TOILET BOWL
AEROSOL-SPREAD-LIMITING SYSTEM

Applicant: Kathlene Mullens, Grove City, OH (US)

Inventor: Kathlene Mullens, Grove City, OH (US)

Appl. No.: 15/012,460

Filed: Feb. 1, 2016

Related U.S. Application Data
Continuation of application No. PCT/US14/49373, filed on Aug. 1, 2014.
Provisional application No. 61/861,024, filed on Aug. 1, 2013.

Publication Classification

Int. Cl.
E03D 9/00 (2006.01)
A47K 13/24 (2006.01)

U.S. Cl.
CPC .. E03D 9/00 (2013.01); A47K 13/24 (2013.01)

ABSTRACT
Exemplary embodiments provide methods and devices for suppressing the propagation of aerosols from a toilet bowl during a flush cycle by providing a cover that can be secured across the opening of a toilet bowl. A disposable toilet cover device has adhesive on its bottom surface to allow it to be secured to the top surface of a toilet bowl rim. The device contains an antimicrobial agent, and can be folded and packaged for portable use.
TOILET BOWL AEROSOL-SPREAD-LIMITING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of International Application No. PCT/US2014/049373, filed Aug. 1, 2014, which claims the benefit of priority to U.S. provisional Application No. 61/861,024, filed on Aug. 1, 2013, both of which are hereby incorporated by reference in their entirety.

TECHNICAL FIELD

[0002] Embodiments generally relate to the field of sanitation devices. More particularly, embodiments relate to the technical field of bathroom sanitation.

BACKGROUND OF THE ART

[0003] Presently, most medically-related facilities, such as hospitals, do not have toilet lids due to concerns for users with mobility challenges, as well as cleaning burdens. However, these users are among the most susceptible to infections that can be spread via toilets, especially if they have irritated or abraded skin that comes into contact with contaminated surfaces like a toilet seat or if they are immune compromised. *Clostridium difficile* is perhaps the most common hospital-acquired infection, and these organisms, once spread, can live on surfaces for months if left untreated. Another common organism spread in the same manner and setting is vancomycin-resistant *Enterococci*. There are also many other types of microbes and prion-like organisms that could pose similar threats to patients.

[0004] Uncovered toilets have been found to spread 12 times more germs than covered toilets. The turbulence of the water in a single toilet flush produces aerosolized water, microorganisms, and waste above the toilet for up to three hours, and the droplets can migrate throughout a room, suite, and facility on the hands, shoes, clothes, instruments, etc. of the patient and caregivers as well as through air flow. As aerosolized materials are traveling through the air, they can settle and remain on surfaces, people, equipment, etc. Further, organisms such as *Clostridium difficile* are not eliminated by typical alcohol-based cleaners that are used by many facilities to kill germs, and can potentially live on hard surfaces for months or longer.

[0005] There are approximately 1.7 million hospital-acquired infections in the United States each year that claim an estimated 99,000 lives. Of those, approximately 337,000 infections and 14,000 deaths are due to Clostridium difficile alone. The cost of direct treatment alone for treating hospital-acquired infections per year in the United States is approximately $45,000,000,000—not including other care settings such as nursing homes and assisted living facilities whose residents are especially vulnerable to hospital-acquired infections such as *Clostridium difficile*, nor does this estimate include the additional costs of malpractice suits, facility cleaning, patients’ costs (health care costs, loss of income, etc.). Further, this estimate is strictly based on the United States—these numbers do not consider the worldwide impact of hospital-acquired infections, which presumably is much greater.

[0006] The prior art is replete with attempts to clean the toilet bowl while not disseminating toilet odors. These objectives, both of which are understandable, are not necessarily mutually achievable. And both of them could be inconsistent with the objective of preventing dissemination of body wastes and germs.

[0007] Exemplary of the prior art are U.S. Pat. No. 7,596,818 to Sutton, U.S. Pat. No. 7,976,600 to Safuto and U.S. Pat. No. 8,709,137 to Chan. Of these, Sutton ‘818 attempts to suppress odors by providing a disposable air exhaust system for a toilet. Safuto ‘600 provides vents that selectively close when aerosol particles are detected at the toilet bowl. Chan ‘137 teaches actively drawing in and exhausting air from a toilet.

[0008] It remains an unsolved problem of the prior art to provide a device and method to limit or contain the amount of aerosol generated in toilet flushing. It is also an unsolved problem of the prior art to provide a device and method that is disposable, portable, and can be easily used by various users of different skill levels.

SUMMARY OF THE INVENTION

[0009] The toilet bowl covering system is designed to sit directly on top of the toilet bowl or in some embodiments the toilet seat, thus closing the gap and limiting exposure and spread of the aerosolized spray as well as any chemicals, microorganisms, or prion-type objects that may be part of the spray. This system will be of great value in a variety of environments where toilets can facilitate the spread of disease including hospitals, nursing homes, doctor’s offices, and churches where toilets are shared but also in the homes of users with immune or other special concerns that might make them vulnerable to diseases that can be spread by aerosolized toilet contents. This invention is useful in disposing of both human and animal waste. The system can be used on all shapes, sizes, and iterations of toilets.

[0010] The invention has multiple embodiments of both methods and devices. Embodiments include methods for suppressing propagation of aerosols from a toilet system during a flush cycle of a toilet system that engages a flush mechanism and a toilet bowl with a flat upper surface having a bowl opening surrounded by a circumferential rim and a seat unit, comprising a seat and optionally a lid, where the seat unit is mounted for hinged movement between a raised and a lowered position on the flat upper surface. In this embodiment the method comprises the steps of obstructing air flow at the bowl opening with a cover, flushing the contents of the toilet bowl, with the cover in place, by activating the flush mechanism, and keeping the cover in place for a predetermined amount of time after the flushing step ends (for example, five minutes, a half hour, etc.). The step of obstructing air flow may comprise the step of placing the cover on the flat upper surface, when the cover is sized and adapted to extend across at least the bowl opening and the circumferential rim. The step of placing the cover may comprise the step of securing the cover to the toilet bowl, which may be achieved through the use of a pressure-sensitive adhesive or by an elastic member. The cover may also be secured to the toilet bowl by being interposed between the flat upper surface and the seat unit in the lowered position. The step of obstructing air flow may comprise the step of placing the cover on the seat unit, with the cover sized and adapted to extend below the flat upper surface around the circumferential rim of the toilet bowl.

[0011] Embodiments of devices include a disposable toilet cover for suppressing propagation of aerosols from a toilet bowl during a flush cycle, said cover comprising a flexible sheet having a top surface and a bottom surface, where the
flexible sheet is sized to extend across the opening of a toilet bowl and at least a portion of the circumferential rim of the toilet bowl. The toilet cover may have an adhesive (a film, a coating, a strip, dots, etc.) located on the bottom surface of the sheet, and the adhesive may be located in a zone on the bottom surface that corresponds to the top surface of the circumferential toilet bowl rim. The toilet cover may have a protective overlay which covers and protects the adhesive coating on the flexible sheet from undesired contact prior to use. The protective overlay may be capable of being separated from the adhesive without disrupting the adhesive. The toilet cover may be treated with an antibacterial, antimicrobial, or germicidal agent, or another type of sanitizer or disinfectant. The toilet cover may include one or more test tabs that can be torn off or peeled off in order to sample the aerosols in the toilet bowl or the ambient air. The toilet cover may have one or more handles to make it easier to secure and remove from a toilet. The toilet cover may be disposable, and may be foldable such that it can be portable and/ or otherwise packaged in a wrapper so that a user can carry it on their person or in luggage. The toilet cover may be made from any variety of materials and constructed in various ways in order to be waterproof, water-resistant, disposable, and biodegradable. The toilet cover may be non-rigid and flexible, or it may be rigid. It may use a variety of adhesives, including pressure-sensitive adhesives. The toilet cover may contain numbering, barcodes or other machine-readable forms, instructions for use and disposal, and/or brand marketing messages. Multiple toilet covers may also be provided to the user in a stacked configuration, where a single cover can be peeled off the stack when needed. In other configurations the toilet covers are provided in a sheet roll, where each device can be torn from the roll when needed. The methods and devices

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] A better understanding of the exemplary embodiments will be obtained from a reading of the following detailed description and the accompanying drawings wherein identical reference characters refer to identical parts and in which:

[0013] FIG. 1A shows a side view of a first embodiment of the toilet cover device on a toilet;

[0014] FIGS. 1B, 1C, and 1D show top, bottom and side views of a device of the first embodiment in isolation;

[0015] FIGS. 1E and 1F show top and side views of a device of the first embodiment with an optional door feature;

[0016] FIG. 2 shows a bottom view of a second embodiment of a toilet cover device;

[0017] FIG. 3 shows a side perspective view of a stack of toilet covers of the embodiment of FIG. 2;

[0018] FIG. 4 shows a bottom view of a device of the second embodiment with a peel-off test tab;

[0019] FIG. 5 shows a bottom view of a device of the second embodiment with an ambient test tab;

[0020] FIG. 6 shows a bottom view of a third embodiment of a toilet cover device with handles;

[0021] FIG. 7 shows a side perspective view of a device of the third embodiment on a toilet;

[0022] FIG. 8 shows a fourth embodiment of a toilet cover device with an outer skirt;

[0023] FIG. 9 shows a side perspective view of a device of the fourth embodiment on a toilet;

[0024] FIG. 10 shows a side perspective view of a fifth embodiment of a toilet cover device that may be dispensed from a roller;

[0025] FIG. 11 shows a bottom view of a device of the fifth embodiment;

[0026] FIG. 12 shows a bottom view of a sixth embodiment of a toilet cover device with adhesive strips;

[0027] FIG. 13 shows a bottom view of a device of the sixth embodiment with adhesive dots;

[0028] FIG. 14 shows a side view of a seventh embodiment of the toilet cover device;

[0029] FIG. 15 shows a side perspective view of the seventh embodiment of the toilet cover device on a toilet;

[0030] FIG. 16 shows a side view of an eighth embodiment of the toilet cover device;

[0031] FIG. 17 shows a partial cut-away perspective view of a device of the eighth embodiment with adhesive dots;

[0032] FIG. 18 shows a side view of a device of the eighth embodiment with a reinforced patch;

[0033] FIG. 19 shows a side view of a foldable embodiment of the toilet cover device; and

[0034] FIG. 20 shows a side view of the foldable embodiment of the toilet cover device in a portable wrapper.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0035] Various embodiments of the present invention will now be described in detail with reference to the accompanying drawings. In the following description, specific details such as detailed configuration and components are merely provided to assist the overall understanding of these embodiments of the present invention. Therefore, it should be apparent to those skilled in the art that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the present invention. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

[0036] The essence of the invention may well be found in understanding a difference between the dissemination of odors and the dissemination of germs. Odors are gaseous molecules that escape from the bulk liquid in the toilet bowl. It is known for example, that an immiscible liquid, especially a scented oil, can limit the odors emanating from the toilet bowl, as the molecules of the odor-causing gas need to pass from the aqueous medium into the oily medium and then to escape from the oily medium. Unfortunately, this solution becomes impractical once the toilet is flushed. To achieve an acceptable level of cleaning the toilet bowl, it is advantageous to create a turbulent flow of water during the flushing process. This turbulence increases the energy available to allow the odors to escape.

[0037] The germs that the inventive concept seeks to limit are not gaseous, or, in fact, may not be liquid. They are particles that are suspended in the liquid. They escape from the liquid as an aerosol, not as a gas. An aerosol is a colloidal suspension of liquid particles dispersed in air. Aerosols are formed by the same turbulence that enhances the emission of odors. In general, the effects of the turbulent liquid flow occur in the vicinity directly above the water surface.

[0038] The turbulent liquid flow will inherently cause air flow near the liquid surface. However, and this shows the error of many of the prior art devices, actively moving the air in the toilet bowl above the liquid surface energizes both the odors and the aerosol, where the germs are contained in the par-
articles. In fact, active movement of the aerosol can result in evaporation of the water in the aerosol, leaving the germs as an even smaller aerosol particle. Active air movement can occur by either injecting air into an air space above the liquid or by removing air from that air space.

[0039] As discussed, traditional toilet lids, which are well known in the art, can help alleviate this problem. Traditional toilet lids, however, are not configured to seal to the toilet bowl. Further, they are not configured to require that the top of the toilet bowl be sealed by the lid before the flush mechanism can be actuated. A tight seal of a lid to the toilet bowl during the flush not only reduces the turbulence of the surrounding air, but it also retains any aerosols produced during the flush inside the toilet bowl, enhancing the potential of the aerosol to settle out of the air into the liquid in the bowl rather than being dispersed into the room. Additionally, many hospitals and medical facilities use toilets that do not have built-in lids.

[0040] Therefore, in many cases it is advantageous to utilize a sealing toilet lid to suppress the generation and propagation of aerosols from toilet bowls.

[0041] Embodiments of the invention are described herein with reference to illustrations that are schematic illustrations of idealized embodiments (and intermediate structures) of the invention. As such, variations from the shapes of the illustrations as a result, for example, of manufacturing techniques and/or tolerances, are to be expected. Thus, embodiments of the invention should not be construed as limited to the particular shapes of regions illustrated herein but are to include deviations in shapes that result, for example, from manufacturing.

[0042] Reference will now be made in detail to the exemplary embodiments of the invention, examples of which are illustrated in the accompanying drawings.

[0043] FIGS. 1A, 1B, 1C, and 1D illustrate a first embodiment of a toilet bowl cover device 10 covering the bowl of a toilet 500. The cover device 10, of this embodiment is rigid and rectangular in shape, having a top surface 12, bottom surface 14, and four side surfaces 16. A top handle 18 is attached to the top surface 12 of the device 10, allowing a user to maneuver the device on and off a toilet. The device 10 may also have a front handle 20, located on the front side surface 22. As illustrated in FIGS. 1E and 1F, the device 10 may have a hatch door 24 covering an aperture in the device 10. When the device 10 is in use, the hatch door 24 may provide a user with the ability to access the toilet bowl 520 through the aperture. FIG. 1F illustrates a side view of a device with a hatch door 24 in the open position. A user may open the hatch door 24 in order to take a sample of the aerosol or water in the toilet bowl, or to deposit liquid or material into the toilet bowl 520. The hatch door 24 may be fixedly attached to the device 10 with a hinge 26 or other attachment means. In some embodiments the hatch door 24 may not be fixedly attached to the device and may instead be completely removable.

[0044] The device 10 may be placed directly on the top surface of the toilet bowl rim 530 by a user prior to flushing the toilet 500 to prevent aerosols from escaping the toilet bowl 520 during the flush. It may also be left on the toilet between uses in order to ensure that aerosols do not escape. While FIGS. 1A-1F illustrate a device with a rectangular shape, other embodiments may use different shapes (circular, oval, etc.) that may be desirable, and may depend in part upon the shape of the particular toilet bowl. The device may be flat, lipped, or indented to fit the toilet bowl. The device may be any size that allows it to extend across at least the toilet bowl opening and the circumferential toilet bowl rim. The device may be made from a variety of materials including disposable cardboard and plastics to durable plastics, rubber, glass, fiberglass, composites, or wood. Furthermore, in some embodiments a rigid version of the device 40 may be constructed from materials including, but not limited to, rubber, plastic, and cardboard. The device may be included with a disposable unit to shield and store the unused rigid toilet bowl covers until they are needed on an individual use basis by the end user.

[0045] FIGS. 2, 3, 4, and 5 illustrate a second embodiment of a toilet cover device 40. The device 40 of this embodiment is a non-rigid sheet, with a top surface 42 and bottom surface 44. An adhesive film 46 is located on the bottom surface 44. As shown in FIG. 2, in this embodiment the adhesive film 46 is located in a ring pattern 48 on the bottom surface 44 of the device 40. The shape of the ring pattern 48 corresponds to the upper surface of a toilet bowl rim, and depending on the embodiment this shape may differ in order to properly correspond to the shape of the intended toilet. The adhesive film 46 may be a pressure-sensitive adhesive that allows the device 40 to be adhered to the toilet bowl rim 530 by a user applying pressure, but can be peeled off with little effort by a user at a later time. Using a pressure-sensitive adhesive also allows for the option of stacking multiple devices 40 together. The device 40 may be made from a variety of materials including paper, plastic, or a mix of the two. In some embodiments the device 40 may be a single layer sheet, and in other embodiments the device 40 may be a sheet comprising of multiple layers. The device may be made from biodegradable materials, including materials that give the user the option of flushing the device 40 down the toilet after use. For devices made of paper or other water-sensitive materials, a plastic film or other waterproof and water resistant material may be applied to the bottom surface and/or top surface of the device 40 to resist the impact of water. The device may contain an antibacterial, antimicrobial, germicide, or other disinfectant or sanitizer on its bottom surface and/or its top surface to prevent the spread of germs.

[0046] FIG. 4 shows a stack 50 of devices, each device positioned such that its adhesive film 46 is in contact with the top surface of the device below it (if any). The stack 50 of devices 40 allows a user to peel off the top device 40 in the stack 50 when a device 40 is needed. This configuration may reduce the amount of packaging needed for each individual device 40, thereby presenting an environmentally-friendly option while also saving space. In embodiments where the devices 40 are not stacked, each device may have a removable protective overlay to cover and protect its adhesive film 46 from undesired contact prior to use.

[0047] It may be desirable for a user to test the aerosols within the toilet bowl, or to test the ambient air outside of the toilet bowl, to detect the presence of bacteria or other germs or substances. As shown in FIG. 4, the device 40 may have a bowl test tab 52 located on the bottom surface 44 that can be removed from the device and tested. The test tab 52 shown in FIG. 4 is attached with adhesive and can be peeled off of the bottom surface when needed. As shown in FIG. 5, the device may have an ambient air test tab 54 located on the outer perimeter of the bottom surface 44 that extends from the device 40 and can be torn off of the device 40 when needed. It is appreciated that the test tabs 54, 56, may be located in any position on the device that allows them to test the air inside the toilet bowl or the ambient air (outside the toilet bowl). Some
embodiments of the device 40 may have multiple tabs in different locations. The tabs may be made out of a variety of materials, including the same materials that the device 40 is made from. Also, the tabs may be tear-off tabs, peel-off tabs, or connected to the device 40 in a variety of other ways that allows the user to test the desired environment. The test tabs may also include a growth medium to facilitate the detection of bacteria.

FIGS. 6 and 7 illustrate a device 40 that has handles 56. In this embodiment a handle 56 is located on either side of the device 40. The handles 56 may allow a user to maneuver the device on and off the toilet and dispose of the device without touching the adhesive film 46. For those devices that contain an antibacterial or antimicrobial, germicide, or other disinfectant or sanitizer on the bottom surface 44, the handles 56 may also prevent the user from coming into contact with such substances. The handles 56 as shown in FIGS. 6 and 7 are extensions of the device 40 and therefore made from the same material(s) as the device 40. This allows for the device 40 to be made from a single material, and then coated with the adhesive film 46 and any antibacterials, antimicrobials, germicides or other disinfectants and sanitizers. However, in other embodiments the device may be made from various materials, with the handles 56 being an extension of only a subset of the materials. In other embodiments the handles of the device 40 may be of a different shape, different material(s) than the device, and/or attached in a different manner.

Once the device 40 is put into place on the toilet, as shown in FIG. 7, the handles can be used to remove the device 40. In some embodiments the handles 56 may be comprised of one or more test tabs.

FIGS. 8 and 9 illustrate an embodiment of a device 60 having a width that extends beyond the adhesive ring pattern 48, forming an outer ring 58 that does not contain adhesive. As shown in FIG. 9, when this device 60 is placed on a toilet 500, the outer ring 58 may extend outward from the toilet bowl rim 530 and cover a larger portion of the toilet. This embodiment may be desirable when a user is uncertain of the measurements of the toilet bowl, as it provides a greater room for error in measurement.

It may also be desirable for a user that wishes to use a larger device that can provide a cover for a wider range of toilet sizes. Other embodiments may also allow a user to adhere the device 60 in the down position, as the cover can be sized and adapted to extend below the seat and the upper surface of the rim of the toilet bowl. In some embodiments this may be done by a device that lacks adhesive.

In some embodiments the outer ring 58 may contain some amount of adhesive to promote a tight seal on a toilet bowl rim. In other embodiments there may not be a full outer ring, but there may instead be a portion of the device that does not contain adhesive located around a portion of the adhesive ring pattern 48. Finally, while FIGS. 2 through 8 illustrate devices for oval and/or elongated toilet bowl rims, in other embodiments the devices are of the proper size and dimension to accommodate other shapes of toilet bowl rims, including compact and round toilet bowl rims.

FIG. 10 illustrates a roll 70 of toilet cover devices 72. In this embodiment, each of the devices 72 are comprised of top sheet 74 and a protective overlay 76. The protective overlay 76 keeps the top sheet 74 protected to ensure its efficacy when it is used. When a user desires to use one of the devices 72, they may remove it from the rest of the roll 70 by tearing it off at a perforated seam 78 that separates the device 72 from the next device 72 on the roll. The user then removes the protective overlay 76 from the bottom surface 80 of the top sheet 74 before placing the top sheet 74 on a toilet bowl rim.

The protective overlay 76 may be made of plastic, paper, fabric, or any other material that provides sufficient protection to the top sheet 74. In some embodiments the top sheet may contain one or more antibacterial, antimicrobial, germicide, or other disinfectant or sanitizing agent.

In some embodiments the top sheet 74 may include pressure-sensitive adhesive for attaching the top sheet 74 to a toilet bowl rim, and in such embodiments the adhesive may also be protected by the protective overlay 76 until the time of usage. Depending on the embodiment, the adhesive may be in a ring shape or other shape that corresponds to a toilet bowl ring. In other embodiments the adhesive may be in various other shapes, including adhesive strips and adhesive dots located in various configurations on the underside of the antimicrobial sheet. FIG. 11 illustrates a top sheet 74 (protective overlay removed) with pressure-sensitive adhesive 82 located in a ring pattern 84 on the bottom surface 80 of the top sheet 74. While the devices 72 of FIGS. 11 and 12 are comprised of top sheets 74 and protective overlay 76 with rectangular shapes, in other embodiments the shape of the top sheets and bottom sheets may differ as desired. Furthermore, the location and type of adhesive may differ as well.

FIG. 12 illustrates a toilet cover device 90 that contains pressure-sensitive adhesive strips 92 along the bottom surface 94 of the device 90, allowing the device 90 to be adhered to a toilet. Each adhesive strip 92 may be protected by a separate strip cover 96. One strip cover 96 is removed in the illustration of FIG. 12.

FIG. 13 illustrates a toilet cover device 100 that contains pressure-sensitive adhesive dots 102 located on its bottom surface 104. Each grouping of dots 102 is protected by a separate adhesive cover 106 (one adhesive cover 106 is removed in the illustration of FIG. 13). Different groupings and locations of adhesive dots 102 may be used on the device as desired.

FIGS. 14 and 15 illustrate a toilet cover device 110 comprised of a flexible bouffant cap 112 with an elastic band 114 around the cap opening 116. The device 110 is sized such that when the elastic band 114 is stretched by a user, the cap opening 116 is large enough to allow the device 110 to fit over the rim of a toilet 500, such that the elastic band 114 of the device 110 wraps around the rim or under the rim, and holds the device 110 in place. As with the other devices described herein, this device 110 may be made from many different materials, including cloth, plastic, paper, and disposable versions thereof. The devices 110 may also be treated with an antimicrobial agent or other solution for disinfecting and sanitization purposes. The devices may include test tabs on any portion of the cap 112 or elastic band 114 for testing the aerosols in the toilet bowl 520 or the ambient environment outside of the toilet bowl 520. FIGS. 16 and 17 illustrate an embodiment of the device 120 with a bottom band 122 that covers the elastic band 124. The bottom band 122 may be made from fabric, plastic, or any other material. Adhesive dots 128 are located on the inside surface 126 of the bottom band to increase the ability of the device 120 to remain in position on the toilet as desired by a user. FIG. 18 illustrates the device 120 with a reinforced patch 130 located on the bouffant cap 132. The reinforced patch 130 provides the user
with a location on the device that can be grasped without potentially ripping a hole in the material.

[0058] Various embodiments of the devices discussed herein may be treated with antibacterials, antimicrobials, germicides, disinfectants, or sanitizers, or combinations thereof in order to prevent the spread of illness and disease from toilet aerosols. Different embodiments may also contain marker chemicals for identifying the presence of certain gerns or other undesirable contaminants (for example, by turning a certain color when in the presence of a certain bacteria). Different embodiments may contain markers for identifying environmental factors such as pH. Additionally, embodiments of the above devices may include numbering, barcodes and other machine-readable forms, or other identification to assist with tracking the usage of the device. In some environments, such as a hospital, it may be desirable to keep metrics on the number of devices used, as it may provide feedback on how often the devices are being used (reflecting the efforts of hospital staff), and may also be used to analyze correlations between the usage of the devices and the prevalence of infections and gerns in a facility. By printing identification on individual or groups of devices, knowledge about the frequency of use can more easily be obtained. Furthermore, the devices may contain directions for use and disposal, and may also contain brand marketing messages.

[0059] Different embodiments of the devices may be made from one or more of a multitude of materials. Various materials and manufacturing techniques may be used to create water resistant devices, water proof devices, biodegradable devices, and properties that may be desirable in different environments and settings. Furthermore, different adhesives may be used as desired, and adhesives may be applied to the devices and/or integrated into the devices in a multitude of ways. Different embodiments may contain no adhesives at all.

[0060] It should also be recognized that any of the embodiments herein may be constructed to be non-rigid or rigid, depending on the materials chosen for construction.

[0061] Embodiments of the non-rigid toilet cover devices discussed herein may be provided in compact portable forms to allow users to take them when they travel, and/or carry them with them throughout the day. FIGS. 19 and 20 illustrate an embodiment of a foldable sheet-style toilet cover device 140. The device 140 may be folded along one or more fold lines. In FIG. 17 the fold lines run in the horizontal and vertical direction and are indicated with the reference letters A, B, C, D, and E. The fold lines may be preformed into the material of the device 140 by pressing an indentation or causing a perforation along the fold lines to facilitate folding of the material. Once folded, the device 140 may be placed in a wrapper 144 and sealed shut with a sticker 146. In various embodiments the devices may be folded and/or compacted and packaged in a variety of ways to allow for ease of portability by an end user. The materials used for both the device and any packaging of the device may be made of a variety of materials (cloth, paper, plastic, rubber, cardboard, etc.). The materials may also be biodegradable to allow the device and/or the packaging to be flushed down the toilet after use. In different embodiments the toilet bowl covering devices may be packaged in various types of portable single or multi-packs. The devices may also be distributed in bulk quantities that can be placed in a portable or non-portable dispensing devices.

[0062] While the foregoing written description of the invention enables one of ordinary skill to make and use what is considered presently to be the best mode thereof, those of ordinary skill will understand and appreciate the existence of variations, combinations, and equivalents of the specific embodiment, method, and examples herein. The invention should therefore not be limited by the above described embodiment, method, and examples, but by all embodiments and methods within the scope and spirit of the invention. Those of ordinary skill will understand that variations and combinations of the above embodiments may be made to fulfill the needs of users, the environment in which the device is used, the real or perceived risk profile of the user, and the type(s) of toilets at issue.

What is claimed is:
1. A method for suppressing propagation of aerosols from a toilet system during a flush cycle, the toilet system having a flush mechanism and a toilet bowl with a flat upper surface having a bowl opening surrounded by a circumferential rim and a seat unit, comprising a seat and, optionally, a lid, the seat unit mounted for hinged movement between a raised and a lowered position on the flat upper surface, the method comprising the steps of:
   - obstructing air flow at the bowl opening with a cover;
   - flushing the contents of the toilet bowl, with the cover in place, by activating the flush mechanism; and
   - keeping the cover in place for a predetermined amount of time after the flushing step ends.
2. The method of claim 1, wherein:
   - the step of obstructing air flow comprises the step of placing the cover on the flat upper surface, the cover sized and adapted to extend across at least the bowl opening and the circumferential rim.
3. The method of claim 1, wherein:
   - the step of placing the cover comprises the step of securing the cover to the toilet bowl.
4. The method of claim 3, wherein:
   - the cover is secured to the toilet bowl by a pressure-sensitive adhesive.
5. The method of claim 3, wherein:
   - the cover is secured to the toilet bowl by an elastic member.
6. The method of claim 3, wherein:
   - the cover is secured to the toilet bowl by an elastic member.
7. The method of claim 1, wherein:
   - the step of obstructing air flow comprises the step of placing the cover on the seat unit, the cover sized and adapted to extend below the flat upper surface around the circumferential rim.
8. The method of claim 7, wherein:
   - the step of placing the cover comprises the step of securing the cover to the toilet bowl.
9. The method of claim 8, wherein:
   - the cover is secured to the toilet bowl by a pressure-sensitive adhesive.
10. The method of claim 8, wherein:
    - the cover is secured to the toilet bowl by an elastic member.
11. A disposable toilet cover for suppressing propagation of aerosols from a toilet bowl during a flush cycle, said cover comprising a flexible sheet having a top surface and a bottom surface, said sheet sized to extend across the opening of a toilet bowl and at least a portion of the circumferential rim of the toilet bowl.
12. The disposable toilet cover of claim 11 further comprising:
   an adhesive located on said bottom surface of said sheet.
13. The disposable toilet cover of claim 12, wherein said adhesive is located in a zone on said bottom surface corresponding to the top surface of the circumferential rim.
14. The disposable toilet cover of claim 11 further comprising:
   a protective overlay which covers and protects said adhesive coating on said flexible sheet from undesired contact prior to use; said protective overlay capable of being separated from said adhesive coating without disrupting said adhesive.
15. The disposable toilet cover of claim 11 wherein said cover has been treated with an antimicrobial agent.
16. The disposable toilet cover of claim 11, wherein said cover includes a tear-off test tab.
17. The disposable toilet cover of claim 11, wherein said cover is adapted to be folded upon itself.
18. The disposable toilet cover of claim 11, wherein said cover includes a handle.
19. The disposable toilet cover of claim 11, wherein said cover is comprised of paper and further comprises a layer of plastic film adapted to resist water.
20. The disposable toilet cover of claim 11, wherein said cover is printed with an identity number in a machine-readable form.

* * * * *