humanized and human OPGL specific antibodies, particularly fully humanized monoclonal antibodies; Myostatin binding proteins, peptibodies,

related proteins, and the like, including myostatin specific peptibodies; IL-4 receptor specific antibodies, peptibodies, related proteins, and the like, particularly those that inhibit activities mediated by binding of IL-4 and/or IL-13 to the receptor; Interleukin 1-receptor 1 ("IL1-R1") specific antibodies, peptibodies, related proteins, and the like; Ang2 specific antibodies, peptibodies, related proteins, and the like; NGF specific antibodies, peptibodies, related proteins, and the like; CD22 specific antibodies, peptibodies, related proteins, and the like, particularly human CD22 specific antibodies, such as but not limited to humanized and fully human antibodies, including but not limited to humanized and fully human monoclonal antibodies, particularly including but not limited to human CD22 specific IgG antibodies, such as, a dimer of a human-mouse monoclonal hLL2 gamma-chain disulfide linked to a human-mouse monoclonal hLL2 kappa-chain, for example, the human CD22 specific fully humanized antibody in Epratuzumab, CAS registry number 501423-23-0; IGF-1 receptor specific antibodies, peptibodies, and related proteins, and the like including but not limited to anti-IGF-1R antibodies; B-7 related protein 1 specific antibodies, peptibodies, related proteins and the like ("B7RP-1" and also referring to B7H2, ICOSL, B7h, and CD275), including but not limited to B7RP-specific fully human monoclonal IgG2 antibodies, including but not limited to fully human IgG2 monoclonal antibody that binds an epitope in the first immunoglobulin-like domain of B7RP-1, including but not limited to those that inhibit the interaction of B7RP-1 with its natural receptor, ICOS, on activated T cells; IL-15 specific antibodies, peptibodies, related proteins, and the like, such as, in particular, humanized monoclonal antibodies, including but not limited to HuMax IL-15 antibodies and related proteins, such as, for instance, 145c7; IFN gamma specific antibodies, peptibodies, related proteins and the like, including but not limited to human IFN gamma specific antibodies, and including but not limited to fully human anti-IFN gamma antibodies; TALL-1 specific antibodies, peptibodies, related proteins, and the like, and other TALL specific binding proteins; Parathyroid hormone ("PTH") specific antibodies, peptibodies, related proteins, and the like; Thrombopoietin receptor ("TPO-R") specific antibodies, peptibodies, related proteins, and the like;Hepatocyte growth factor ("HGF") specific antibodies, peptibodies, related proteins, and the like, including those that target the HGF/SF:cMet axis (HGF/SF:c-Met), such as fully human monoclonal antibodies that neutralize hepatocyte growth factor/scatter (HGF/SF); TRAIL-R2 specific antibodies, peptibodies, related proteins and the like; Activin A specific antibodies, peptibodies, proteins, and the like; TGF-beta specific antibodies, peptibodies, related proteins, and the like; Amyloid-beta protein specific antibodies, peptibodies, related proteins, and the like; c-Kit specific antibodies, peptibodies, related proteins, and the like, including but not limited to proteins that bind c-Kit and/or other stem cell factor receptors; OX40L specific antibodies, peptibodies, related proteins, and the like, including but not limited to proteins that bind OX40L and/or other ligands of the OX40 receptor; Activase® (alteplase, tPA); Aranesp® (darbepoetin alfa) Erythropoietin [30-asparagine, 32-threonine, 87-valine, 88-asparagine, 90-threonine], Darbepoetin alfa, novel erythropoiesis stimulating protein (NESP); Epogen® (epoetin alfa, or

erythropoietin); GLP-1, Avonex® (interferon beta-1a); Bexxar® (tositumomab, anti-CD22 monoclonal antibody); Betaseron® (interferon-beta); Campath® (alemtuzumab, anti-CD52 monoclonal antibody); Dynepo® (epoetin delta); Velcade® (bortezomib); MLN0002 (anti- α4ß7 mAb); MLN1202 (anti-CCR2 chemokine receptor mAb); Enbrel® (etanercept, TNF-receptor /Fc fusion protein, TNF blocker); Eprex® (epoetin alfa); Erbitux® (cetuximab, anti-EGFR / HER1 / c-ErbB-1); Genotropin® (somatropin, Human Growth Hormone); Herceptin® (trastuzumab, anti-HER2/neu (erbB2) receptor mAb); Kanjinti™ (trastuzumab-anns) anti-HER2 monoclonal antibody, biosimilar to Herceptin®, or another product containing trastuzumab for the treatment of breast or gastric cancers; Humatrope® (somatropin, Human Growth Hormone); Humira® (adalimumab); Vectibix® (panitumumab), Xgeva® (denosumab), Prolia® (denosumab), Immunoglobulin G2 Human Monoclonal Antibody to RANK Ligand, Enbrel® (etanercept, TNF-receptor /Fc fusion protein, TNF blocker), Nplate® (romiplostim), rilotumumab, ganitumab, conatumumab, brodalumab, insulin in solution; Infergen® (interferon alfacon-1); Natrecor® (nesiritide; recombinant human B-type natriuretic peptide (hBNP); Kineret® (anakinra); Leukine® (sargamostim, rhuGM-CSF); LymphoCide® (epratuzumab, anti-CD22 mAb); Benlysta™ (lymphostat B, belimumab, anti-BlyS mAb); Metalyse® (tenecteplase, t-PA analog); Mircera® (methoxy polyethylene glycol-epoetin beta); Mylotarg® (gemtuzumab ozogamicin); Raptiva® (efalizumab); Cimzia® (certolizumab pegol, CDP 870); Soliris™ (eculizumab); pexelizumab (anti-C5 complement); Numax® (MEDI-524); Lucentis® (ranibizumab); Panorex® (17-1A, edrecolomab); Trabio® (lerdelimumab); TheraCim hR3 (nimotuzumab); Omnitarg (pertuzumab, 2C4); Osidem® (IDM-1); OvaRex® (B43.13); Nuvion® (visilizumab); cantuzumab mertansine (huC242-DM1); NeoRecormon® (epoetin beta); Neumega® (oprelvekin, human interleukin-11); Orthoclone OKT3® (muromonab-CD3, anti-CD3 monoclonal antibody); Procrit® (epoetin alfa); Remicade® (infliximab, anti-TNFα monoclonal antibody); Reopro® (abciximab, anti-GP IIb/IIIa receptor monoclonal antibody); Actemra® (anti-IL6 Receptor mAb); Avastin® (bevacizumab), HuMax-CD4 (zanolimumab); Mvasi™ (bevacizumab-awwb); Rituxan® (rituximab, anti-CD20 mAb); Tarceva® (erlotinib); Roferon-A®-(interferon alfa-2a); Simulect® (basiliximab); Prexige® (lumiracoxib); Synagis® (palivizumab); 145c7-CHO (anti-IL15 antibody, see U.S. Patent No. 7,153,507); Tysabri® (natalizumab, anti-α4integrin mAb); Valortim® (MDX-1303, anti-B. anthracis protective antigen mAb); ABthrax™; Xolair® (omalizumab); ETI211 (anti-MRSA mAb); IL-1 trap (the Fc portion of human IgG1 and the extracellular domains of both IL-1 receptor components (the Type I receptor and receptor accessory protein)); VEGF trap (Ig domains of VEGFR1 fused to IgG1 Fc); Zenapax® (daclizumab); Zenapax® (daclizumab, anti-IL-2Rα mAb); Zevalin® (ibritumomab tiuxetan); Zetia® (ezetimibe); Orencia® (atacicept, TACI-Ig); anti-CD80 monoclonal antibody (galiximab); anti-CD23 mAb (lumiliximab); BR2-Fc (huBR3 / huFc fusion protein, soluble BAFF antagonist); CNTO 148 (golimumab, anti-TNFα mAb); HGS-ETR1 (mapatumumab; human anti-TRAIL Receptor-1 mAb); HuMax-CD20 (ocrelizumab, anti-CD20 human mAb); HuMax-EGFR (zalutumumab); M200 (volociximab, anti-α5β1 integrin mAb);

MDX-010 (ipilimumab, anti-CTLA-4 mAb and VEGFR-1 (IMC-18F1); anti-BR3 mAb; anti-C. difficile Toxin A and Toxin B C mAbs MDX-066 (CDA-1) and MDX-1388); anti-CD22 dsFv-PE38 conjugates (CAT-3888 and CAT-8015); anti-CD25 mAb (HuMax-TAC); anti-CD3 mAb (NI-0401); adecatumumab; anti-CD30 mAb (MDX-060); MDX-1333 (anti-IFNAR); anti-CD38 mAb (HuMax CD38); anti-CD40L mAb; anti-Cripto mAb; anti-CTGF Idiopathic Pulmonary Fibrosis Phase I Fibrogen (FG-3019); anti-CTLA4 mAb; anti-eotaxin1 mAb (CAT-213); anti-FGF8 mAb; anti-ganglioside GD2 mAb; anti-ganglioside GM2 mAb; anti-GDF-8 human mAb (MYO-029); anti-GM-CSF Receptor mAb (CAM-3001); anti-HepC mAb (HuMax HepC); anti-IFNα mAb (MEDI-545, MDX-198); anti-IGF1R mAb; anti-IGF-1R mAb (HuMax-Inflam); anti-IL12 mAb (ABT-874); anti-IL12/IL23 mAb (CNTO 1275); anti-IL13 mAb (CAT-354); anti-IL2Ra mAb (HuMax-TAC); anti-IL5 Receptor mAb; anti-integrin receptors mAb (MDX-018, CNTO 95); anti-IP10 Ulcerative Colitis mAb (MDX-1100); BMS-66513; anti-Mannose Receptor/hCGβ mAb (MDX-1307); anti-mesothelin dsFv-PE38 conjugate (CAT-5001); anti-PD1mAb (MDX-1106 (ONO-4538)); anti-PDGFRα antibody (IMC-3G3); anti-TGFß mAb (GC-1008); anti-TRAIL Receptor-2 human mAb (HGS-ETR2); anti-TWEAK mAb; anti-VEGFR/Flt-1 mAb; and anti-ZP3 mAb (HuMax-ZP3).

[0212] In some embodiments, the containers described herein may contain a sclerostin antibody, such as but not limited to romosozumab, blosozumab, BPS 804 (Novartis), Evenity™ (romosozumab-aqqg), another product containing romosozumab for treatment of postmenopausal osteoporosis and/or fracture healing and in other embodiments, a monoclonal antibody (IgG) that binds human Proprotein Convertase Subtilisin/Kexin Type 9 (PCSK9). Such PCSK9 specific antibodies include, but are not limited to, Repatha® (evolocumab) and Praluent® (alirocumab). In other embodiments, the containers may contain rilotumumab, bixalomer, trebananib, ganitumab, conatumumab, motesanib diphosphate, brodalumab, vidupiprant or panitumumab. In some embodiments, the containers may be filled with IMLYGIC® (talimogene laherparepvec) or another oncolytic HSV for the treatment of melanoma or other cancers including but are not limited to OncoVEXGALV/CD; OrienX010; G207, 1716; NV1020; NV12023; NV1034; and NV1042. In some embodiments, the containers may contain endogenous tissue inhibitors of metalloproteinases (TIMPs) such as but not limited to TIMP-3. In some embodiments, the containers may contain Aimovig® (erenumab-aooe), anti-human CGRP-R (calcitonin gene-related peptide type 1 receptor) or another product containing erenumab for the treatment of migraine headaches. Antagonistic antibodies for human calcitonin gene-related peptide (CGRP) receptor such as but not limited to erenumab and bispecific antibody molecules that target the CGRP receptor and other headache targets may also be contained in the containers of the present disclosure. Additionally, bispecific T cell engager (BiTE®) molecules such as but not limited to BLINCYTO® (blinatumomab) can be contained in the containers of the present disclosure. In some embodiments, the containers may contain an APJ large molecule agonist such as but not limited to apelin or analogues thereof. In some embodiments, a therapeutically effective amount of an anti-thymic stromal lymphopoietin

(TSLP) or TSLP receptor antibody is used in the containers of the present disclosure. In some embodiments, the containers may contain Avsola™ (infliximab-axxq), anti-TNF α monoclonal antibody, biosimilar to Remicade® (infliximab) (Janssen Biotech, Inc.) or another product containing infliximab for the treatment of autoimmune diseases. In some embodiments, the containers may contain Kyprolis® (carfilzomib), (2S)-N-((S)-1-((S)-4-methyl-1-((R)-2-methyloxiran-2-yl)-1-oxopentan-2-ylcarbamoyl)-2-phenylethyl)-2-((S)-2-(2-morpholinoacetamido)-4-phenylbutanamido)-4-methylpentanamide, or another product containing carfilzomib for the treatment of multiple myeloma. In some embodiments, the containers may contain Otezla® (apremilast), N-[2-[(1S)-1-(3-ethoxy-4-methoxyphenyl)-2-(methylsulfonyl)ethyl]-2,3-dihydro-1,3-dioxo- 1H-isoindol-4-yl]acetamide, or another product containing apremilast for the treatment of various inflammatory diseases. In some embodiments, the containers may contain Parsabiv™ (etelcalcetide HCl, KAI-4169) or another product containing etelcalcetide HCl for the treatment of secondary hyperparathyroidism (sHPT) such as in patients with chronic kidney disease (KD) on hemodialysis. In some embodiments, the containers may contain ABP 798 (rituximab), a biosimilar candidate to Rituxan®/MabThera™, or another product containing an anti-CD20 monoclonal antibody. In some embodiments, the containers may contain a VEGF antagonist such as a non-antibody VEGF antagonist and/or a VEGF-Trap such as aflibercept (Ig domain 2 from VEGFR1 and Ig domain 3 from VEGFR2, fused to Fc domain of IgG1). In some embodiments, the containers may contain ABP 959 (eculizumab), a biosimilar candidate to Soliris®, or another product containing a monoclonal antibody that specifically binds to the complement protein C5. In some embodiments, the containers may contain Rozibafusp alfa (formerly AMG 570) is a novel bispecific antibody-peptide conjugate that simultaneously blocks ICOSL and BAFF activity. In some embodiments, the containers may contain Omecamtiv mecarbil, a small molecule selective cardiac myosin activator, or myotrope, which directly targets the contractile mechanisms of the heart, or another product containing a small molecule selective cardiac myosin activator. In some embodiments, the containers may contain Sotorasib (formerly known as AMG 510), a $KRAS^{G12C}$ small molecule inhibitor, or another product containing a $KRAS^{G12C}$ small molecule inhibitor. In some embodiments, the containers may contain Tezepelumab, a human monoclonal antibody that inhibits the action of thymic stromal lymphopoietin (TSLP), or another product containing a human monoclonal antibody that inhibits the action of TSLP. In some embodiments, the drug delivery device may contain or be used with rocatinlimab (AMG 451), a human anti-OX40 monoclonal antibody that is expressed on activated T cells and blocks OX40 to inhibit and/or reduce the number of OX40 pathogenic T cells that are responsible for driving system and local atopic dermatitis inflammatory responses. In some embodiments, the containers may contain AMG 714, a human monoclonal antibody that binds to Interleukin-15 (IL-15) or another product containing a human monoclonal antibody that binds to Interleukin-15 (IL-15). In some embodiments, the containers may contain AMG 890, a small interfering RNA

(siRNA) that lowers lipoprotein(a), also known as Lp(a), or another product containing a small interfering RNA (siRNA) that lowers lipoprotein(a). In some embodiments, the containers may contain ABP 654 (human IgG1 kappa antibody), a biosimilar candidate to Stelara®, or another product that contains human IgG1 kappa antibody and/or binds to the p40 subunit of human cytokines interleukin (IL)-12 and IL-23. In some embodiments, the containers may contain Amjevita™ or Amgevita™ (formerly ABP 501) (mab anti-TNF human IgG1), a biosimilar candidate to Humira®, or another product that contains human mab anti-TNF human IgG1. In some embodiments, the containers may contain AMG 160, or another product that contains a half-life extended (HLE) anti-prostate-specific membrane antigen (PSMA) x anti-CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain AMG 119, or another product containing a delta-like ligand 3 (DLL3) CAR T (chimeric antigen receptor T cell) cellular therapy. In some embodiments, the containers may contain AMG 119, or another product containing a delta-like ligand 3 (DLL3) CAR T (chimeric antigen receptor T cell) cellular therapy. In some embodiments, the containers may contain AMG 133, or another product containing a gastric inhibitory polypeptide receptor (GIPR) antagonist and GLP-1R agonist. In some embodiments, the containers may contain AMG 171 or another product containing a Growth Differential Factor 15 (GDF15) analog. In some embodiments, the dr containers may contain AMG 176 or another product containing a small molecule inhibitor of myeloid cell leukemia 1 (MCL-1). In some embodiments, the containers may contain AMG 199 or another product containing a half-life extended (HLE) bispecific T cell engager construct (BiTE®). In some embodiments, the containers may contain AMG 256 or another product containing an anti-PD-1 x IL21 mutein and/or an IL-21 receptor agonist designed to selectively turn on the Interleukin 21 (IL-21) pathway in programmed cell death-1 (PD-1) positive cells. In some embodiments, the containers may contain AMG 330 or another product containing an anti-CD33 x anti-CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain AMG 404 or another product containing a human anti-programmed cell death-1(PD-1) monoclonal antibody being investigated as a treatment for patients with solid tumors. In some embodiments, the containers may contain AMG 427 or another product containing a half-life extended (HLE) anti-fms-like tyrosine kinase 3 (FLT3) x anti-CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain AMG 430 or another product containing an anti-Jagged-1 monoclonal antibody. In some embodiments, the containers may contain AMG 506 or another product containing a multi-specific FAP x 4-1BB-targeting DARPin® biologic under investigation as a treatment for solid tumors. In some embodiments, the containers may contain AMG 509 or another product containing a bivalent T-cell engager and is designed using XmAb® 2+1 technology. In some embodiments, the containers may contain AMG 562 or another product containing a half-life extended (HLE) CD19 x CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain Efavaleukin alfa (formerly AMG 592) or another product containing an IL-2 mutein Fc

fusion protein. In some embodiments, the containers may contain AMG 596 or another product containing a CD3 x epidermal growth factor receptor vIII (EGFRvIII) BiTE® (bispecific T cell engager) molecule. In some embodiments, the containers may contain AMG 673 or another product containing a half-life extended (HLE) anti-CD33 x anti-CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain AMG 701 or another product containing a half-life extended (HLE) anti-B-cell maturation antigen (BCMA) x anti-CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain tarlatamab (AMG 757) or another product containing a half-life extended (HLE) anti- delta-like ligand 3 (DLL3) x anti-CD3 BiTE® (bispecific T cell engager) construct. In some embodiments, the containers may contain AMG 910 or another product containing a half-life extended (HLE) epithelial cell tight junction protein claudin 18.2 x CD3 BiTE® (bispecific T cell engager) construct.

[0213] Although the systems for packaging one or more containers, such as glass vials, have been described in terms of exemplary embodiments, they are not limited thereto. The detailed description is to be construed as exemplary only and does not describe every possible embodiment of the present disclosure. Numerous alternative embodiments could be implemented, using either current technology or technology developed after the filing date of this patent that would still fall within the scope of the claims defining the invention(s) disclosed herein.

[0214] Those skilled in the art will recognize that a wide variety of modifications, alterations, and combinations can be made with respect to the above described embodiments without departing from the spirit and scope of the invention(s) disclosed herein, and that such modifications, alterations, and combinations are to be viewed as being within the ambit of the inventive concept(s).

What is claimed is:

1. A system for packaging one or more containers, comprising:

a carton having a storage configuration where the carton is substantially flat, and an assembled configuration, the carton comprising:

a bottom box having a first bottom wall, a first sidewall, a second sidewall, a first back wall, and a first front wall when the carton is in the assembled configuration;

a lid coupled to the bottom box and movable between an open position and a closed position;

a first flap extending from the first sidewall of the bottom box; and

a second flap extending from the second sidewall of the bottom box, the second sidewall being opposite the first sidewall and facing the first sidewall, wherein the first flap and the second flap define a set of cavities; and

an insert configured to be disposed within the bottom box of the carton, the insert having a storage configuration where the insert is substantially flat and an assembled configuration, and where the insert defines at least one cavity dimensioned to house at least one container,

wherein, in the assembled configuration, the insert comprises a top wall defining the at least one cavity, a second bottom wall, a second back wall, a second front wall, and a middle wall positioned between the top wall and the second bottom wall.

2. The system of claim 1, wherein the insert defines a first cavity dimensioned to house a first container and a second cavity dimensioned to house a second container.

3. The system of claim 2, wherein a diameter of the first cavity is smaller than a diameter of the second cavity, and wherein a diameter of the first container is smaller than a diameter of the second container.

4. The system of claim 1, wherein a bottom surface of the at least one container is configured to abut the middle wall of the insert when the at least one container is housed within the at least one cavity.

5. The system of claim 1, wherein the carton further comprises a release tab comprising a portion of at least one of the lid and the bottom box and being defined by a perforated line in at least one of the lid and the bottom box.

6. The system of claim 5, wherein:

when the lid is in the closed position, the release tab is secured to at least one of the lid and the bottom box via the perforation, and

when the lid is in the open position, the release tab is separated along the perforated line from at least one of the lid and the bottom box.

7. The system of claim 5, wherein the release tab is a push tab that detaches the release tab from at least one of the lid and the bottom box.

8. The system of claim 5, further comprising an adhesive positioned on at least a part of the release tab, and wherein the release tab includes a kiss cut to improve securement between the release tab and the adhesive.

9. The system of claim 1, wherein, when the insert is disposed within the bottom box of the carton, the second bottom wall is configured to abut the first bottom wall, the second back wall is configured to abut the first back wall, and the second front wall is configured to abut the first front wall.

10. The system of claim 1, wherein the at least one container includes a drug vial.

11. The system of claim 10, wherein the drug vial is one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.

12. The system of claim 2, wherein:

the first container is one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and

the second container is a different one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.

13. The system of claim 10, wherein the drug vial is filled or pre-filled with a drug, and wherein the drug comprises tarlatamab.

14. The system of claim 1, wherein the carton and the insert are made of paperboard or a combination of synthetic and natural materials.

15. A system for packaging a plurality of containers, comprising:

a carton having a storage configuration where the carton is substantially flat, and an assembled configuration, the carton comprising:

a bottom box having a first bottom wall, a first sidewall, a second sidewall, a first back wall, and a first front wall when the carton is in the assembled configuration;

a lid coupled to the bottom box and movable between an open position and a closed position;

a tray coupled to the bottom box and movable between a first position and a second position;

a first flap extending from the first sidewall of the bottom box; and

a second flap extending from the second sidewall of the bottom box, the second sidewall being opposite the first sidewall and facing the first sidewall; and

an insert configured to be disposed within the bottom box of the carton, the insert having a storage configuration where the insert is substantially flat and an assembled configuration, and where the insert defines a plurality of cavities, each cavity dimensioned to house a respective one of a plurality of containers,

wherein, in the assembled configuration, the insert comprises a top wall, a second bottom wall, a third sidewall, a fourth sidewall, a second back wall, a second front wall, and a first middle wall positioned between the top wall and the second bottom wall, and

wherein the top wall and the first middle wall define the plurality of cavities.

16. The system of claim 15, wherein the tray is configured to define a second bottom box disposed within the bottom box when the tray is in the second position.

17. The system of claim 15, wherein the insert further comprises a first pair of opposing flaps coupled to the second front wall and a second pair of opposing flaps coupled to the second back wall.

18. The system of claim 15, wherein the insert further comprises a third pair of opposing flaps coupled to the top wall, wherein the third pair of opposing flaps are movable between an open position and a closed position.

19. The system of claim 18, wherein, in the closed position, the third pair of opposing flaps define the third sidewall and the fourth sidewall of the insert.

20. The system of claim 15, wherein, when the insert is disposed within the bottom box of the carton, the second bottom wall is configured to abut the first bottom wall, the third sidewall is configured to abut the first sidewall, the fourth sidewall is configured to abut the second sidewall, the second back wall is configured to abut the first back wall, and the second front wall is configured to abut the first front wall.

21. The system of claim 15, wherein the insert further comprises a second middle wall positioned between the first middle wall and the second bottom wall.

22. The system of claim 21, wherein at least one of the first middle wall or the second middle wall is configured to abut bottom surfaces of the plurality of containers when the plurality of containers are housed within the plurality of cavities.

23. The system of claim 15, wherein the insert further comprises a vertical rib support extending between the second middle wall and the second bottom wall, wherein the vertical rib support is configured to maintain a predefined distance between the second middle wall and the second bottom wall.

24. The system of claim 15, wherein a number of cavities defined by the top wall is different from a number of cavities defined by the first middle wall.

25. The system of claim 15, wherein a number of cavities defined by the top wall is equal to a number of cavities defined by the first middle wall.

26. The system of claim 15, wherein each of the plurality of cavities have equal dimensions.

27. The system of claim 15, wherein at least one of the plurality of cavities has different dimensions than a remainder of the plurality of cavities.

28. The system of claim 15, wherein the carton further comprises a release tab comprising a portion of at least one of the lid and the bottom box and being defined by a perforated line in at least one of the lid and the bottom box.

29. The system of claim 28, wherein:

when the lid is in the closed position, the release tab is secured to at least one of the lid and the bottom box via the perforation, and

when the lid is in the open position, the release tab is separated along the perforated line from at least one of the lid and the bottom box.

30. The system of claim 28, wherein the release tab is a push tab that detaches the release tab from at least one of the lid and the bottom box.

31. The system of claim 28, further comprising an adhesive positioned on at least a part of the release tab, and wherein the release tab includes a kiss cut to improve securement between the release tab and the adhesive.

32. The system of claim 15, wherein at least one of the plurality of containers includes a drug vial.

33. The system of claim 32, wherein the drug vial is one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.

34. The system of claim 15, wherein:

the plurality of containers includes at least a first drug vial and a second drug vial,

the first drug vial is one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial, and

the second drug vial is a different one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.

35. The system of claim 32, wherein the drug vial is filled or pre-filled with a drug, and wherein the drug comprises tarlatamab.

36. The system of claim 15, wherein the carton and the insert are made of paperboard or a combination of synthetic and natural materials.

37. A system for packaging one or more containers, comprising:

a carton having a storage configuration where the carton is substantially flat, and an assembled configuration, the carton comprising:

a plurality of sidewalls;

a top wall;

a bottom wall;

a first flap extending from a first sidewall of the plurality of sidewalls; and

a second flap extending from a second sidewall of the plurality of sidewalls, the second sidewall being opposite the first sidewall and facing the first sidewall,

wherein the first flap and the second flap define a first set of cavities; and

an insert configured to be disposed within the carton, the insert having a storage configuration where the insert is substantially flat and an assembled configuration,

wherein, in the assembled configuration, the insert comprises a first layer, a second layer positioned at a first distance below the first layer, and a third layer positioned at a second distance below the second layer,

wherein the first layer comprises at least one hole configured to house a container and a first set of flaps extending from opposite sides of the first layer,

wherein the second layer is configured to support a bottom surface of the container and comprises a second set of flaps extending from opposite sides of the second layer, and

wherein the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down.

38. The system of claim 37, wherein, in the assembled configuration, the carton comprising four sidewalls, the top wall, and the bottom wall, and wherein at least the four sidewalls and the bottom wall define a second cavity inside the carton.

39. The system of claim 38, wherein the second cavity inside the carton is configured to accommodate the insert.

40. The system of claim 39, wherein, in the assembled configuration, the insert comprises two opposite sidewalls connecting the first layer, the second layer, and the third layer.

41. The system of claim 40, wherein, when the insert is in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down to define two additional sidewalls of the insert.

42. The system of claim 41, wherein, when the insert is in the assembled configuration and disposed within the carton:

an inner surface of the first set of flaps of the first layer is configured to abut an outer surface of the second set of flaps of the second layer, and

an outer surface of the first set of flaps of the first layer is configured to abut an inner surface of two sidewalls of the four sidewalls of the carton.

43. The system of claim 37, wherein the first set of cavities comprise substantially rectangular air cavities, and wherein the first set of cavities is configured to provide a distance between the top wall of the carton and a top surface of the container to protect the container from top load.

44. The system of claim 37, wherein, in the assembled configuration, the insert comprises two opposite sidewalls connecting the first layer, the second layer, and the third layer, and wherein, in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down to define two additional sidewalls of the insert.

45. The system of claim 44, wherein the first layer, the second layer, the third layer, the two opposite sidewalls connecting the first layer, the second layer, and the third layer, and the two additional sidewalls of the insert are formed integrally.

46. The system of claim 37, wherein the second layer of the insert is raised the second distance from the third layer of the insert when the insert is disposed within the carton such that the bottom surface of the container is raised the second distance from the bottom wall of the carton.

47. The system of claim 37, wherein the plurality of sidewalls, the top wall, the bottom wall, the first flap, and the second flap of the carton are formed integrally.

48. The system of claim 37, wherein the container is a vial, and wherein the vial is one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.

49. A system for packaging a plurality of containers, comprising:

a carton having a storage configuration where the carton is substantially flat and an assembled configuration, the carton comprising:

a plurality of sidewalls;

a top wall;

a bottom wall;

a first flap extending from a first sidewall of the plurality of sidewalls; and

a second flap extending from a second sidewall of the plurality of sidewalls, the second sidewall being opposite the first sidewall and facing the first sidewall,

wherein the first flap and the second flap define a first set of cavities; and

an insert configured to be disposed within the carton, the insert having a storage configuration where the insert is substantially flat and an assembled configuration,

wherein, in the assembled configuration, the insert comprises a first layer, a second layer positioned at a first distance below the first layer, a third layer positioned at a second distance below the second layer, and a fourth layer positioned at a third distance below the third layer,

wherein the first layer comprises a first set of holes configured to accommodate a plurality of containers, wherein each of the first set of holes is configured to accommodate a first portion of a respective container of the plurality of containers, and wherein the first layer comprises a first set of flaps extending from opposite sides of the first layer,

wherein the second layer comprises a second set of holes configured to accommodate the plurality of containers, wherein each of the second set of holes is configured to accommodate a second portion of the respective container of the plurality of containers, and

wherein the second layer comprises a second set of flaps extending from opposite sides of the second layer,

wherein the third layer is configured to support a bottom surface of the plurality of containers, and

the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down.

50. The system of claim 49, wherein the insert further comprises a vertical rib support extending between the third layer and the fourth layer, wherein the vertical rib support is configured to maintain the third distance between the third layer and the fourth layer.

51. The system of claim 49, wherein the first set of holes in the first layer and the second set of holes in the second layer are vertically aligned.

52. The system of claim 49, wherein, in the assembled configuration, the carton comprises four sidewalls, the top wall, and the bottom wall, and wherein at least the four sidewalls and the bottom wall define a second cavity inside the carton.

53. The system of claim 52, wherein the second cavity inside the carton is configured to accommodate the insert.

54. The system of claim 53, wherein, in the assembled configuration, the insert comprises two opposite sidewalls connecting the first layer, the second layer, the third layer, and the fourth layer.

55. The system of claim 54, wherein, when the insert is in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down to define two additional sidewalls of the insert.

56. The system of claim 55, wherein, when the insert is in the assembled configuration and disposed within the carton:

an inner surface of the first set of flaps of the first layer is configured to abut an outer surface of the second set of flaps of the second layer, and

an outer surface of the first set of flaps of the first layer is configured to abut an inner surface of two sidewalls of the four sidewalls of the carton.

57. The system of claim 49, wherein the first set of cavities comprise substantially rectangular air cavities, and wherein the first set of cavities is configured to provide a distance

between the top wall of the carton and a top surface of the plurality of containers to protect the plurality of containers from top load.

58. The system of claim 49, wherein, in the assembled configuration, the insert comprises two opposite sidewalls connecting the first layer, the second layer, the third layer, and the fourth layer, and wherein, in the assembled configuration, the first set of flaps of the first layer and the second set of flaps of the second layer are configured to fold down to define two additional sidewalls of the insert.

59. The system of claim 58, wherein the first layer, the second layer, third layer, the fourth layer, the two opposite sidewalls connecting the first layer, the second layer, the third layer, and the fourth layer, and the two additional sidewalls of the insert are formed integrally.

60. The system of claim 49, wherein the third layer of the insert is raised the third distance from the fourth layer of the insert when the insert is disposed within the carton such that the bottom surface of the plurality of containers is raised the third distance from the bottom wall of the carton.

61. The system of claim 49, wherein the plurality of sidewalls, the top wall, the bottom wall, the first flap, and the second flap of the carton are formed integrally.

62. The system of claim 49, wherein the plurality of containers are vials, and wherein the vials comprise at least one of: an ISO 2R vial, an ISO 6R vial, an ISO 10R vial, an ISO 20R vial, or an ISO 50R vial.